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SCIENCE BELOW ROKOSKA HILL

History of the Institute of Rock Structure and Mechanics, v. v. i., and Its Predecessors

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PREFACE

For more than 120 years, a complex of buildings of the former Vydra Consumables Factory has been located in Praha-Libeň, above a bend that made an indelible mark in our country's history in 1942. And it is now 90 years since these premises, after a buy-out by the Union of Mine Owners, were converted into a research institution, later an institute of the Czechoslovak Academy of Sciences and finally into an institute of the Czech Academy of Sciences. This book depicts the history of research conducted in these remarkable premises in 1927–2017, which also to a great extent reflects the history of our republic. History is obviously created by people, and this book is dedicated to those people and their efforts.

From the very beginning and for many decades, the history of research here was closely linked to coal and its mining, treatment and utilisation, including all its benefits as well as drawbacks. After 1989, during the phasing down of coal research and the termination of planned research works while selectively supporting some of them, rapid development could be seen in other new scientific disciplines in research into rocks and the rock environment. Some of the activities in the research and use of carbon as the basic element from which coal is composed have continued, although on a completely different basis and level. Other scientific disciplines, relating to the development of the earth's surface or depths of the earth's crust, are focused, for instance, on research into earthquakes, whether contemporary or prehistoric, or the development of hazardous forms of topographical relief, such as landslides, including those in extreme polar and high mountain areas. Other activities deal with the possibilities of using geothermal energy. From the utility point of view, rocks are raw materials, and their properties, treatment, processing technology and the resulting materials have also been subject to intense research. In addition, environmental technologies are also now included in the wide range of research activities.

The premises under the Rokoska hill in Prague-Libeň have changed over more than a century of the institute's existence, both outside and inside, but the tradition of research has remained. The successor of the rich research history, the Institute of Rock Structure and Mechanics of the Czech Academy of Sciences, is a modern top-level institution which carries out advanced measurements and research activities not only across Europe, but basically anywhere in the world, for instance at Spitzbergen in the Arctic Ocean, in Peru, the Himalayas, in California, Ethiopia, and elsewhere.

The book covers an extensive period of time as regards research efforts and inevitably includes historical events which often had a major influence on it. It was not easy to write. I would like to thank all those who helped in its creation, whether through their recollections or by lending photographs. Appreciation also goes to the editorial team, for making the history of the premises used by the Institute of Rock Structure and Mechanics available to the general public. Last but not least, I would like to thank the three reviewers for their valuable input, namely Kamila Mádrová, Lubomír Němec and Vít Vilímek.

Josef Stemberk

I. INSTITUTE FOR SCIENTIFIC COAL RESEARCH (ÚVVU)[1]

The first efforts to establish a scientific institution to carry out mineral research can be traced back to shortly after the establishment of the independent Czechoslovakia. However, the concept of the future institute then somewhat differed from that of the actual Institute for Scientific Coal Research, which was founded later and focused on applied research.

Before the Institute

After the breakup of the Austro-Hungarian Monarchy, Czechoslovakia inherited the title to more than 80% of its minable deposits of black and brown coal,[2] which increased the importance of the mining enterprises in Czechoslovak industry. However, the war had had such a damaging impact on coal mining and its distribution that the first task for the industry in the months just after the war was to stabilise itself. It was also one of the reasons why, immediately after the establishment of the Republic, the state felt that it must deal with the coal shortage. Along with this, another objective emerged over time, i.e. to cut production and fuel extraction costs. As early as in 1919 representatives of the developing Masaryk Academy of Labour (MAP)[3] suggested that a coal research institute be established in order to examine the country's coal from the viewpoint of mechanics and chemistry, and thus help to boost the country's economy.[4] It took too long to carry out the suggestions, however, and the MAP itself was only in the process of being established. The initiative was eventually undertaken by the Ministry of Public Works[5] which, in the autumn of 1921, began negotiations in order to establish the Institute for the Efficient Use

1 Czech: Ústav pro vědecký výzkum uhlí.

2 JAKUBEC, Ivan, PÁTEK, Jaroslav: Průmysl [Industry]. In KUBŮ, Eduard, PÁTEK, Jaroslav a kol.: *Mýtus a realita hospodářské vyspělosti Československa mezi světovými válkami [Myth and Reality of Czechoslovakia's Economic Advancement between the World Wars]*. Praha: Karolinum, 2000, p. 113.

3 Czech: Masarykova akademie práce; established legally in 1920 as a scientific body organising the scientific technological work in order to efficiently use human and natural resources in the country. It was officially dismissed in 1952 and some of its members became members of the newly established Czechoslovak Academy of Sciences.

4 Joint Czech and Slovak Digital Parliamentary Library, *Národní shromáždění československé 1918–1920* (112. schůze, 29. 1. 1920) *[Czechoslovak National Assembly, 1918–1920* (112th session, 29 January 1920)] [online]. [Accessed on 2 June 2017]. Available on www: <http://www.psp.cz/eknih/1918ns/ps/stenprot/112schuz/s112010.htm>.

5 Czech: Ministerstvo veřejných prací; 1918–1942.

of Fuels as an umbrella institution associating industrial enterprises as well as experts.[6]

The tasks of the future institute were defined quite broadly from the very beginning. The Ministry demanded that the institute be engaged in all fuel-related activities, i.e. not only the extraction and production of fuels, but also their conversion into heat, production of derivatives, etc., while the main requirements included improving Czechoslovakia's economy and making efficient use of energy resources. The institute's activities were expected to result in a future reduction in extraction costs and to save on heat. It was also assumed that the institute would primarily serve the needs of industry, while scientific research would remain with the technical universities. Still, the plan was to set up two departments – one for theoretical tasks and one for practical tasks.[7]

At the same time the Masaryk Academy of Labour ceased its preparations for its own coal institute and began to cooperate in creating an institute under the authority of the Ministry of Public Works. In February and March 1922 major discussions were held concerning the concept of the new scientific institution, attended, besides industry representatives, by Antonín Klír, a professor in hydraulic engineering and the then president of the Masaryk Academy of Labour; Stanislav Špaček, an engineer, promoter of scientific work management principles and an important MAP operative; and František Kovářík, a former Minister of Public Works in the caretaker government and an entrepreneur in industrial machinery.

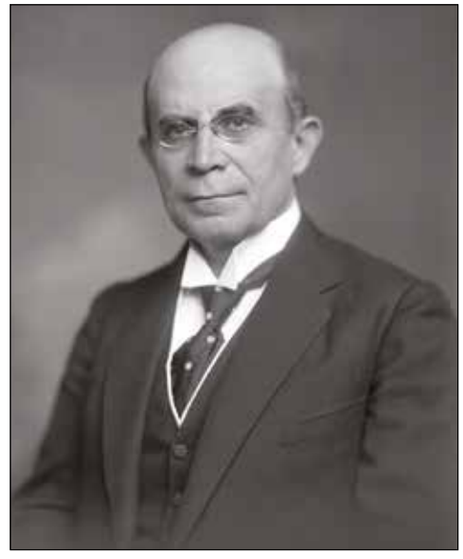
Various topics were discussed during the meetings, including the plan to open a chemical coal research laboratory and the introduction of boiler plant and industrial furnace inspections. Groups were also to be established to study fuels, conduct laboratory research into fuels and the economic use of fuels, and scientific sections were to be created. The funding was expected to come partly from coal fees and, to some extent, also from payments for industrial supervision and economisation. The scientific department was to undertake scientific research into fuels, experiments with heating systems and the reconstruction of furnaces, and research in geology, chemistry and the power industry was also considered. It was primarily the matter of inspections and supervision that became an issue. If this activity had been fully transferred to the institute, the activities of boiler plant associations would have been put at risk[8], and they and the institute therefore agreed to cooperate.[9] The Institute was to have its headquarters in the Holešovice gasworks in Prague and was expected to attract a large number of members from the beginning.

6 NA Archives, Ministry of Public Works collection, box 993, inv. no. 1959, Zápis o poradě konané na ministerstvu veřejných prací [Minutes from a meeting held at the Ministry of Public Works], 17 November 1921.

7 Ibidem.

8 Boiler plant associations which carried out boiler inspections at that time.

9 NA Archives, Ministry of Public Works collection, box 993, inv. no. 1959, Zápis o poradě konané na ministerstvu veřejných prací [Minutes from a meeting held at the Ministry of Public Works], 21 February 1922.



František Kovářík (1865–1942), a technician and entrepreneur who taught at the Czech Technical University in Brno. He and his brother Josef founded an agricultural machinery company and a foundry in Prostějov in 1894. It merged with an important machinery works in Prostějov, owned by F. Wichterle, in 1918 to form a new company called Wichterle and Kovářík. In 1920–1921 he was the Minister for Public Works in the first caretaker government of the PM Jan Černý, and later the deputy chairman of the Central Union of Czechoslovak Industrialists. Photo taken on 10 or 11 October 1920.
Photo courtesy of © LANGHANS PRAHA FOUNDATION Archives, www.langhans.cz.

The Institute for the Efficient Use of Fuels[10] was officially established through a government decree dated 29 September 1922. Eventually representatives of all the Czechoslovak universities became members, along with representatives of the Masaryk Academy of Labour, gasworks, power stations, fuel consumers (including, for instance, the Association of Czechoslovak Towns[11]), Boiler Plant Supervisory Authority[12] and the Coal Board[13], the City of Prague and engineering associations. The members therefore included not only important university pedagogues and scientists, such as the chemists Rudolf Vondráček, Vítězslav Veselý, František Pavlíček and the mining expert and geologist Radim Kettner, but also representatives of key industrial and mining enterprises, such as Vítkovice Coal Mines[14] in Moravská Ostrava, the Emperor Ferdinand Northern Railway[15] in Moravská Ostrava, Vítkovice Ironworks[16]

10 Czech: Ústav pro hospodárné využití paliv.

11 Czech: Svaz československých měst, 1926–1938.

12 Czech: Kotelní dozor. Supervision of steam boilers and gas boilers in Czechoslovakia was carried out by representatives of state authorities together with boiler associations, namely Spolek pro zkoušení a přehlížení parních kotlů v Praze [Association for the Testing and Inspection of Steam Boilers in Prague] and Společnost pro zkoušky a vyšetřování parních kotlů a vzájemné pojištění v Praze [Society for Tests and Inspections of Steam Boilers and Mutual Insurance in Prague].

13 Czech: Uhelná rada. A coal economy advisory and control body at the Ministry for Public Works.

14 Czech: Vítkovické kamenouhelné doly, 1872–1945 (nationalised).

15 Czech: Ferdinandova severní dráha, German: k. k. privilegierte Kaiser Ferdinands-Nordbahn (KFN), 1836–1907 (nationalised).

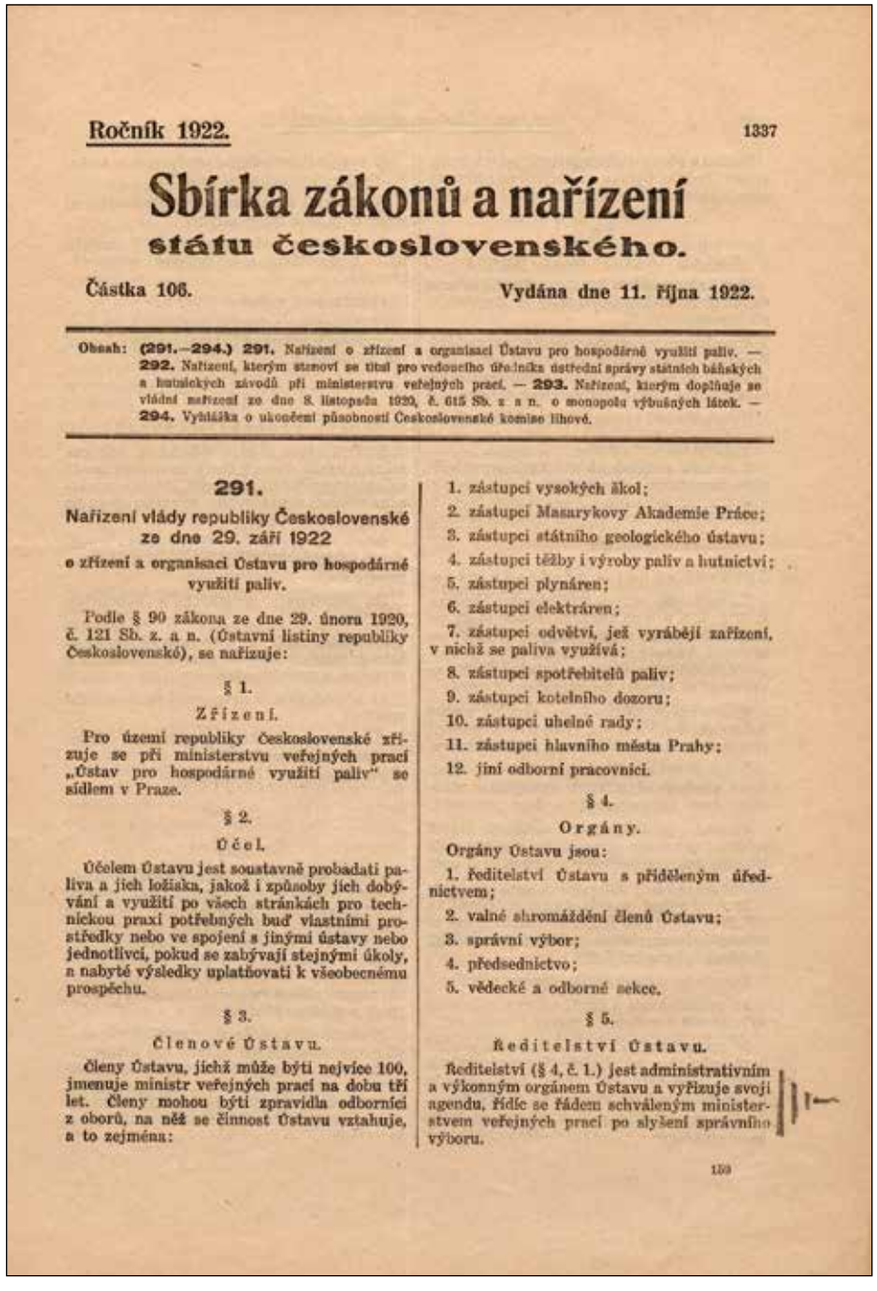
16 Czech: Vítkovické železárny, established 1830.

and other smaller companies, associations, unions and institutions.[17] The numerous membership eventually exceeded 70 (the highest number permitted was 100) and they professed various expectations for the institute's future, prefiguring the issues in the organisation of the institute's actual activities that were to be carried out by a mere 12 employees, including the director, heads of departments and scientific, technical and auxiliary staff. During the first years of its existence, the institute actually had a shortage of staff because of unsatisfactory wages and was therefore unable to launch its activities as much as it had planned.

From the very beginning, the institute's existence was also accompanied by questions over its practical value. At the beginning of 1925, for instance, the daily *Lidové noviny* published a claim that the Institute for the Efficient Use of Fuels had been working for more than a year and had not yet done anything practical in resolving important issues, such as the efficient use of fuels.[18] The Institute responded with a letter to the desk of *Lidové noviny*, describing its work on measuring smoke from Prague's chimneys, but in doing so, it inadvertently proved that it was still not prepared for conceptual scientific work. Smoke in chimneys was allegedly measured by the only employee of the Institute, who had nowhere to do the measurements apart from in his own house. This was one of the reasons why *Lidové noviny* stated that the Institute was not based on practical foundations[19] and was unable to assist the state in making economic savings, which was seen among some circles as the Institute's most important task.

However, opposite trends also began to appear over time. In the mid-1920s the slight slump in sales began to affect the coal industry, partially due to German competition and partially due to savings measures. It was therefore crucial for the Czechoslovak coal industry to find new markets. Some entrepreneurs began to support the idea of establishing a scientific institute which would seek new ways of using coal. At the same time, experiments were carried out in neighbouring Germany to produce petrol from coal, increasing the appeal of the idea of creating an institute with a similar scope of activity in Czechoslovakia, too. The Chemical Department of the Institute for the Efficient Use of Fuels under the Ministry of Public Works seemed ideal for the purpose. The fact that the existing Institute was facing big difficulties also went in favour of the industrial entrepreneurs united in the Union of Mine Owners[20]. In its report from 1927, the Ministry of Public Works mentioned that the Institute had achieved remarkable practical results in the area of smokeless combustion and in gaining fuels from coal, such as through low temperature distillation or liquefaction, but that did not change the fact that the Institute was too expensive for the Ministry. On top of that, the fact that the Institute would have to move from its premises at the

17 NA Archives, Ministry of Public Works collection, box 993, inv. no. 1959.
18 Hospodaření s palivem [Fuel Economy]. *Lidové noviny*, 28 January 1925, Vol. 33, No. 49, p. 9.
19 Hospodaření s palivem [Fuel Economy]. *Lidové noviny*, 13 February 1925, Vol. 33, No. 77, p. 9.
20 Czech: Svaz majitelů dolů, 1919–1940.



Ročník 1922. 1337

Sbírka zákonů a nařízení státu československého.

Částka 106. Vydána dne 11. října 1922.

Obsah: (291.—294.) **291.** Nařízení o zřízení a organisaci Ústavu pro hospodárné využití paliv. — **292.** Nařízení, kterým stanoví se titul pro vedoucího úředníka ústřední správy státních báňských a hutnických závodů při ministerstvu veřejných prací. — **293.** Nařízení, kterým doplňuje se vládní nařízení ze dne 8. listopadu 1920, č. 615 Sb. z. a n. o monopolu výbušných látek. — **294.** Vyhláška o ukončení působnosti Československé komise lihové.

291.

Nařízení vlády republiky Československé ze dne 29. září 1922

o zřízení a organisaci Ústavu pro hospodárné využití paliv.

Podle § 90 zákona ze dne 29. února 1920, č. 121 Sb. z. a n. (Ústavní listiny republiky Československé), se nařizuje:

§ 1.

Zřízení.

Pro území republiky Československé zřizuje se při ministerstvu veřejných prací „Ústav pro hospodárné využití paliv" se sídlem v Praze.

§ 2.

Účel.

Účelem Ústavu jest soustavně probadati paliva a jich ložiska, jakož i způsoby jich dobývání a využití po všech stránkách pro technickou praxi potřebných buď vlastními prostředky nebo ve spojení s jinými ústavy nebo jednotlivci, pokud se zabývají stejnými úkoly, a nabyté výsledky uplatňovati k všeobecnému prospěchu.

§ 3.

Členové Ústavu.

Členy Ústavu, jichž může býti nejvíce 100, jmenuje ministr veřejných prací na dobu tří let. Členy mohou býti zpravidla odborníci z oborů, na něž se činnost Ústavu vztahuje, a to zejména:

1. zástupci vysokých škol;
2. zástupci Masarykovy Akademie Práce;
3. zástupci státního geologického ústavu;
4. zástupci těžby i výroby paliv a hutnictví;
5. zástupci plynáren;
6. zástupci elektráren;
7. zástupci odvětví, jež vyrábějí zařízení, v nichž se paliva využívá;
8. zástupci spotřebitelů paliv;
9. zástupci kotelního dozoru;
10. zástupci uhelné rady;
11. zástupci hlavního města Prahy;
12. jiní odborní pracovníci.

§ 4.

Orgány.

Orgány Ústavu jsou:

1. ředitelství Ústavu s přiděleným úřednictvem;
2. valné shromáždění členů Ústavu;
3. správní výbor;
4. předsednictvo;
5. vědecké a odborné sekce.

§ 5.

Ředitelství Ústavu.

Ředitelství (§ 4, č. 1.) jest administrativním a výkonným orgánem Ústavu a vyřizuje svoji agendu, řídíc se řádem schváleným ministerstvem veřejných prací po slyšení správního výboru.

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Front page of Government Decree 291/1922 Coll. of 29 September 1922 establishing the Institute for the Efficient Use of Fuels and outlining its organisation.
A AV ČR Archives, Masaryk Academy of Labour collection, box 231, inv. no. 700.

Holešovice gasworks was openly discussed as early as in 1926.[21] The Union of Mine Owners, established in 1919 and striving to promote the interests of mining industry and mining entrepreneurs in Czechoslovakia, came to intervene in the matter. Its members demanded that research be focused more on coal and its wide use. In fact it was often mentioned during the first years of the Republic that coal had not yet been sufficiently researched from the viewpoint of chemistry.[22] The Union was a member institution of the Institute for the Efficient Use of Fuels and in 1926–1927 it was gradually taking the initiative in discussions over the Institute's future.

Josef Peters, the director of the Union of Mine Owners and a mining expert, became the key figure as he came up with the idea that the Union would acquire part of the Institute for the Efficient Use of Fuels from the Ministry, namely its Chemical Department which was focused on coal research. At that time, the Union was already thinking of buying the premises of the Vydra Consumables Factory (then at Rokoska 94, later changed to V Holešovičkách 41) and promised that there would also be room for the Heat Technology section, which would remain under the competence of the Ministry.[23] However, the Union demanded that it obtain a state subsidy each year, amounting to over half a million crowns. This turned out to be an interesting offer for the state. Despite the subsidies granted to the new institute, it would save on the running of its expensive section and on top of that it would have a place to relocate its own institute. In 1927 discussions began and were followed by preparations to establish a new institute that would fall within the competence of the Union. In one of the internal explanatory reports, however, the Ministry brought forth the idea that the activities of the new institute would directly contradict the requirements to use coal efficiently because it was naturally in the mine owners' interests to increase mining volumes, but even that did not hinder further negotiations.[24]

The establishment of a new research institute was also supported by the then scientists working in the field of chemistry, Ferdinand Schulz and Rudolf Vondráček, who were primarily concerned with guaranteeing sufficient funding for research. With respect to the unsuitable circumstances for scientific mining research at universities, they were among those who initially promoted the establishment of an institute operating on subsidies from the Ministry of Public Works. In his recollections of Ferdinand Schulz, who habilitated in the discipline of fuels and incandescent materials as early as in 1912, Stanislav Landa mentioned that *"So the Institute for the Efficient Use of Fuels was established, and when* [F. Schulz] *saw that not even this institute fulfilled his expectations, he tried to arrange that the costs of research carried out according to his expectations would be paid through a certain contribution from the extracted coal. And so the Institute for Scientific Coal Research was established, following an agreement with the Union of Mine Owners.*[25]

The creators of the new institute admitted drawing inspiration from neighbouring Germany.[26] All in all, they were not alone. The trend to establish research institutes as part of industrial enterprises slowly became popular in Czechoslovakia. A research laboratory had already existed from the end of the 19th century with the Association for Chemical and Metallurgical Production in Ústí and Labem[27], and in the 1920s this Association followed the German model in launching active cooperation with

21 Joint Czech and Slovak Digital Parliamentary Library, *Poslanecká sněmovna Národního shromáždění republiky Československé* (tisk 1224/27, Vládní návrh. Finanční zákon republiky Československé z 1927, kterým se stanoví státní rozpočet pro rok 1928. Kapitola 14 – Ministerstvo veřejných prací. Báňská administrativa, přičleněné ústavy. Ústav pro hospodárné využití paliv *[Chamber of Deputies of the National Assembly of the Czechoslovak Republic* (Draft 1224/27, Government Draft, The Financial Act of the Czechoslovak Republic from 1927 which determines the state budget for 1928, Chapter 14 – Ministry of Public Works. Mining administration, Associated institutes. Institute for the Efficient Use of Fuels)] [online]. [Accessed on 2 June 2017]. Available on www: <http://www.psp.cz/eknih/1925ns/ps/tisky/t1224_27.htm>.

22 DLOHOŠ, Václav: Uhelný problém po světové válce [The Coal Issue after World War]. *Báňský svět*, 1923, Vol. 2, No. 4, p. 35.

23 NA Archives, Ministry of Public Works collection, box 1007, inv. no. 1998.

24 NA Archives, Ministry of Public Works collection, box 1007, inv. no. 1998, Důvodová zpráva ministerstva veřejných prací [Explanatory memorandum of the Ministry of Public Works].

Josef Peters (1876–1933), mining expert and lawyer, 14 May 1929.
Photo courtesy of © LANGHANS PRAHA FOUNDATION Archives, www.langhans.cz.

25 A AV ČR Archives, Stanislav Landa collection, box 4, inv. no. 112, Stanislav Landa: Dějiny vědního oboru chemie paliv od r. 1921 do r. 1952 [History of the Chemistry of Fuels as a Scientific Discipline from 1921 to 1952], pp. 2–3.

26 Ústav pro vědecký výzkum uhlí v Praze [*Institute for Scientific Coal Research in Prague]*. Praha: Ústav pro vědecký výzkum uhlí v Praze, 1930, p. 3.

27 Czech: Spolek pro chemickou a hutní výrobu; an enterprise, established 1856, still in operation.

universities and in focusing on company research in addition to its production activities.[28] Also, the Škoda factory in Plzeň and ČKD had their own research institute, and in the 1930s, for instance, the Research Institute for Rubber Manufacturing Technology[29] was established at the Baťa company in Zlín.

Coal research institutes, however, had a far lesser tradition and only began to develop to a greater extent in the 20th century as they came up with the slogan that *"the finding that has begun to win over is that the efficient use of coal as a chemical raw material is only possible with the support of intense and systematic chemical research"*.[30] Before World War One, a network of coal institutes was established in the United States of America and in Germany. In Great Britain, the Fuel Research Board was only established in 1917, and its French equivalent, Office National des Combustibles Liquides, as late as in 1925. In the Czech environment, mining companies established experimental stations, but they were still a long way from working on a scientific basis.[31] The Czechoslovak institute drew most inspiration from the coal research institute in Mülheim, Germany established by the scientific society Kaiser-Wilhelm-Gesellschaft zur Förderung der Wissenschaften[32], the establishment of which was also financially supported by the coal industry.[33] It was expected that mining enterprises would finance a research institute that would deal with the topics they preferred.

Eventually a decision was taken to establish a non-political association that would acquire the scientific institution and handle its practical aspects. A question was raised in connection with the process of acquiring the existing sections as to whether this was a true establishment of a new employer or not. At a meeting in September, the Ministerial Advisor Karel Kurz stated that *"the point now is not to establish a new coal institute, but to make the existing institute independent of the state and then to locate it more efficiently and provide it with staff"*.[34] There was no doubt that the Institute was close to fading under the Ministry and carried out substantially fewer activities than had been expected a few years previously. On the other hand, in 1926 the Institute's employees, the Head of the Chemical Section Hugo Novák and Jaroslav Tichý, published several studies on liquefaction and low-temperature distillation

28 LORENCOVÁ, Ivana: Chemický výzkum ve Spolku pro chemickou a hutní výrobu v 1. polovině 20. století [Chemical Research in the Association for Chemical and Metallurgical Production in the 1st Half of the 20th Century]. *Dějiny věd a techniky*, 2007, pp. 7–20.

29 Czech: Výzkumný ústav gumárenské technologie, 1935–1996.

30 TROPSCH, Hans: Ústav pro vědecký výzkum uhlí [Institute for Scientific Coal Research]. *Zvláštní otisk z Báňského světa*, 1930, Vol. 9, Nos. 10 and 11.

31 ŠIMEK, Břetislav G.: Výzkum uhlí v Československu [Coal Research in Czechoslovakia]. *Zvláštní otisk z Průvodce světem techniky*, 1938, Vol. 1, No. 4.

32 Emperor William's Society for the Support of Sciences.

33 TROPSCH, Hans: Ústav pro vědecký výzkum uhlí [Institute for Scientific Coal Research]. *Zvláštní otisk z Báňského světa*, 1930, Vol. 9, Nos. 10 and 11.

34 NA Archives, Ministry of Public Works collection, box 1007, inv. no. 1998, Zápis o schůzi týkající se reorganizace Ústavu pro hospodárné využití paliv [Minutes from the meeting on reorganising the Institute for the Efficient Use of Fuels], 9 September 1927.

(*Hydrogenisace hnědého uhlí pod tlakem* and *Nízkotepelná destilace v laboratoři a její význam pro výzkum uhlí*[35]). These short publications indicated the beginning of scientific work in the section, although they were probably mostly a summary of findings made during a study trip taken by Jaroslav Tichý to Germany, England and France. Many of these findings, however, were undoubtedly attractive for entrepreneurs, who were willing to provide the funding to build an institute that would develop research in their interests. Considerations of continuity with the ministerial institute, however, were soon abandoned as the Association was established and a brand-new institute was built up, and all the period journals and lexicons give the year 1927 as the year of the Institute's establishment.

Establishment and First Years of the Institute for Scientific Coal Research

The establishing general meeting of the 'Institute for Scientific Coal Research' Association was held on 22 September 1927. Any individual or organisation that was active in coal extraction in Czechoslovakia could become a member. An individual or organisation that traded in coal could become a contributing member.[36] The members were entitled to have their coal enterprise products scientifically analysed by the Institute. The Association had its leadership consisting of the chairman, two or three deputy chairmen and the statutory representative. The board of trustees had 12 to 18 members (if state subsidies continued, the Ministry for Public Works could appoint two members) and was elected by the general meeting for a period of three years.[37] Voting at the general meeting followed a simple formula. Each organisation had a number of votes proportionate to their contribution to the joint fund for the Institute's operation, where one vote was allocated per each 10 000 CZK of the founding contribution. The most influential organisation was undoubtedly the Mining and Metallurgical Company[38] with 58 votes, as it contributed more than half a million crowns to the establishment of the Institute. The second most powerful stakeholder was the Vítkovice Coal Mines company from Moravská Ostrava with 36 votes, and the third was the Most Coal Company[39] with 25 votes. Another six companies had 20–24 votes, and the Prague Ironworks Company[40], whose managing

35 NOVÁK, Hugo, TICHÝ, Jaroslav: *Nízkotepelná destilace v laboratoři a její význam pro výzkum uhlí [Low Temperature Distillation in a Laboratory and Its Importance for Coal Research]*. Praha: Prometheus 1926; NOVÁK, Hugo, TICHÝ, Jaroslav: *Hydrogenisace hnědého uhlí pod tlakem [Coal Liquefaction under Pressure]*. Praha: Prometheus 1926.

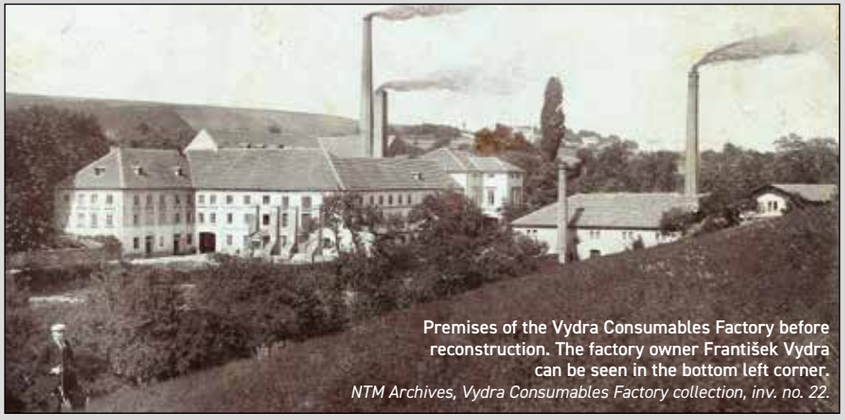
36 NA Archives, Ministry of Public Works collection, box 1007, inv. no. 1998, Stanovy spolku „Ústav pro vědecký výzkum uhlí" [Articles of Incorporation of the 'Institute for Scientific Coal Research' Association] dated 1927.

37 Ibidem.

38 Czech: Báňská a hutní společnost, established 1905.

39 Czech: Mostecká uhelná společnost.

40 Czech: Pražská železářská společnost, German: Prager Eisenindustrie-Gesellschaft, established 1857.



Premises of the Vydra Consumables Factory before reconstruction. The factory owner František Vydra can be seen in the bottom left corner.
NTM Archives, Vydra Consumables Factory collection, inv. no. 22.

Vydra Consumables Factory[1]

The present large premises of the Institute of Rock Structure and Mechanics of the Czech Academy of Sciences, parts of which have protected national heritage status, used to house a sugar refinery from the 1830s on the site of the former utility buildings that were part of the Rokoska homestead. The refinery was redesigned into what is more or less its current shape at the beginning of the 20th century with the support of the entrepreneur and researcher František Vydra (1869–1921), who had built the seat of his Vydra Consumables Factory here. It had originally been located on the site of the former farmstead with a brewery in Dobrovíz, near Prague, which František Vydra inherited and from where he moved his factory for the production of chicory to Libeň, a district of Prague, in 1898.

His factory originally met with failure in connection with his effort to innovate the coffee market. *"From the very beginning we were driven by an effort to produce goods of the best quality and, while willing to be the reformists of this industry, lack of knowledge meant that we failed to add the most important admixture to the chicory – molasses."*[2] However, František Vydra soon learned from his own mistakes and, having been inspired by the success of Kathreiner's malt coffee, he became the first in the country to produce rye coffee, under the trade name of Vydrovka, which became widely popular at the beginning of the 20th century.

The factory's range of products was soon extended to include a wide variety of diverse consumables and stimulants. Some of the more well-known goods included, for instance, the fizzy lemonade sweets sold under the Ambo trade name in many flavours, such as raspberry, strawberry, lemon or woodruff, canned soup (with mushroom, peas, lentils, rice and pasta flavour) or Maggi soup spices. Vydra's special mixture of spices was called Buchtin and helped to add flavour to dough. Other products included so-called crowns, which was grape sugar wrapped in aluminium foil and stamped into the shape of a coin, wafers with a honey cream filling, butter biscuits, fruit sauces, raspberry grog with genuine Jamaica rum, Vydra's children's flour as an instant substitute for breast milk, baby food, mustard and hosts.

In 1909–1912, František Vydra had his factory completely rebuilt and expanded. The growing prosperity of the enterprise can also be seen in the fact that, while in 1901 it had one official and twenty female workers, ten years later there were more than 40 officials and over 150 workers; the factory had its own post office branch and the monthly consumption of rye was around 15 rail wagons. It is worth mentioning that the factory had its own private library.

František Vydra also became renowned as the publisher of several magazines that he used to promote his company and its products. However, the magazine entitled *Vydrovy Besedy [Vydra's Collections]*, established in 1901, also included a fairly large section on culture featuring contributions by some leading Czech writers and poets. Its regular print run was a remarkable 45 thousand copies. Following the example of *Besedy*, the German *Familientisch* came one year later, to be followed by *Domaći Prijatelj* in Slovenia in 1904, the *Novosti* in Croatia and Serbia and the *Vydrove Besiedky* in Slovakia. Trade subscribers were delivered the *Kupecké listy [Merchants' Newspaper]*, published in Czech as the only magazine solely designed for tradesmen.

During World War One and in the first years after the war, František Vydra focused on the caramelisation of malt from which dark beer was produced. The result of his efforts, a malt preparation called Maltovin, also proved useful in practical tests carried out in several breweries. However, during the preparations for its wholesale production and work on putting together the portfolio of purchasers, František Vydra died suddenly in 1921, and Maltovin was therefore not patented in this country and abroad until after his death.

1 Czech: Vydrova továrna požívatin.
2 NTM Archives, Vydra Consumables Factory collection, box 5, inv. no. 27.

director Zdenko Hořovský became the first chairman of the Association, had 17 votes. In total there were 24 companies involved during the first years of existence of the Association.[41]

Josef Peters, the Director of the Union of Mine Owners, was elected the statutory representative, and played a very active role in organising the Association and in the operation of the research institute in the following years. The general meeting also approved the purchase of the Vydra Consumables Factory in Libeň, a district of Prague, which had been pre-arranged by Josef Peters a few months earlier. The purchase was finally concluded at the beginning of 1928. The whole complex of premises cost three million crowns and further investments had to be made in the reconstruction of the buildings and the purchase of laboratory equipment and books for the library.[42] The chemist Václav Jelínek became the first employee of the institute. In 1928 another two scientists were hired, namely the thermal power expert Ferdinand Heyd in May and the renowned German Czech-born scientist Hans Tropsch in July, to become the Institute's director.[43]

In 1928 the activities of the Institute were limited primarily to planning and to construction and installation works, and no time or space was left for scientific and technical research. It is worth mentioning that some of the plans for the adaptation of the former Vydra Consumables Factory had already been drawn up in Mülheim, from where Hans Tropsch, the Institute's first director, came. The layout of the laboratories and departments was therefore probably based on the sample layouts of the German top scientific institute that focused on coal research, the Kaiser-Wilhelm-Institut für Kohlenforschung, based in Mülheim.

Four laboratories were built on the ground floor of the purchased building, together with a big experiment room. The great hall on the 1st floor was converted into a library, smaller rooms for administration and two large laboratories. Darkrooms were set up with rooms for microscopic work on the 2nd floor. The connecting wing became the place for a guest laboratory and a fine mechanic workshop was set up in the cellars. One factory chimney was torn down and two technicians, hired in 1928, had already moved into the reconstructed apartments. Steam heating was installed, new water and gas pipe lines were laid, as was the sewerage system. Despite certain difficulties, a ventilation system and electrical lines were also installed. After that, the working desks for employees were moved in and telephone lines were

41 NA Archives, Ministry of Public Works collection, box 1786, inv. no. 2735, Zápis o schůzi představenstva Ústavu pro vědecký výzkum uhlí [Minutes from the meeting of the board of trustees of the Institute for Scientific Coal Research], 4 June 1929.
42 NA Archives, Ministry of Public Works collection, box 1786, inv. no. 2735, Finanční přehled o koupi Vydrovy továrny, o adaptaci a vnitřním zařízení od založení ústavu do 31. 12. 1929 [Financial Overview of the purchase of the Vydra factory, adaptation works and interior equipment from the establishment of the Institute until 31 December 1929].
43 NA Archives, Ministry of Public Works collection, box 1786, inv. no. 2735, Zápis o schůzi představenstva Ústavu pro vědecký výzkum uhlí [Minutes from the meeting of the board of trustees of the Institute for Scientific Coal Research], 4 June 1929.

Full view of the Institute.
In: Institute for Scientific Coal Research in Prague, 1930.

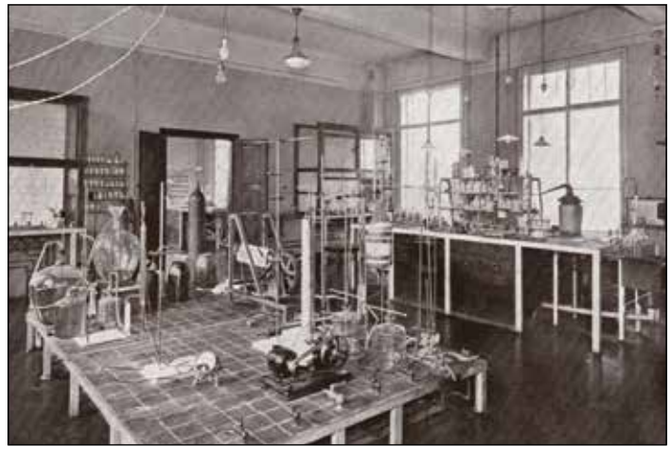
The yard with a covered veranda.
In: Institute for Scientific Coal Research in Prague, 1930.

established both for connections inside the building and for external calls, so the Institute was eventually equipped with six telephone stations.[44]

Special attention was initially paid to the library, for which series of journals were purchased, namely *Chemische Zentralblatt* (1888–1927), the almost complete *Berichte der Deutschen Chemischen Gesellschaft*, *Zeitschrift für physikalische Chemie*, *Zeitschrift für anorganische Chemie* and many other professional handbooks.[45] This

44 Ibidem.
45 Ibidem.

Laboratories of the Institute for Scientific Coal Research.
In: Institute for Scientific Coal Research in Prague, 1930.



The great Test Room of the Institute for Scientific Coal Research.
In: Institute for Scientific Coal Research in Prague, 1930.

Mechanical Workshop of the Institute for Scientific Coal Research.
In: Institute for Scientific Coal Research in Prague, 1930

Library of the Institute for Scientific Coal Research.
In: Institute for Scientific Coal Research in Prague, 1930.

instantly made the library one of the best Czechoslovak libraries focused on technology and chemistry. The purchase of literature cost almost half a million crowns,[46] and in the subsequent years the library deservedly played an important role in educating Czechoslovak technicians and chemists.

However, not everything went according to plan. As early as in mid-1929, the statutory representative of the Institute for Scientific Coal Research Josef Peters mentioned that the Ministry had failed to hand over at least one half of the instruments that it had promised to transfer from its Chemical Department.[47] However, it cannot be ruled out that this was a form of revenge against the entrepreneurs for somehow forgetting their pledge to provide room for the ministerial institute in the Vydra factory during the year 1928. The promise was in fact only verbally made by Josef Peters, without stating any specific conditions, and bidding commenced over the rental price.[48] The required fee seemed too high to the Ministry, considering the fact that it granted the Institute a subsidy amounting to half a million crowns, and repeatedly called on the Institute to reduce it.[49] In the end no agreement was reached and the Institute for the Efficient Use of Fuels, under the competence of the

46 NA Archives, Ministry of Public Works collection, box 1786, inv. no. 2735, Finanční přehled o koupi Vydrovy továrny, o adaptaci a vnitřním zařízení od založení ústavu do 31. 12. 1929 [Financial Overview of the purchase of the Vydra factory, adaptation works and interior equipment from the establishment of the Institute until 31 December 1929].

47 NA Archives, Ministry of Public Works collection, box 1786, inv. no. 2735, Zápis o schůzi představenstva Ústavu pro vědecký výzkum uhlí [Minutes from the meeting of the board of trustees of the Institute for Scientific Coal Research], 4 June 1929.

48 NA Archives, Ministry of Public Works collection, box 1007, inv. no. 1998, Materiál Ministerstva veřejných prací [Materials of the Ministry for Public Works], 3 February 1928.

49 Ibidem.

Ministry for Public Works, remained in Holešovice, a district of Prague. The Institute therefore rented out the extensive premises of the former Vydra factory, thus providing itself with a regular source of income. One of the most important tenants was Prometheus, the printing house of the Mining and Metallurgy publishers, and one building was rented out to the glass-cutting company of Dr. Pollak and the Mirora company which manufactured mirrors.[50] The Ultraphon music publishers also soon began to use some of the premises.[51]

The adaptation works on the buildings continued in 1929, but scientific activities were able to begin at the end of the year. The Institute began to accept coal samples from various enterprises and analyse their quality and the volume of distillation products. Other research works were planned, such as monitoring brown coal during desiccation and the possibilities of briquetting, the behaviour of black coal during the coking process and its mechanical strength. In the following months the Institute also conducted research into the preparation of petrol and benzol from coal, and the demand from enterprises to analyse minerals from their sites grew.

In 1929 the ministerial Institute for the Efficient Use of Fuels also slowly phased down the coal agenda and began to focus primarily on thermal technology and on checking state supplies, such as roadway construction materials and lubricating oils.[52] However, some of its employees applied for a job at the emerging Institute for Scientific Coal Research at the same time. Two of the three applicants eventually became employees of the new Institute, namely Břetislav Hlavica and František Koudelák. The third applicant, Jaroslav Tichý, who would later influence the Institute's history, did not take up a position at the time and went to the Ervěnice power station instead.

In 1929 the Institute had nine employees. Besides the director Hans Tropsch there were the chemists Břetislav G. Šimek, Ferdinand Heyd, Václav Jelínek, Břetislav Hlavica and František Koudelák, one laboratory worker and two administrative staff.[53] In 1930 the chemists František Coufalík and Antonín Klouda came[54], and Jaroslav Ludmila and August Stadler, then still students, soon joined the team.

50 NA Archives, Ministry of Public Works collection, box 1786, inv. no. 2735, Finanční přehled o koupi Vydrovy továrny, o adaptaci a vnitřním zařízení od založení ústavu do 31. 12. 1929 [Financial Overview of the purchase of the Vydra factory, adaptation works and interior equipment from the establishment of the Institute until 31 December 1929].

51 NA Archives, Ministry of Public Works collection, box 1786, inv. no. 2735, Záznam o usnesení představenstva ze dne 20. června 1930 [Record of the resolution of the board of trustees on 29 June 1930].

52 ŠIMEK, Břetislav G.: Výzkum uhlí v Československu [Coal Research in Czechoslovakia]. *Zvláštní otisk z Průvodce světem techniky*, 1938, Vol. 1, No. 4.

53 NA Archives, Czechoslovak Mines, national enterprise, General Directorate collection, box 78, inv. no. 211, Úrazové pojištění [Accident Insurance], 1929.

54 NA Archives, Ministry of Public Works collection, box 1786, inv. no. 2735, Záznam o usnesení představenstva ze dne 20. června 1930 [Record of the resolution of the board of trustees on 20 June 1930].

Four special research laboratories were built, namely the Laboratory for analysis and research in solid fuels, the Laboratory for research of the coking properties of coal, the Laboratory for analysis and research of coal by-products, especially coal tars and liquid fuels, and the Laboratory for analysis of fuels and research into coal gases.[55] The chemists first focused on verifying the data from the Fischer–Tropsch synthesis[56] the purpose of which was to produce a crude oil substitute from coal. The synthesis was widely used especially during World War Two by countries which had no access to crude oil. Beside this, experiments with methane were carried out, as Hans Tropsch was actually the first to prepare formaldehyde through methane oxidation.[57] The Institute also dealt with synthesising petrol hydrocarbons from water gas or from gases of similar chemical composition, and also with other tasks, of which there were probably too many for a small scientific team. This is also why Břetislav G. Šimek recollected the years 1929 and 1930 as a time when *"a scientific institute had to be built from the initial chaos that not just every institute, but also every other enterprise has to go through at first."*[58]

Prominent Figures in the Leadership of the Association

The three-year mandate of the Association's board ended in 1930. The chairman Zdenko Hořovský[59] resigned from office, as he did from his other positions in the Czechoslovak industry, and went into retirement.[60] This was not particularly surprising, as he had excused himself from some of the board meetings in the preceding year, while Zdeněk Maloch was his replacement on behalf of the Prague Ironworks

55 SMÉKAL, František (according to PETERS, Josef): *Statistická příručka československého hornictví pro rok 1935 [Statistical Yearbook of Czechoslovak Mining Industry for 1935]*. Praha: Hornicko-Hutnické nakladatelství Prometheus, 1936, pp. 330–331; NA Archives, Ministry of Public Works collection, box 1786, inv. no. 2735, Zpráva o činnosti výzkumu uhlí [Coal Research Activity Report], 25 September 1930.

56 NA Archives, Ministry of Public Works collection, box 1786, inv. no. 2735, Zpráva o činnosti výzkumu uhlí [Coal Research Activity Report], 25 September 1930.

57 TOMEŠ, Josef a kol.: Český biografický slovník XX. století [20th Century Czech Biographical Lexicon]. 3. díl (Q–Ž). Praha: Paseka, 1999, p. 377.

58 ŠIMEK, Břetislav G.: Výzkum uhlí v Československu [Coal Research in Czechoslovakia]. *Zvláštní otisk z Průvodce světem techniky*, 1938, Vol. 1, No. 4.

59 Zdenko Hořovský (1863–1937) graduated from the Mining University in Leoben, Styria. He stayed in the USA for five years at the Carnegie Steel Company in Pittsburgh. He travelled through California and Alaska. In Serravalle, San Marino, he built blast furnaces and then stayed shortly at Société Métallurgique du Sud-Oural in Russia and the Sosnowiecke ironworks in Poland. He worked as a technical director and in 1920–1930 the general director of the Prague Ironworks Company. See *Album reprezentantů všech oborů veřejného života československého [Album of Representatives of All Disciplines in Czechoslovak Public Life]*. Praha: Umělecké nakladatelství J. Zeibrdlich, 1927, p. 970; Inž. Zdenko Hořovský zemřel [Zdenko Hořovský Dies]. *Lidové noviny*, 30 November 1937, Vol. 45, No. 601, p. 4.

60 NA Archives, Ministry of Public Works collection, box 1786, inv. no. 2735, Záznam o usnesení představenstva ze dne 20. června 1930 [Record of the resolution of the board of trustees on 20 June 1930].

Hans Tropsch

NA Archives, Police Headquarters II collection, box 11598, sign. T1362-2.

Hans Tropsch was born on 7 October 1889 in Planá u Mariánských Lázní, West Bohemia. He studied at the Deutsche Technische Hochschule (German Technical University) in Prague and the German Charles-Ferdinand University in Prague. From 1916 he conducted coal research at the Kaiser Wilhelm Institute in Mülheim an der Ruhr where he was, except for the period of 1917–1920, a colleague of the Geheimrat Prof. Franz Fischer until he came to Prague in 1928.[1] He and F. Fischer invented a production method to synthesise petrol from water gas. The so-called Fischer-Tropsch synthesis was patented in 1925 and published in 1926, and enabled petrol to be produced from coal, earning Tropsch international acclaim. This helped him to become the scientific director of the newly established Institute for Scientific Coal Research in Prague. In his office he focused primarily on obtaining equipment for the Institute and on creating its scientific concept. Besides this, he was an associate professor at the Deutsche Technische Hochschule in Prague in 1928–1931. At the Institute he was involved, for instance, in the production of ethylene chloride and chlorine. However, he only worked in Czechoslovakia for a short time, as in 1931 he accepted an invitation from the Armour Institute of Technology in Chicago where he became a professor, and later worked at the University of Chicago. At the same time he worked as a scientific advisor to the Universal Oil Products Company based in Illinois. Illness caused him to return to Europe in 1935 and he died in Essen, Germany on 8 October 1935.[2]

1 Úvod [Introduction]. Zprávy Ústavu pro vědecký výzkum uhlí v Praze. Vol. 3, own publication, Praha 1937, pp. 3–5.
2 Ibidem.

Company. However, the remaining members of the board of trustees continued in the following term. The meetings were chaired by the internationally recognised expert Emil Modr, then the director of the Mining and Metallurgical Company.

Karel Galler (1874–1938) from the Czech Trading Company[61] was elected the new chairman of the Association. Born in Petrovice near Rakovník, Central Bohemia, he studied in Leoben (Styria) and in Příbram. After that he worked for the State Railways in Kladno, for the Lomské uhelné doly mining enterprise and in 1914 became the mining director of the Czech Trading Company. He was in charge of mine modernisation and organised, for instance, the relocation of the village of Chotějovice because of undermining. He later became the central director and in 1933 the general director of the Czech Trading Company, which had 15 votes in the Association. He was also active with other associations and had links to other companies. He was, for instance, the deputy chairman of the board of trustees of the Prague Ironworks Company, a member of the board of supervisors of Živnostenská

61 Czech: Česká obchodní společnost.

Zdenko Hořovský, 13 April 1929.
Photo courtesy of © LANGHANS PRAHA FOUNDATION Archives, www.langhans.cz.

banka and a member of the board of trustees of North Bohemian Coal Company[62] in Most.[63] He was probably also led to join the leadership of the Association, which he chaired until his death, by his interest in coal liquefaction and the valorisation of brown coal.[64]

The key figure for the first years of the Institute was undoubtedly Josef Peters (1876–1933), who, as the Association's statutory representative, procured materials and premises for the Association and acted on its behalf in important research tasks. Peters himself had ample groundwork and experience to organise not only the Czechoslovak coal industry, but also its scientific interests. He graduated with a degree in law at Charles University in Prague and from the Mining Academy in

62 Czech: Severočeská uhelná společnost, German: Nordböhmische Kohlenwerks Gesellschaft, a major mining company in the Most region, established in 1890, merged with the SUBAG trust in 1939 (see also Note 107).

63 Dr. Inž. Karel Galler zemřel [Karel Galler Dies]. *Lidové noviny*, 11 September 1938, Vol. 46, No. 457, p. 4.

64 PŘIBIL, Martin: Galler, Karel. In *Biografický slovník českých zemí*, 19. sešit, Fu-Gn. Praha: Historický ústav AV ČR, Academia, 2016, p. 553.

Karel Galler.
Karel Kestner's personal archives.

Leoben, Styria. During the Austro-Hungarian Monarchy, he worked for the state mines in Idrija (now Slovenia), Most, Klagenfurt, Ostrava and Brno. After 1918, as a Czech patriot, experienced mining expert and a representative of the National Board of Moravian and Silesian Coal Districts[65], he participated in the Paris Peace Conference and concluded the coal agreement with Germany. In the first years of the new Republic he organised the Czechoslovak coal industry as the head of the Coal Section of the Ministry for Public Works. However, he quit this position in 1920, to become the director of the Union of Mine Owners, a position he maintained until his death. It must be noted that the highest position in the Union was that of the chairman, accompanied by four deputy chairmen, and the director was only their subordinate. However, Peters was also one of the deputy chairmen. As the Union's director he pro-actively influenced the preparation of mining legislation and published scientific articles in journals, on whose editorial policy he often had a major influence.[66] He founded the journals *The Mining Gazette*, *Coal* and the popular scientific journal *The Mining World*.[67] From the viewpoint of the Institute for Scientific Coal Research, his initiative to build a scientific institution for the coal industry was important. He was an appointed expert of the Masaryk Academy from 1923 and even a member of its scientific board from 1931. He lectured in mining law

65 Czech: Národní výbor moravských a slezských uhelných revírů.

66 ŠIMEK, Břetislav G.: Za Dr. Mont. H. c. JUDr. Ing. Josefem Petersem [In the footsteps of Josef Peters]. *Chemické listy pro vědu a průmysl*, 1933, Vol. 57, No. 6, pp. 139–140.

67 Czech: *Hornický věstník* (1919–1942); *Uhlí* (1953–1991); *Báňský svět* (1922–1937).

at the Mining School in Moravská Ostrava and was an honorary associate professor in mining law at the Faculty of Law of Charles University in Prague. Besides his other positions in the scientific environment,[68] another important factor was that he was a founder of the Prometheus Mining and Metallurgical Publishers.[69] It was also thanks to him that the printing house of the publishing company moved to the premises of the Institute. He was also the best person to promote the interests of the Institute because, besides the positions he occupied in the coal industry and scientific institutions, he was a member of the Bohemian Land Chamber of MPs and a member of the City of Prague Central Council from 1928.[70]

The Institute in the Throes of Economic Crisis

The building up of the Institute ended just in time, as the effects of the world economic crisis were being felt all the more intensely by Czechoslovakia, and the coal industry would have been hardly able to provide ample sponsoring for the construction work when the economic conditions changed. The wheels of crisis started spinning after the breakdown of exchange rates on the New York Stock Exchange on 24 and 29 October 1929 and the crisis soon reached Czechoslovakia. During the following years many banks went bankrupt, industrial production declined considerably and international trade was ruined. The recession also hit the mining industry, which had to face the decreasing demand for coal. From 1930 mine owners in Czechoslovakia were regularly reporting that the production of brown coal, black coal and coke was in inevitable decline. The savings measures affected all spheres of life, including the Institute, financed from the funds of mining companies. The decline in revenues from coal mining led to the Institute's budget being cut down to approximately one third, which also limited the scope of its scientific activities.[71] Initially, some of the activities that had commenced before were completed, such as the catalytic reduction and hydrogenation of phenols under pressure, the elimination of nitric oxide from coke gas through catalytic reduction while producing ammonia, and research into the melting point of Czechoslovak brown coal. However, the scientific director Hans Tropsch left the Institute in the middle of 1931 for the USA and the direction the institution would take was uncertain.[72]

68 The chairman of the Psychotechnical Institute at the Masaryk Academy of Labour, the founder of the Svaz československých horních a hutních inženýrů [Union of Czechoslovak Mining and Foundry Engineers] in Prague and its deputy chairman, the chairman of the Jednota přátel Masarykovy akademie práce [Union of Friends of Masaryk Academy of Labour].

69 A AV ČR Archives, Masaryk Academy of Labour collection, box 36, inv. no. 336, Josef Peters's personal file.

70 Ibidem.

71 ŠIMEK, Břetislav G.: Výzkum uhlí v Československu [Coal Research in Czechoslovakia]. *Zvláštní otisk z Průvodce světem techniky*, 1938, Vol. 1, No. 4.

72 Ibidem.

Břetislav G. Šimek.
NA Archives, Police Headquarters II collection, box 10164, sign. S2015-26.

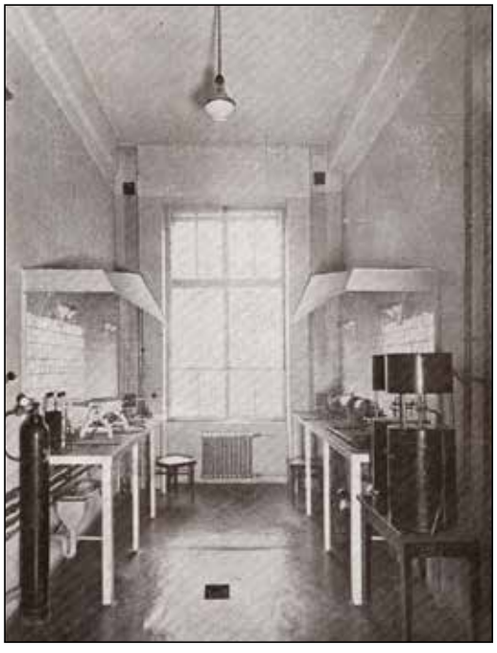
After the departure of Hans Tropsch, his deputy Břetislav G. Šimek took up the directorship. His primary aim was that the Institute play an unavoidable part on the Czechoslovak scientific scene. This is why he also gave public lectures and invited representatives of various professional associations for tours around the Institute. For instance, a visit by the representatives of the gas section of the Czechoslovak Gas and Water Association[73] was organised in 1932[74]. In the same year Břetislav G. Šimek was awarded the President T. G. Masaryk Prize for his study on coal desiccation, which he had presented together with Apollon Růžička at the 12th Congress of Industrial Chemistry in Prague.[75]

Thanks to the new director, the Institute did not phase down its scientific activities, but the crisis made it change its publishing methods. Until 1933, series of brochures entitled *News from the Institute for Scientific Coal Research in Prague* were published each year. The fifth brochure in 1933 ended the first volume of *News* and in the following years all the brochures were published in a single volume once every two years. The second volume was published in 1935, the third in 1937, but the fourth volume was not published until 1948, when the political situation was

73 Czech: Plynárenské a vodárenské sdružení československé, established in 1919, one of the seven founding members of the International Gas Union in 1931.

74 Odborné vycházky a prohlídky. Sekce plynárenská [Professional Walks and Tours. Gasworks Section]. *Plyn a voda*, 1932, Vol. 12, No. 7–9, pp. 362–363.

75 A AV ČR Archives, Masaryk Academy of Labour collection, box 39, inv. no. 339, Břetislav Šimek's personal file.



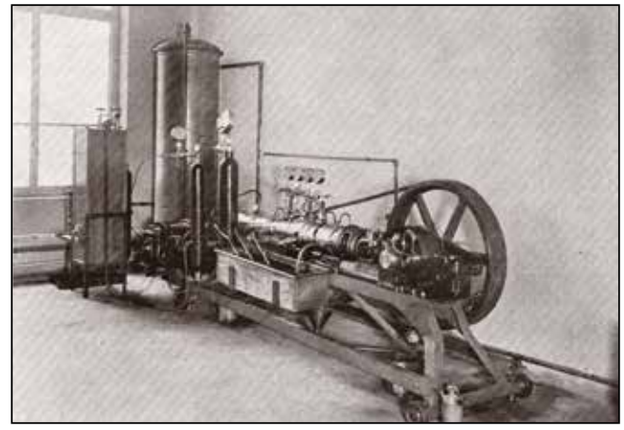
Elementary analysis equipment.
In: Institute for Scientific Coal Research in Prague, 1930.

completely different. It is apparent from the published texts that the staff focused on the topics of coke, tar pitch, and also phenol, benzol and ethylene. Břetislav G. Šimek was undoubtedly the most prolific contributor, with 16 out of the total 19 studies in the 1937 volume.[76]

Under the leadership of Břetislav G. Šimek the Institute was opening its doors to cooperation with home or foreign institutions. The director himself became a member of the Masaryk Academy of Labour in 1934 as an expert of the 5th Department. Besides this, he was an active member of the Czechoslovak Chemical Society (the statutory representative for the Prague branch and a reserve for the Central Committee), the Association of Czechoslovak Engineers (a member of the editorial board of *Chemický obzor* journal), the Union of Mining and Metallurgy Engineers, the Gas and Water Association in Prague, the Czechoslovak Union for the Research and Testing of Substances of Technical Importance (the Fuels Group) and the Union to Encourage Czech Industry.[77] He was also the delegate of the Institute for Scientific Coal Research in

76 *Zprávy Ústavu pro vědecký výzkum uhlí v Praze [News from the Institute for Scientific Coal Research]*. Praha: Ústav pro vědecký výzkum uhlí v Praze, 1937.

77 Czech: Československá společnost chemická (from 1920); Spolek československých inženýrů (SIA, 1920–1951); Svaz horních a hutních inženýrů; Plynárenské a vodárenské sdružení v Praze; Československý svaz pro výzkum a zkoušení technicky důležitých látek (ca. 1920–1949); and Jednota ku povzbuzení průmyslu v Čechách (established 1833).



Air liquefaction equipment; vacuum production equipment.
In: Institute for Scientific Coal Research in Prague, 1930.

the Normalisation Society (Committee for the Normalisation of Tar Thread Felts), the delegate of the Czechoslovak Chemical Society in the Bottle Normalisation Committee and also a member of some foreign scientific societies, namely Société de Chimie Industrielle in Paris, Deutsche Chemische Gesellschaft in Berlin, the Chemical Society in London and the American Chemical Society in Washington.[78]

In 1934 the Institute was visited by Dutch mining students from the Delft Institute of Technology.[79] On the other hand, the director Břetislav G. Šimek travelled abroad with his research tasks. In 1933, he and Robert Kassler of the German Technical University in Prague made a presentation at the 13th Congress of Industrial

78 A AV ČR Archives, Masaryk Academy of Labour collection, box 39, inv. no. 339, Břetislav Šimek's personal file.

79 Český zájezd holandských studujících hornictví [Czech Trip of Dutch Mining Students]. *Národní politika*, 2 May 1934, Vol. 52, No. 120, p. 3.

Chemistry in Lille, and in 1935 he attended a convention of the German Society for Research in Mineral Oils in Berlin.[80]

One adverse aspect of the 1st half of the 1930s was the deteriorating situation for mining enterprises, which saw a continuous decrease in the production and sales of coal until 1934. The decline in sales went hand in hand with cuts in the miners' working hours, soon followed by redundancies, which led to strikes in some regions. Society's strongest response was to the extensive miners' strikes in North Bohemia in 1932, which were joined by the strikes in the Ostrava and Kladno regions and a huge strike in the Rosice-Oslavany coal district.

Under these circumstances, some companies' interest in financing the Institute gradually waned. The Institute focused on seeking the most suitable conditions to boost coal sales; however, it did not offer a real solution to the existing crisis. Its position was furthermore weakened by the death of Josef Peters in March 1933. That was the least appropriate time for the position of the statutory representative of the Association to become vacant. Josef Peters was one of the co-founders of the Institute and as the statutory representative had a major influence on the activities of the Association and on providing funding for research.

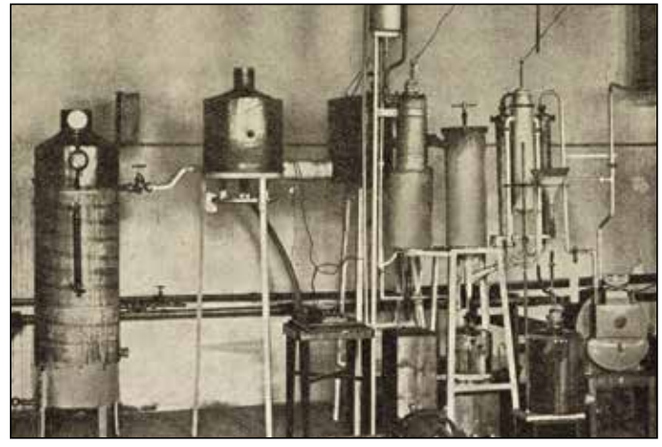
After several months of uncertainty, Zdeněk Maloch took up the post of statutory representative. During the 1930s his power in the coal industry saw a major boom. Zdeněk Maloch had appeared in the leadership of the Association at the end of the 1920s as a representative of the Prague Ironworks Company and now was one of its directors. Later, he also took over from Josef Peters as the director of the Union of Mine Owners. However, despite his efforts, financing the Association was by no means an easy matter. In the mid-1930s subsidies continued to come from just 22 coal companies, and even those were less and less willing to continue.[81] They were also damaged by the government's efforts to quickly resolve the country's critical economic situation through the empowering act. The industrial elites therefore tried to prevent the adverse impact of these measures, and in the autumn of 1934 they established Uhlospol, a trading limited company which also associated almost all private coal enterprises and was supposed to ensure the efficient division of labour and direct the coal policy in the country.[82] Zdeněk Maloch became the statutory representative of Uhlospol, and was also a member of the Coal Board's statutory committee and its pricing committee.[83] Considering the combination of

80 A AV ČR Archives, Masaryk Academy of Labour collection, box 39, inv. no. 339, Břetislav Šimek's personal file.

81 SMÉKAL, František (according to PETERS, Josef): *Statistická příručka československého hornictví pro rok 1935 [Statistical Yearbook of the Czechoslovak Mining Industry for 1935]*. Praha: Hornicko-Hutnické nakladatelství Prometheus, 1936, p. 330.

82 MALOCH, Zdeněk: Organizační úsilí uhelného průmyslu [Organisational Efforts of the Coal Industry]. *Národní listy*, 15 December 1935, Vol. 75, No. 343, p. 10; Nový jednatel Uhlospolu [New Statutory Representative of Uhlospol]. *Národní listy*, 17 May 1935, Vol. 75, No. 136, p. 6.

83 SMÉKAL, František (according to PETERS, Josef): *Statistická příručka československého hornictví pro rok 1935 [Statistical Yearbook of the Czechoslovak Mining Industry for 1935]*. Praha: Hornicko-Hutnické nakladatelství Prometheus, 1936, pp. 285–286.



Full view of the carbonisation equipment. It was designed especially for use with brown coal, but could also be used to carbonise black caking coal. *In: News from the Institute for Scientific Coal Research in Prague, Vol. 3, 1937.*

his appointments, it is likely that at this time there was increasing pressure on the Institute to help, through its scientific work, to boost coal sales.

As the crisis dragged on, the people were becoming increasingly dissatisfied, which was also apparent in the May 1935 elections. By number of votes, the Sudetendeutsche Partei (SdP) with close links to Nazi Germany became the strongest party, and Hlinka's Slovak People's Party,[84] which advocated Slovak autonomy, was also hugely successful. The former government parties made up a broad coalition and tried to maintain the existing nature of the democratic republic. The growing uncertainty from the development of political power in Central Europe led the new government to invest more heavily in warfare production. For the government this promised the revival of Czechoslovak industry which, unlike in other countries, was undergoing not only a deep but also long stagnation.

In its 1935 annual report, the Union of Mine Owners noted a slight improvement in the situation in the coal industry as coke consumption in particular had increased. However, the Institute for Scientific Coal Research was only mentioned once in connection with the growing importance of producing petrol from coal. In fact the Association assumed that coal liquefaction and production of synthetic petrol would lead to increasing sales of the extracted raw material. However, for the time being this means of producing fuel did not appear to be profitable.[85]

At the general meeting of the Union of Mine Owners in 1936 it was voiced that the Czechoslovak coal industry had already invested 12 million crowns in the Institute's scientific and research activities. There was also a plan that in the future

84 Slovak: Hlinkova slovenská ľudová strana, 1913–1945 (banned).

85 *Svaz majitelů dolů. Výroční zpráva za rok 1935 [Mine Owners' Association. 1935 Annual Report]*. Praha: Svaz majitelů dolů, 1936, p. 22.

it would be better to use suction engines in trains powered by gas produced from coke, which would boost sales.[86] This was one of the reasons why the key topic of scientific research was carbonisation and related issues, whether with coal with a metallic admixture, overheated steam carbonisation or brown coal briquettes. František Coufalík made a considerable contribution to research in this area. Another great topic was tar pitch and tar, the subject of the work of Jiří Helm and Jaroslav Ludmila with Břetislav G. Šimek.[87]

The activities on which the Institute focused were also related to the contemporary requirement to increase the yield of by-products during coke production, such as tar or benzol.[88] However, the scientific team was still not very big in 1935, with just five university chemists (František Coufalík, Jiří Helm, Jaroslav Ludmila, Václav Plachý and August Stadler), three younger assistant chemists, three administrative staff and seven blue-collar, and the director.[89]

In the late 1930s the press started to push more for better attention to science and research. Experience with the waning crisis, which had clearly shown the limitations of the Czechoslovak economy, played a certain role in this. It seemed that increased attention given to scientific education and actual scientific research could in the future help to better face a similar crisis to the one which had affected Czechoslovakia in preceding years.[90] This was related to criticism over Czechoslovak industry's lack of support for research, which in turn was denied by industry representatives, who pointed out their merits for the development of the relevant scientific research. The Central Union of Czechoslovak Industrialists[91] even sent out a circular to industrial enterprises at the end of 1936, calling upon them to report how they supported science and research. The Institute for Scientific Coal Research was often praised as a splendid example of a research institution financed solely from the funds of industrial enterprises. It was also mentioned that the Ministry for Public Works had promised a state subsidy of half a million crowns each year for the Institute, but only part of this was paid and only in the first years, after which the payments ceased. The Institute was therefore able to work only thanks to the support from industry.[92]

However, criticism that the subsidies to scientific institutions were considerably reduced due to the economic crisis, as the ÚVVU itself experienced, was justified.

86 Nepatrné zlepšení v uhelném průmyslu v r. 1935 [Slight Improvement in the Coal Industry in 1935]. *Národní listy*, 24 June 1936, Vol. 76, No. 173, p. 8.

87 *Zprávy Ústavu pro vědecký výzkum uhlí v Praze [News from the Institute for Scientific Coal Research]*. Praha: Ústav pro vědecký výzkum uhlí v Praze, 1937.

88 JERIE, Ladislav: Koksárenství [Coke Industry]. In Československá vlastivěda. Svazek 9: Technika. Praha: Sfinx, 1929, pp. 431–440.

89 SMÉKAL, František (according to PETERS, Josef): *Statistická příručka československého hornictví pro rok 1935 [Statistical Yearbook of the Czechoslovak Mining Industry for 1935]*. Praha: Hornicko-Hutnické nakladatelství Prometheus, 1936, p. 330.

90 PIMPER, Antonín: O užší spolupráci vědy s hospodářskou praksí [On Closer Cooperation between Science and the Practice of Economy]. *Národní listy*, 3 May 1936, Vol. 76, No. 122, p. 6.

91 Czech: Ústřední svaz československých průmyslníků, 1918–1939.

92 NA Archives, Mine Owners' Association collection, box 72, inv. no. 100.

Břetislav Gustav Šimek

NA Archives, Police Headquarters II collection, box 10144, sign. S2015-26.

Břetislav Gustav Šimek was born on 4 September 1900 in Jičín, East Bohemia, where he also studied at the local grammar school. After graduating, he was admitted to the College of Chemical Engineering and Technology at the Czech Technical University, from which he graduated in 1923. The next year he defended his doctoral thesis entitled *Nitrogen Oxidation in a Bomb Calorimeter* and became the head of the control and research chemical laboratory of the Czech Trading Society in Ústí nad Labem. In 1926 he proposed a new coal desiccation method which was put into practical use in 1932/1933 in the Marica mines in South Bulgaria, the Gustav mine in Citice u Falknova and the Albert mine in Tuchomyšl, near Ústí nad Labem. In 1927 the Coal Board presented him with an award for his paper on resolving the crisis in the north Bohemian brown-coal districts, and it was perhaps this success which opened the way for him to join the newly established Institute for Scientific Coal Research. He began his career there in 1929, initially as the deputy director and, from 1931, as the director.[1] Most of his professional as well as his private life was linked to the Institute. He lived within the Institute itself in the director's apartment, which he left only after organisational changes in the early 1950s. During almost twenty years as the director, he enjoyed a great deal of success. He was, for instance, awarded the President T. G. Masaryk Prize for his paper entitled *Valorisation of Brown Coal through Steam Heating under Pressure* (with A. Růžička of Ústí nad Labem as the co-author) in 1932 and the Prize of the Czech Academy for Sciences and Art for a collection of papers on fuels in 1937. He was a member of the Czechoslovak Chemical Society, where he was closely involved in the leadership of its Prague branch, at first as the treasurer and later as the deputy chairman[2] and the chairman. The Masaryk Academy of Labour elected him as a member of the Expert Board in 1934[3] and as a member of its Scientific Council in 1950. Besides this, he was a member of many other professional Czech and foreign associations, such as the Union of Mining and Metallurgy Engineers, Gas and Water Association in Prague, Société de Chimie Industrielle, Deutsche Chemische Gesellschaft zu Berlin, the Chemical Society of London and the American Chemical Society.[4]

In connection with the country's post-war reconstruction, B. G. Šimek enjoyed many scientific successes, attended foreign conferences, habilitated in 1947 in the discipline of fuels at the College of Chemical Engineering and Technology in Prague, part of the Czech Technical University,[5] and at the time was considered one of the best and most experienced Czech fuel chemists. He worked for the editorial board of the Czech magazine *Fuels and Water*, spoke German and French and was able to study in English, Russian or Polish.[6]

After the communist state coup in 1948, he faced opposition from some employees, but eventually kept his position in the leadership of the Institute as its technical manager. He left this post in 1951 in connection with the reorganisation of the Institute when he opposed the merger with the Institute for the Effcient Use of Fuels and the overall change in the research concept. After that he often came into conflict with the new leadership, and therefore joined the payroll of the Institute for Mineral Deposit Research in Kutná Hora, although he continued to work and live in the Institute.[7] He no longer desired to be a member of the management but primarily wished to continue his scientific work, an intention he did not greatly succeed in under the new circumstances.[8] Eventually he went to the Research Institute of Inorganic Chemistry in Ústí nad Labem, which was governed by the Ministry of Chemical Industry. He died on 30 July 1958.

1 RIEDL, Rudolf: In memoriam Doc. Dr. Ing. Břetislava Šimka. *Paliva*, Vol. 38 (1958), No. 9, p. 328.

2 Československá společnost chemická – zpráva odbočky v Praze [Czechoslovak Chemical Society – Prague Branch Report]. *Chemické listy pro vědu a průmysl*, Vol. 27 (1932), No. 9, p. 9; Valná hromada pražské odbočky České společnosti chemické [General Meeting of the Prague Branch of the Czechoslovak Chemical Society]. *Chemické listy pro vědu a průmysl*, Vol. 33, No. 14, p. 270.

3 A AV ČR Archives, Masaryk Academy of Labour collection, box 412, Schůze V. odboru MAP [Meeting of the 5th Department], record dated 18 June 1934.

4 A AV ČR Archives, Masaryk Academy of Labour collection, box 39, inv. no. 339, Břetislav Šimek's personal file.

5 RIEDL, Rudolf: In memoriam Doc. Dr Ing. Břetislava Šimka. *Paliva*, Vol. 38 (1958), No. 9, p. 328.

6 A AV ČR Archives, Masaryk Academy of Labour collection, box 39, inv. no. 339, Břetislav Šimek's personal file.

7 NA Archives, Ministry for Fuels and the Power Industry collection, box 1, inv. no. 4, Letter from Břetislav G. Šimek, 17 April 1952.

8 NTM Archives, František Špetl collection, box 22, personal file, professional evaluation.

Some critics even pointed out that scientific and research activities were assessed only according to momentary needs or interests. Despite that, the Institute succeeded in continuing its scientific work and in 1937 received an award from the Czech Academy of Sciences and Arts (ČAVU).[93] Břetislav G. Šimek was presented with a prize of 800 crowns from the Academy's fund for technical works for his research in fuel technology.[94]

In the same year, representatives of the Institute attended the 2nd World Petroleum Congress in Paris.[95] Thanks to their participation at international conferences, contacts were maintained with many experts from coal or petroleum institutes, such as in London, Lille, Lisbon, Milan, Lviv, and also Pittsburgh, Kharkiv, Moscow, Santiago de Chile and Kawaguchi (Japan).[96] Given the Institute's tradition and geographical location, its orientation on Germany was apparent, and Germany was a great example especially as regards the production of liquid fuels from their domestic raw materials. The Institute's management complained in this context that unlike institutions abroad, which were always focused on one specific geographical area, the Institute had to cover all the geographical areas of Czechoslovakia, from brown coal basins to black coal basins, which greatly limited its potential to becoming more specialised.[97]

In 1938 the difficult international situation also affected the Institute's activities. After the Austrian anschluss in March, the pressure of the major powers on Czechoslovakia increased while its political crisis deepened. The demands of the Czech Germans intensified and events started to move quickly. After the partial mobilisation in May, which convinced many Czechs that the republic would be defending itself against a possible German invasion, a national manifestation came in the 10th Sokol[98] Convention. After that, the international and domestic crisis escalated with the mobilisation in September. The tensions were seemingly brought to an end by the Munich Agreement, as a result of which Czechoslovakia lost a considerable portion of its border areas. Following these events, Břetislav G. Šimek and Jaroslav Ludmila were unable to travel to the 18th Congress of Industrial Chemistry, held in Nancy, France from 22 September to 2 October 1938.[99] Their paper entitled *On the Impact of Underpressure on Coal Carbonisation Yields* was therefore read on behalf

93 Czech: Česká akademie věd a umění, 1890–1952 (became part of the newly established Czechoslovak Academy of Sciences).

94 A AV ČR Archives, ČAVU collection, box 8, sign. II. 4, Zápis o schůzi druhé třídy ČAVU [Minutes from the Meeting of the 2nd Class of ČAVU], 12 March 1937.

95 NA Archives, Czechoslovak Mines, national enterprise, General Directorate collection, box 244, inv. no. 562.

96 Ibidem.

97 ŠIMEK, Břetislav G.: Výzkum uhlí v Československu [Coal Research in Czechoslovakia]. *Zvláštní otisk z Průvodce světem techniky*, 1938, Vol. 1, No. 4.

98 Sokol, a very popular gymnastics and community organisation for all ages founded in Bohemia in 1862.

99 A AV ČR Archives, Masaryk Academy of Labour collection, box 39, inv. no. 339, Břetislav Šimek's personal file.

of both scientists by the French chemist Charles Berthelot.[100] And on 10 September 1938 the Institute was hit by another unfortunate event. Karel Galler, the chairman of the Institute for Scientific Coal Research Association, died and the Institute was facing its definitive demise.

The "Second Republic" and Occupation

The Munich Agreement was a serious blow not only to the confidence of the Czech nation but also to the country's economic structure. Czechoslovakia lost areas along its borders with Germany, Poland and Hungary, where major industrial enterprises were located. The membership of the Union of Mine Owners was heavily affected, as thus was the Institute for Scientific Coal Research Association. Many enterprises whose headquarters remained inside the curtailed country lost their property and especially sources of raw materials situated in the border areas. Under these circumstances, defeatism prevailed, and awareness that the so-called Second Republic was far from self-sufficient also led to calls for a controlled economy.

In connection with this, ideas were voiced that the further existence of some cultural and scientific institutions would not be possible. These ideas were also raised in the reduced Institute for Scientific Coal Research Association which, through the annexation of the border areas, lost four-fifths of its members. Major enterprises, such as the Mine and Metallurgical Company, Prague Ironworks Company and the Emperor Ferdinand Northern Railway, remained inside the republic, but saw major losses, and this was probably another reason why, in the atmosphere of disillusionment and shock from the Munich events, calls to have the Institute abolished were on the increase. As early as in October 1938, Břetislav G. Šimek therefore prepared a memorandum stating the necessity of preserving the Institute. However, the decision-making meeting of the board of trustees kept being postponed, also in the light of the death of the chairman Karel Galler.[101]

In the meantime, the country's political situation changed considerably when the state, through the First Vienna Diktat, lost the southern parts of Slovakia and a part of Carpathian Ruthenia. The German occupation of Czechoslovakia then began in March 1939. After the creation of the Protectorate of Bohemia and Moravia, the Czech economy became even more subject to German influence. The Reich intended to merge some Czech institutions with Reich ones, or at least to make them subordinate.

The Institute experienced this as early as at the beginning of April 1939 when it was visited by Rudolf Mentzel, a German chemist, the president of the Deutsche Forschungsgemeinschaft and also a representative of the Reich's Ministry for

100 Ibidem.

101 NA Archives, Czechoslovak Mines, national enterprise, General Directorate collection, box 244, inv. no. 562, Břetislav G. Šimek: Zpráva o vývoji Ústavu pro vědecký výzkum uhlí v letech 1938–1945 [Report on the Development of the Institute for Scientific Coal Research in 1938–1945].

Science, Pedagogy and People's Education.[102] Together with Erich Schumann, the head of the army high command research service, they suggested that the Institute be incorporated into the Kaiser-Wilhelm-Gesellschaft zur Förderung der Wissenschaften, the scientific association with which the Institute had earlier cooperated.[103] Mentzel and Schumann were reportedly surprised at the scarcity of resources available to the Institute, but perhaps that is why they expected that there would be no objections to the proposed restructuring.

The future of the Institute was to be decided by the leadership of the Association, which held a meeting on 23 May 1939. The idea of winding up the Institute was, however, still present, as to some members the Institute seemed unbearably expensive under the new conditions in the country. The key role at the meeting was played by the managing director of the Emperor Ferdinand Northern Railway, Ladislav Jerie, who firmly stood up for the complete preservation of the Institute. Jerie himself was a member of the Association's board from its establishment in 1927 and, as a member of the Economic Committee for the Research and Use of Fuels, part of the Coal Board, was understandably interested in maintaining Czech scientific research.[104] His own professional interest was the production of nitrogenous substances and, most importantly, he was the chairman of the Committee for the Establishment of a Factory for Synthetic Petrol Production from Ostrava Coal.[105]

According to later recollections, the only remaining German board member, Hans Hofer, the director of the J. Wilczek coal mines in Slezská Ostrava, was absent from this crucial meeting, but he attended the following meeting on the same day and his vote contributed to the decision on the Institute's future. Also thanks to him, the board decided that the Institute remain independent, as the Czech coal industry needed it for its tasks. The attempts to incorporate it into the Kaiser Wilhelm Society were rejected, giving the assurance that contacts with the Reich's scientific institutions and staff would continue to intensify and expand.[106] Karel

102 Scientific research for the Nazi state was planned and coordinated by the Reich's Research Council, of which R. Mentzel was the president. For details, see ŠIMŮNEK, Michal: „Německý vědecký generální štáb": Říšská rada pro výzkum (Reichsforschungsrat) v letech 1942–1945 ["German Scientific Headquarters": The Reich's Research Council (Reichsforschungsrat) in 1942–1945]. In *Věda a technika v českých zemích v období 2. světové války*. Eds. Miloš HOŘEJŠ, Ivana LORENCOVÁ. Praha: Národní technické muzeum, 2009, pp. 391–399.

103 NA Archives, Czechoslovak Mines, national enterprise, General Directorate collection, box 244, inv. no. 562, Břetislav G. Šimek: Zpráva o vývoji Ústavu pro vědecký výzkum uhlí v letech 1938–1945 [Report on the Development of the Institute for Scientific Coal Research in 1938–1945].

104 SMÉKAL, František (podle PETERS, Josef): *Statistická příručka československého hornictví pro rok 1935 [Statistical Yearbook of the Czechoslovak Mining Industry for 1935]*. Praha: Hornicko-Hutnické nakladatelství Prometheus, 1936, p. 286.

105 Czech: Výbor pro zřízení továrny na výrobu syntetického benzínu z ostravského uhlí. Gen. Ředitel ing. Lad. Jerie šedesátníkem [Managing Director Ladislav Jerie Turning 60]. *Národní listy,* 9 August 1938, Vol. 78, No. 217, p. 6.

106 NA Archives, Czechoslovak Mines, national enterprise, General Directorate collection, box 244, inv. no. 562, Břetislav G. Šimek: Zpráva o vývoji Ústavu pro vědecký výzkum uhlí v letech 1938–1945 [Report on the Development of the Institute for Scientific Coal Research in 1938–1945].

Ladislav Jerie.
In. Národní listy gazette, 9 August 1938, p. 6.

Gold, a German and the former director of the Citice-Habartov brown coal mining company near Karlovy Vary, an enterprise connected to the Sudeten German Mining Joint Stock[107], was elected the chairman of the Association. The scientific board and focus of the Institute did not change, with Břetislav G. Šimek staying on as the Institute's director.

When the questions over the Institute's existence had been cleared up, the leadership of the Association undertook to change its articles of incorporation in line with the new state order. Their amendment, approved on 27 June 1939, extended the contributor and membership base of the Association in order to provide sufficient funding for the Institute.[108] While this meant a relatively undisturbed working environment for the employees, for instance the director Břetislav G. Šimek together with Jaroslav Ludmila continued their work on the vacuum carbonisation of black coal and the germanium content of coal from the Ostrava-Karviná mining district,[109] the leading representatives of Czech industry and the Association had to face many forced organisational changes and pressure from Germany. Many enterprises were compelled to make capital transfers in connection with the requirement to hand

107 Czech: Sudetoněmecká báňská společnost, known as SUBAG.

108 NA Archives, Czechoslovak Mines, national enterprise, General Directorate collection, box 244, inv. no. 562, Břetislav G. Šimek: Zpráva o vývoji Ústavu pro vědecký výzkum uhlí v letech 1938–1945 [Report on the Development of the Institute for Scientific Coal Research in 1938–1945].

109 A AV ČR Archives, Masaryk Academy of Labour collection, box 39, inv. no. 339, Břetislav Šimek's personal file.

over the basic industrial enterprises to German management. The associated changes in the Association's board of trustees could be anticipated, and soon occurred.

An important change for Czech industry was the establishment of an organisation entitled Central Union of Industry for Bohemia and Moravia[110], with a compulsory membership, which was divided into 22 specialised economic groups. The first group, called Economic Group of the Mining Industry,[111] covered the extraction and production of ore, coal, crude oil etc.[112], and the Union of Mine Owners in Prague was entrusted with its control.[113] The activities of the Institute became fully dependent on the requirements of the Group, whose policy was on the edge between the obligatory cooperation with the Germans and resistance to instructions coming from the Reich.

The Closure of Universities

The environment in the Institute was intensely affected by the closure of the Czech universities after the burial of the student Jan Opletal[114] in November 1939. The Institute became one of the few refuges for students of technical disciplines, including Gustav Šebor, then 19, later the long-standing director of the Institute. However, in 1939 he was just a student of the College of Chemical Engineering and Technology[115] and worked at the Institute as a helping hand, later as a chemist. He was first involved in the analytics of coal and its by-products, especially tar, and helped to conceive a new method for producing phthalic acid anhydride through naphthalene oxidation. In his research, therefore, he used Heyrovsky's polarographic method.[116]

The closure of the universities also accelerated negotiations with the Association for Chemical and Metallurgical Production which, after the events in Munich, lost its research laboratories in Ústí nad Labem and was frequently using university laboratories. From the summer 1939 talks were also held concerning possible cooperation with the Institute for Scientific Coal research, where many employees of the Association for Chemical and Metallurgical Production were transferred in the following years.[117] They worked at the Institute's laboratories until a new laboratory complex

110 Czech: Ústřední svaz průmyslu pro Čechy a Moravu, 1939–1950 (abolished by government decree).

111 Czech: Hospodářská skupina báňského průmyslu.

112 *Průvodce řízeným hospodářstvím Čech a Moravy. Co znát o nových institucích a úřadech [Guidebook to the Controlled Economy of Bohemia and Moravia. What to Know of the New Institutions and Authorities]*. Red. Otto Müller. Praha: Grafia, 1941, p. 27.

113 Odborné hospodářské skupiny [Specialised Economic Groups]. *Lidové noviny*, 11 November 1939, Vol. 47, No. 566, p. 8.

114 Jan Opletal (1915–1939), a Medical Faculty student who was shot at an anti-Nazi demonstration on Czechoslovak Independence Day (28 October 1939); he died two weeks later.

115 Czech: Vysoká škola chemicko-technologického inženýrství (VŠCHTI), part of the Czech Technical University in Prague.

116 A AV ČR Archives, Personal Files of ČSAV Members collection, box 80, Gustav Šebor's personal file.

117 NA Archives, Czechoslovak Mines, national enterprise, General Directorate collection, box 244, inv. no. 562, Břetislav G. Šimek: Zpráva o vývoji Ústavu pro vědecký výzkum uhlí v letech 1938–1945 [Report on the Development of the Institute for Scientific Coal Research in 1938–1945].

in Rybitví, near Pardubice, was opened in 1941.[118] The mutual cooperation, however, continued, and some staff stayed in the Libeň-based Institute until the end of the war.

During the occupation, the role of the Institute's library also grew stronger as it remained open after 1939 for students, too. Besides studying, it also allowed social events and meetings to be held. As the Institute's director Břetislav G. Šimek recollected after the war, *"... our Institute's library became a much sought-after centre for the Czech technology students who used it to look up not only the literature they needed at the time, but also as the source of further cultural life"*.[119] In saying so, he pointed out the fact that the library was a place where the Prague branch of the Czech Chemical Society[120], which he then chaired, held its meetings. However, the premises also had to be loaned several times for the meetings of the local branch of the NSDAP, at the request of the German board of trustees.[121]

Germanisation of the Institute and Persecution of the Jews

The board of trustees of the Institute for Scientific Coal Research Association was quickly turning German at the outbreak of war. This was linked with the staff reshuffles in the leadership of the enterprises that were members of the Association. However, there were many board members that were not particularly interested in the activities of the Institute, as the enterprises were kept occupied with their own problems in connection with the switch to warfare production.[122] Besides the Chairman Karel Gold, those interested in the Institute's activities, included, for instance, Emil Sedlák, the pre-war chairman of the Union of Mine Owners, and Eduard Czeike Zentzytzki, the chief director of the Prague Ironworks Company with good links

118 On building up the research institute in Rybitví, see LORENCOVÁ, Ivana: Chemický výzkum ve Spolku pro chemickou a hutní výrobu v 1. polovině 20. století [Chemical Research in the Association for Chemical and Metallurgical Production in the 1st half of the 20th century]. *Rozpravy Národního technického muzea* (Vol. 203, Dějiny vědy a techniky 15), Praha 2007, pp. 7–20; LORENCOVÁ, Ivana: Výstavba chemických závodů Spolku pro chemickou a hutní výrobu v období protektorátu v Rybitví u Pardubic [Building up of the Chemical Plant of the Association for Chemical and Metallurgical Production in Rybitví, near Pardubice, during the Protectorate]. In *Věda a technika v českých zemích v období 2. světové války*. Eds. Miloš HOŘEJŠ, Ivana LORENCOVÁ. Praha: Národní technické muzeum, 2009, pp. 337–355.

119 NA Archives, Czechoslovak Mines, national enterprise, General Directorate collection, box 244, inv. no. 562, Břetislav G. Šimek: Zpráva o vývoji Ústavu pro vědecký výzkum uhlí v letech 1938–1945 [Report on the Development of the Institute for Scientific Coal Research in 1938–1945].

120 Czech: Česká společnost chemická (1906–1920).

121 Nationalsozialistische Deutsche Arbeiterpartei [National Socialist German Workers' Party]. An extreme right party, whose members called themselves the Nazis.

122 PÁTEK, Jaroslav: Zápas Živnostenské banky s Mannesmannovým koncernem o Pražskou železářskou společnost [The Struggle of Zivnostenska banka against the Mannesmann Concern for the Prague Ironworks Company]. In *Pocta profesoru Zdeňku Jindrovi. K sedmdesátým narozeninám* (Acta Universitatis Carolinae, Philosophica et historica, 3/1998, Studia historica 50). Ed. Drahomír JANČÍK. Praha: Univerzita Karlova, 2003, pp. 303–312.

with the Institute from the pre-war era. Eduard Czeike Zentzytzki, as the deputy chairman of the Association, was very positive towards the needs of the Institute, but after conflicts within the Prague Ironworks Company in 1943, he resigned as the chief director.[123] A high-ranking position in Czech industry during the Protectorate would not have been of much benefit for him in the future anyway, and after the war his house in the Prague district of Střešovice was confiscated.[124]

Unlike the board, the Institute itself did not undergo any particular process of Germanisation. It had good relationships with the German universities in Prague as well as various scientific institutions in Germany, and had cooperated with them frequently since the 1930s. The change in the political circumstances during the Protectorate, however, naturally led employees to be fairly cautious as regards German institutions. Greater openness was shown towards Czech institutions, even though the German board was not much in favour of that.

After the Munich events, and even more intensely after the establishment of the Protectorate, the Jewish inhabitants were experiencing constant persecution in the Czech lands as well. They had to face hateful harassment at first, followed by the slow implementation of the Nuremberg laws. It was primarily the Aryanisation of Jewish property, followed by the dismissal of the Jews from their jobs, restrictions on their use of public transport and the obligation to wear the Star of David on their clothes. The Jews gradually lost their civil rights and were eventually deported en-mass to the concentration camps, from where many of them never returned. The increasing persecution also affected some of the Institute's employees.

In connection with the deteriorating financial condition of the Institute at the end of 1938, when the number of members again decreased, savings were necessary and the leadership had to dismiss several employees, including Jewish ones. While in the autumn of 1938 four Jews were employed in the Institute, in spring 1939 there were only two. Their fates differed substantially. August Stadler, who had worked for the Institute since the early 1930s, fled before war broke out in the summer 1939 through Poland to Great Britain. Antonín Edinger, on the contrary, stayed in the Institute and managed to procure Aryan identity documents during the occupation. He later left his job, but the Institute continued to pay him, for instance, for translations and tried to secretly support him.[125]

123 BALCAR, Jaromír: *Panzer für Hitler – Traktoren für Stalin. Grossunternehmen in Böhmen und Mähren 1938–1950 [Armours for Hitler – Tractors for Stalin. Large-scale Businesses in Bohemia and Moravia, 1938–1950]*. München: Oldenbourg Verlag, 2014, pp. 67, 76, 80, 105, 133, 258, 311.

124 LAŠŤOVKA, Marek – VOKÁČOVÁ, Petra: Ústřední národní výbor hlavního města Prahy – Referát pro národní správu majetku a následující agendy 1945–1949 (1969). Inventář [*City of Prague Central National Council – Office for the National Administration of Property and the Following Agendas 1945–1949 (1969). Inventory Book]*. Praha: Archiv hlavního města Prahy, 2007.

125 NA Archives, Czechoslovak Mines, national enterprise, General Directorate collection, box 244, inv. no. 562, Břetislav G. Šimek: Zpráva o vývoji Ústavu pro vědecký výzkum uhlí v letech 1938–1945 [Report on the Development of the Institute for Scientific Coal Research in 1938–1945].

Robert Kassler.
NA Archives, Police Headquarters II collection, box 7335, sign. K690-7.

During the war, the German chemist Hans Zocher (1893–1973) also came to the Institute after working for the Chemical Department of the German Technical University in Prague until 1939. In the reorganisation of the university he had to leave as his wife was Jewish. He joined the Institute as an employee of the Association for Chemical and Metallurgical Production which, during the occupation, developed cooperation with the Institute. He was referred to as someone who, despite the racial rage of the Nazis, employed Jews.[126] The rumour was confirmed when he employed the chemist Robert Kassler,[127] a former employee of the Institute of Organic and Inorganic Chemistry of the German Technical University in Prague and the Ostrava Moravian Chemical Enterprise.[128] Robert Kassler cooperated with the Institute for Scientific Coal Research from the early 1930s and, together with Hans Tropsch, also published some studies, for instance on the elimination of nitrogen dioxide from coke oven gas or the preparation of pure ethylene and ethyl alcohol.[129]

126 JOSEFOVIČOVÁ, Milena: *Německá vysoká škola technická v Praze 1938–1945. Struktura, správa, lidé [German Technical University in Prague 1938–1945. Structure, Administration, People]*. Praha: Univerzita Karlova – Nakladatelství Karolinum, 2017, pp. 60–61.

127 NA Archives, Czechoslovak Mines, national enterprise, General Directorate collection, box 244, inv. no. 562, Břetislav G. Šimek: Zpráva o vývoji Ústavu pro vědecký výzkum uhlí v letech 1938–1945 [Report on the Development of the Institute for Scientific Coal Research in 1938–1945].

128 Czech: Ústav anorganické a analytické chemie Německé vysoké školy technické v Praze; Moravsko-ostravské chemické závody, 1920–1945.

129 Zprávy Ústavu pro vědecký výzkum uhlí v Praze [News from the Institute for Scientific Coal Research]. *Chemické listy pro vědu a průmysl*, 25 March 1932, Vol. 26, No. 6, p. 154.

When the war began, his position became more and more difficult, and even though he tried to keep a low profile and the Institute did not mention him anywhere, the authorities became interested in him in December 1941.[130] Eventually he was transported to the Terezín camp in July 1943 and died in the Oswiecim camp in October the same year.[131]

The Rokoska Premises during World War Two

During the occupation, the premises of the research institute at Rokoska 94 attracted an array of candidates interested in acquiring it. No wonder, as besides its modern and well-equipped laboratories, it offered potential for further expansion given the extensive scale of the property. Also the good public transport links played an important role. Trams began to service the Vychovatelna stop from the lower parts of Libeň in 1910, even before the construction of the Vydra Consumables Factory. In 1924 the tram line was extended to Kobylisy and in 1936 it was connected to the line from the Holešovice train station via the Trojský bridge and Pelc-Tyrolka directly to the Institute.

The buildings could be used not only for scientific research but possibly also for a factory. That is why the German authorities repeatedly attempted to incorporate the Institute into their institutions. Besides the aforementioned case of April 1939, when its incorporation into the Kaiser Wilhelm Society for the Support of Sciences was discussed, this came up at least twice. In spring 1939 the then dean of the German Technical University in Prague and a senator for SdP Kurt Brass[132] advocated, in connection with the increasing importance of glassmaking and the ceramics industry, the idea of establishing an Institute for Chemistry of Silicates and proposed that it be located at Rokoska. However, at that time he was only planning to move it in. The new university institute was eventually not established, also owing to the political downfall of Kurt Brass, who lost his position as dean.[133] Shortly afterwards, in March 1940, there was talk of the Institute being directly appended to the German Technical University in Prague, but this time again the plans were in vain, as the key factor for the Institute were its ties with

130 NA Archives, Czechoslovak Mines, national enterprise, General Directorate collection, box 244, inv. no. 562, Břetislav G. Šimek: Zpráva o vývoji Ústavu pro vědecký výzkum uhlí v letech 1938–1945 [Report on the Development of the Institute for Scientific Coal Research in 1938–1945].

131 Database of holocaust victims [online]. [Accessed on 2 June 2017]. Available on www: http://www.holocaust.cz/databaze-obeti/obet/97469-robert-kassler/ .

132 Kurt Brass (1880–1964), in 1936–1939 a senator of the Czechoslovak National Assembly for the Sudeten German Party (Sudetendeutsche Partei).

133 JOSEFOVIČOVÁ, Milena: *Německá vysoká škola technická v Praze 1938–1945. Struktura, správa, lidé [German Technical University in Prague 1938–1945. Structure, Administration, People]*. Praha: Univerzita Karlova – Nakladatelství Karolinum, 2017, pp. 76–81.

Period view of the traffic situation around the Institute's premises, 1936.
Archives of the Municipal Transport Company of the City of Prague.

industry.[134] This was probably the decisive factor, in the end, for leaving the Institute under the control of an association-type organisation in the Protectorate's industry.

The Assassination Attempt on Heydrich

The atmosphere in the Protectorate of Bohemia and Moravia changed considerably after the appointment of Reinhard Heydrich as the acting Reichsprotector in September 1941.

Considering the conditions in the Protectorate and the diplomatic objectives of the Czechoslovak government-in-exile in London, some members of the Czechoslovak resistance movement became convinced that Heydrich should be liquidated. This task was undertaken by the paratroopers' airdrop sent from Great Britain under the code name Operation Anthropoid. The paratroopers Jan Kubiš and Jozef Gabčík chose the sharp bend between the streets Kirchmayerova (sometimes also Kirchmaierova,

134 NA Archives, Czechoslovak Mines, national enterprise, General Directorate collection, box 244, inv. no. 562, Břetislav G. Šimek: Zpráva o vývoji Ústavu pro vědecký výzkum uhlí v letech 1938–1945 [Report on the Development of the Institute for Scientific Coal Research in 1938–1945].

today Zenklova) and V Holešovičkách, in the proximity of the Institute for Scientific Coal Research, where Heydrich would regularly be driven on his way from Panenské Břežany, as the best place for the attempt. The place was a strategic location, especially because every car had to slow down there, which gave the assailants enough time to attack. Another reason was that nothing could be seen beyond the Institute's garden with its tall trees, so neither the driver Johannes Klein nor Reinhard Heydrich had the slightest idea of the impending attack until the very last moment.

The action itself took place on 27 May 1942 at around half past ten in the morning. As part of the hunt for the attackers, possible witnesses were immediately interrogated, mostly passers-by and people from the tram that had driven past, and the investigation also included the Institute's staff. Although, according to the period records, no one from the Institute had seen anything and the Institute apparently had nothing to do with the attempt, the consequences of the furious search for the perpetrators and the desire for revenge resulted in the all the trees being cut down in the Institute's garden, which had provided the paratroopers with such convenient conditions for their act.[135]

Science and Research during the Protectorate

With the changing atmosphere in the Protectorate, the tension among Czech scientists slowly grew. The overall nervousness also affected the director of the Institute, Břetislav G. Šimek, in November 1939. He was accused of allegedly taking a stand against the Masaryk Academy of Labour at the general meeting of the Czech Union for the Research and Testing of Substances and Structures of Technical Importance[136]. Šimek responded to these accusations with a letter in which he wrote, "*At such a serious time I do not intend to allow a discussion to unfold on the subject of the above statement. However, I must strongly object to the accusations and derogations against the Academy.*" The conflict lay in the fact that Břetislav G. Šimek meant his critical words as a contribution to the discussion to improve the operation of the Masaryk Academy of Labour, while its leaders saw this as an assault on the substance of the institution. Šimek therefore preferred to resign from his position at the Academy to avoid further conflicts, and did not come back until 1945.[137]

During the war, Šimek confined himself to organisational work in the Czech Chemical Society and scientific research in the Institute. However, the question of what parts of the research results should be published and thus served to the German occupants, and what should better be kept secret, was becoming all the more urgent. The staff usually preferred to publish only analytical papers or papers that were of negligible importance for the war economy. However, the authors could not avoid

135 Ibidem.

136 Czech: Český svaz pro výzkum a zkoušení technicky důležitých látek a konstrukcí.

137 A AV ČR Archives, Masaryk Academy of Labour collection, box 39, inv. no. 339, Břetislav Šimek's personal file.

publishing in German, in which for instance a study on determining water content through xylene distillation was published. A paper entitled *Adjustment for Heat Exchange in Fuel Calometry* was published in 1942 in Czech and German, and the *Critical Considerations of Determining Water Content in Solid Fuels*[138] were published at the same time.[139] The Liquid Fuels section in particular, headed by Jiří Helm from 1937, was involved in resolving the production of petrol from coal. Car fuels and their sufficiency or lack thereof in fact played a very important role in the Reich's war economy.

Besides this, however, tasks were also assigned from places higher up from time to time. One such place was the Central for Generators in Berlin, the aim of which was to obtain fuel for all engine-powered generators in civil as well as military transport. Its head officer Rudolf Beyschlag, who also worked for the Technical University in Berlin, came up with the idea of substituting lignite for wood, and turned to the Institute in this respect. However, Beyschlag's plan failed as it did not prove viable in laboratory or practical tests.

This was certainly not the only case of dictating the Institute what to research. The Central Union of Industry urged that the Institute carry out research into briquetting North Bohemian char as its forced purchase caused considerable difficulties for local enterprises. At the initiative of the chairman of the Association Karel Gold, cooperation was agreed between the petrol factory in Horní Litvínov, the Czech-Moravian Engineering Works[140] and the Institute in the area of char briquetting. The plant in Horní Litvínov even gave the Institute a subsidy of half a million crowns for the purpose. At that time, the construction of an experimental briquetting shop at the Institute was anticipated; however, the plan did not come to fruition until many years later. The Central for Generators then expected that a test room for generator fuels would be built directly in the Institute, too, but the employees purposefully kept slowing the construction works and it was eventually not put into operation.[141] The topic of generator fuels and briquetting char from the Most area, however, formed the bulk of the Institute's work during the occupation.[142]

The scientific work at the Institute was also considerably dependent on the provision of supplies. The occupying power required that supplies be reported, especially petrol. However, according to later recollections, the Institute followed

138 Czech: *Oprava za výměnu tepla při kalometrii paliv; Kritické úvahy o stanovení vody v tuhých palivech*.

139 A AV ČR Archives, Masaryk Academy of Labour collection, box 39, inv. no. 339, Břetislav Šimek's personal file.

140 German: Böhmisch-Mährische Maschinenfabrik AG, renamed in 1940 from the Českomoravská-Kolben-Daněk concern.

141 NA Archives, Czechoslovak Mines, national enterprise, General Directorate collection, box 244, inv. no. 562, Břetislav G. Šimek: Zpráva o vývoji Ústavu pro vědecký výzkum uhlí v letech 1938–1945 [Report on the Development of the Institute for Scientific Coal Research in 1938–1945].

142 KESSLER, Miroslav Ferdinand: Výzkum chemie uhlí v letech 1945–1960 [Coal Chemistry Research in 1945–1960]. In *Věda v Československu 1945–1960*. (1. svazek. Pracovní zasedání 22.–23. 10. 1980). Praha: Ústav československých a světových dějin ČSAV, 1982, pp. 531–548.

the principle that nothing should be reported, and this worked surprisingly well. In 1943 and 1944, it even succeeded, with the assistance of its contacts from the Ministry, in purchasing platinum, gold and silver.[143] During the war, the Institute was part of the specialised Mining Industry Group, which did not engage in any particular activity with regard to planning scientific research, while the major task was to increase work productivity in the mines. However, the Group was of invaluable importance for the Institute when providing supplies of various materials, such as iron or steel. The situation in supplies worsened substantially after all-out war was declared in connection with the German failures at the Russian front. At that time the *Coal* and *Mining and Metallurgy Magazine*[144] journals were banned[145] and the Institute's employees resorted to publishing in *Chemical Journal for Science and Industry* and in the magazine *Gas, Water and Medical Equipment*.[146] In the last months of the war, they tried to restrict their benefits for the occupying power as much as possible, while doing their best to put suitable conditions in place for post-war renewal.

Prague Uprising and the End of the War

As the East and West fronts approached the Czech borders during the war, the mood of resistance was increasing among the Czech population. At the same time, however, the allied bombardment of the Czech lands continued. Prague was hit as early as on 15 November 1944, and then again on 14 February 1945 and 25 March 1945. While in November 1944 the raid only damaged the Holešovice power plant and the nearby houses, the next two bombardments in 1945 were much more destructive. Bombs hit the districts of Smíchov, Nusle, Vršovice, Žižkov, Nové Město near Charles Square and Vinohrady. The March raid was targeted at industrial enterprises in Vysočany and Libeň, and also the Kbely and Letňany airports. As regards Libeň, especially the area around the then Praga factory and the train station suffered considerable damage, while the upper parts of Libeň, including the Institute site, remained unscathed.

However, the Institute's premises were in danger during the Prague Uprising, when German tanks attacked Prague from several directions at the same time. The 'Der Führer' tank bomber regiment was pushing forward from the north, and after a struggle against Prague's insurgents from Dolní Chabry on 6 May it seized Kobylisy around midnight. By then the tanks had drawn very close to the Institute. In the morning of 7 May the Germans began to proceed towards the Trojský bridge

143 NA Archives, Czechoslovak Mines, national enterprise, General Directorate collection, box 244, inv. no. 562, Břetislav G. Šimek: Zpráva o vývoji Ústavu pro vědecký výzkum uhlí v letech 1938–1945 [Report on the Development of the Institute for Scientific Coal Research in 1938–1945].

144 Czech: *Hornicko-hutnické listy.*

145 MAJER, Jiří: Hornictví [Mining]. In *Studie o technice v Českých zemích V. 1918–1945 (1. část)*. Ed. Ivan SMOLKA. Praha: Národní technické muzeum, 1995, p. 66.

146 Czech: *Chemické listy pro vědu a průmysl* (1907–1950); *Plyn, voda a zdravotní technika* (1936–1945).

(today the Barikádníků Bridge) while an insurgent unit was attacking them from Slovanka and Okrouhlík. The insurgents successfully put a German tank out of action, but soon had to withdraw.[147] During these local clashes not only the premises of the Institute were under threat, but also some employees who lived there, for instance, the director Šimek. But eventually no major damage was done to the buildings, except for a garden wall column which was torn down by a tank driving by, and several windows broken by gunfire.[148]

Post-war Renewal of the Institute (1945–1947)

After the end of the war an extensive renewal began in all spheres of national life. The Protectorate experience brought forth the desire to build a better society and an economic system which would prevent another crisis and war, and also promote the growing importance of natural and technical sciences. The key role in this was played by the Decrees of the President of the Republic Edvard Beneš, including a decree which nationalised mines and some industrial enterprises.[149] Even before that, national administrators had been appointed in many enterprises to replace the German, Hungarian or collaborator managements and to maintain their uninterrupted operation.

National administration was also introduced in the Institute for Scientific Coal Research Association as it had been under the control of the German board of trustees during the war. The head of the national administration here was Zdeněk Maloch, the Association's former statutory representative, who exerted a substantial influence in the years just after the war. A new body was established, called the Technical Board[150], which was to act on behalf of the member enterprises in decisions concerning all issues that were under the competence of the national administrator, and thus to play a role in shaping the future of the Institute. Emil Petýrek was elected as the chairman of the Technical Board and Břetislav G. Šimek, the director of the Institute, became the Board's statutory representative. Other members included representatives of national enterprises, primarily Czechoslovak Mines[151], with František Špetl, who would go on to be an important figure at the Institute.[152]

147 KOKOŠKA, Stanislav: *Praha v květnu 1945. Historie jednoho povstání [Prague in May 1945, The History of One Uprising]*. Praha: Nakladatelství Lidové noviny, 2005, pp. 153, 173–174.

148 NA Archives, Czechoslovak Mines, national enterprise, General Directorate collection, box 244, inv. no. 562, Břetislav G. Šimek: Zpráva o vývoji Ústavu pro vědecký výzkum uhlí v letech 1938–1945 [Report on the Development of the Institute for Scientific Coal Research in 1938–1945].

149 Dekret prezidenta republiky ze dne 24. 10. 1945 o znárodnění dolů a některých průmyslových podniků, č. 100/1945 Sb. [Decree of the President of the Republic dated 24 October 1945 on the Nationalisation of Mines and Some Industrial Enterprises, no. 100/1945 Coll.] In *Sbírka zákonů a nařízení republiky Československé*. Praha: Státní tiskárna, 1945–1947.

150 Czech: Technický výbor.

151 Czech: Československé doly, established 1945.

152 NA Archives, Czechoslovak Mines, national enterprise, General Directorate collection, box 244, inv. no. 562, Zpráva o činnosti Ústavu pro vědecký výzkum uhlí v Praze pod národní správou v roce

In the first months under the national administration, the Institute went through a relatively difficult period. In summer 1945 a great many employees left, both in connection with the reopening of universities and as brand new opportunities emerged for the staff. The head count dropped to twenty, as a result of which some departments had to be closed down. The crisis in the Institute was also intensified by other circumstances. At the end of the war the ties to industrial enterprises were broken and were difficult to re-establish in 1945. Some enterprises declined to participate in joint projects because they were working on their post-war renewal. One the few exceptions was the Škoda works[153] which, on the contrary, welcomed the cooperation.

The leadership of the Institute was aware that its position would no longer be the same as it had been during the so-called First Republic (1918–1938) and therefore did not hesitate, from the very beginning, to establish new links with the state, especially the Ministry of Industry.[154] In coordination with the ministry, the Institute redefined its focus, and concentrated on matters related to the production and treatment of fuels, namely coal, crude oil, gases and ores, while consumer matters were the task of other institutions, for instance the Institute for the Efficient Use of Fuels.

The situation in the Institute had gradually improved, and by 1946 it had 8 scientific staff and 23 chemists of various qualifications, some of whom still continued their training and education. The Institute soon regained the renown it used to have among the Czechoslovak research institutions, and its representatives joined in the preparation of the Two-year National Economy Plan and the act on research work, which became effective on 23 December 1949 as Act 261/1949 Coll. on the Organisation of Research Work and the Documentation Service. The Institute also cooperated with the College of Chemical Engineering and Technology at the Czech Technical University, providing it with the use of laboratories as well as professional guidance. Many students took their practical classes in fuels and incandescent materials at the Institute under the supervision of its more experienced scientific staff.[155]

Despite the nationalisation of most enterprises, the Institute for Scientific Coal Research remained an association-type organisation. In practice, this meant that it was financed from the contributions of its member enterprises and worked in their interests. All national mining enterprises became members of the Association,

1945 a 1946 [Report on the Development of the Institute for Scientific Coal Research under the National Administration in 1945 and 1946].

153 The Škoda Machinery Company was established by Emil Škoda in 1866. In the period between the wars it became one of the biggest machinery companies in Europe.

154 NA Archives, Czechoslovak Mines, national enterprise, General Directorate collection, box 244, inv. no. 562, Zpráva o činnosti Ústavu pro vědecký výzkum uhlí v Praze pod národní správou v roce 1945 a 1946 [Report on the Development of the Institute for Scientific Coal Research under the National Administration in 1945 and 1946].

155 Ibidem.

irrespective of whether they mined coal, ore or crude oil. After many years, those enterprises that had been outside the Protectorate rejoined as members again.[156]

However, in the first months after the war it began to appear that the stabilisation of the Institute's economy would be a long-term task. On the one hand, demands to extend the Institute's research activities were increasing, and in 1946, for instance, coal preparation as a new discipline was introduced and a new preparatory laboratory was built. On the other hand, the enterprises were reluctant to pay membership fees to the Institute. As early as in 1947 the North Bohemian Brown Coal Mines claimed that it would be more appropriate to merge the Institute with the competing Institute for the Efficient Use of Fuels and convert it into a publicly funded state institute, as the Institute worked for the nationalised industry anyway.[157] The difficult financial situation the Institute was facing raised the real threat that most of the staff would leave, which the director Šimek averted by promising higher salaries.[158] In fact the Institute needed to expand its staff numbers at the same time in order to be able to carry out all of its tasks, and even introduced a training course for its laboratory personnel.

By 1947 the annual activity report noted an improvement in the Institute's funding and staffing. The staff fluctuation ceased and it was time for the Institute to turn its attention to equipping the laboratories.[159] As the institution expanded, and the demands for coal preparation and analytical activities grew, making it necessary to procure new instruments, it began to become apparent that the placement of the laboratories would be one of the Institute's major issues in the upcoming years. Despite many shortcomings, readers of the publication entitled Czechoslovak Mines, published in 1947, learned that *"The Institute, with its equipment and scientific and technical expertise, is now the best institute of its type in Europe."*[160]

At the 12th regular general meeting of the Institute, held on 24 April 1947, the national administration of the Institute was abolished and a new board of trustees was elected. Svatopluk Rada, then the general manager of the Czechoslovak Mines state enterprise, was elected the new chairman of the Association. Samo Hloška,

156 Ibidem.

157 NA Archives, Czechoslovak Mines, national enterprise, General Directorate collection, box 187, inv. no. 241, Korespondence [Correspondence].

158 NA Archives, Czechoslovak Mines, national enterprise, General Directorate collection, box 244, inv. no. 562, Zpráva o činnosti Ústavu pro vědecký výzkum uhlí v Praze pod národní správou v roce 1945 a 1946 [Report on the Development of the Institute for Scientific Coal Research under the National Administration in 1945 and 1946].

159 NA Archives, Czechoslovak Mines, national enterprise, General Directorate collection, box 187, inv. no. 421, Zpráva o činnosti Ústavu pro vědecký výzkum uhlí a nerostů v Praze v roce 1947 [Report on the Development of the Institute for Scientific Coal and Mineral Research in Prague in 1947].

160 MACEK, Ladislav: Československé doly. Organizace, problémy a úkoly znárodněných československých dolů *[Czechoslovak Mines. Organisation, Issues and Tasks of the Nationalised Czechoslovak Mines]*. Praha: Československé doly, n. p., 1947, pp. 31–32.

the regional director of the national enterprise Mines and Foundries in Slovakia[161], and the deputy directors to the general manager of Czechoslovak Mines Samuel Pilz and Jaroslav Wurm, were elected as deputy chairmen. The key position of the Association's statutory representative was undertaken by František Špetl. The Technical Board, originally established only for the duration of national administration, proved to have served its purpose well and was therefore left in place. Emil Petýrek remained its chairman, Břetislav G. Šimek its statutory representative, and František Špetl was one of the other eight members.[162] The new articles of incorporation also enacted the change of the Institute's name to **Institute for Scientific Coal and Mineral Research** (ÚVVUN)[163] due to the fact that its research scope had been extended.

It is worth describing in detail the Association's chairman at that time, Svatopluk Rada. He was the head of the Institute and the chairman of the Association until the Institute's statute of an association-type organisation was cancelled in 1949. Svatopluk Rada (1903–1952) was an important figure in the post-war economy. He graduated from the Mining Academy in Příbram and gained valuable experience during the time he worked in the Donets coal basin in the Soviet Union. As an employee of the Mining and Metallurgical Company, he was a director of ore mines in Bulgaria. The high point of his career was at the end of World War Two. He had spent the war in the Soviet Union and joined the Communist party of Czechoslovakia in 1943. He was also an officer in the Czechoslovak Army.[164] After the establishment of Czechoslovak Mines as a national enterprise he became its central director, took the position of deputy minister[165] and became a member of the National Economy Board of the Central Committee of the Communist Party.[166] As the government commissioner for uranium mining, he held a great deal of power. However, in 1950 he was withdrawn from the management of Czechoslovak Mines, reportedly to enable him to devote himself fully to his work for the ministry.[167] Shortly afterwards he was arrested because he was incorporated by the regime into a huge political trial against Rudolf Slánský, and in April 1952 he committed suicide.[168]

161 Slovak: Bane a huty na Slovensku, n.p.

162 NA Archives, Czechoslovak Mines, national enterprise, General Directorate collection, box 121, inv. no. 276.

163 Czech: Ústav pro vědecký výzkum uhlí a nerostů.

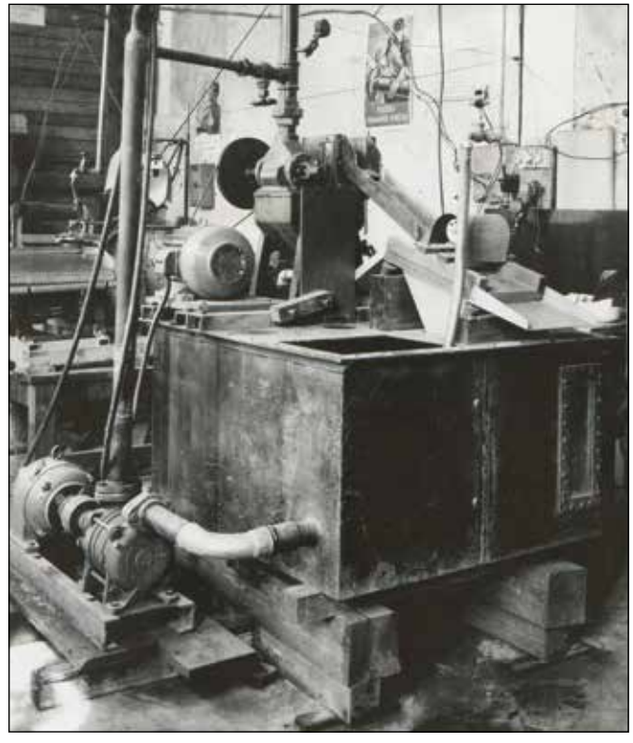
164 Posmrtná rehabilitace [Post-mortem Rehabilitation]. *Naše pravda*, 24 May 1968, p. 3; VALIŠ, Zdeněk: *Velitelství osvobozeného území v dokumentech 1944–1945 [High Command of the Liberated Territory in Documents, 1944–1945]*. Praha: Ústav pro studium totalitních režimů, 2016, p. 248.

165 The post of the deputy minister was probably related to his position as the central director of Czechoslovak Mines.

166 KELLER, Filip: *Národohospodářská komise ÚV KSČ 1945–1948. Aktéři a ideologie [The National Economy Board of the Central Committee of the Communist Party of Czechoslovakia, 1945–1948. Agents and Ideology]*. (Bachelor's thesis), Praha: Ústav hospodářských a sociálních dějin FF UK v Praze, 2012, p. 64.

167 *Rudé právo* [a daily], 15 November 1950, Vol. 31, No. 270, p. 1.

168 Posmrtná rehabilitace [Posthumous Rehabilitation]. *Naše pravda*, 24 May 1968, p. 3.



An example of the Institute's instruments. A device for the vacuum carbonisation of black coal, in which brown coal was also tested. Photograph from the Institute's 1952 annual report.
NA Archives, Ministry for Fuels and the Power Industry collection, box 110, inv. no. 84.

The Year 1948 in the Institute

In February 1948 the Communist Party of Czechoslovakia gained total control of the state and launched a major transformation of the state system and society. The new regime paid considerable attention, amongst other things, to the mining industry as an important segment in the state's new economy. The events of February 1948 also brought organisational changes in the Institute. Each member enterprise now had just one vote at the general meeting, irrespective of its financial contribution.[169]

Inside the Institute the director Šimek met with opposition from the machine operator Václav Hron and the chairman of the organisation's board František Kupka. Václav Hron, just like Břetislav G. Šimek, lived in an apartment directly within the Institute, and the conflict against the director may have arisen from neighbourly

169 NA Archives, Czechoslovak Mines, national enterprise, General Directorate collection, box 175, inv. no. 374, Zápis o XIV. řádném valném shromáždění Ústavu pro vědecký výzkum uhlí a nerostů [Minutes from the 14th ordinary general meeting of the Institute for Scientific Coal and Mineral Research], 29 June 1949.

issues. At the proposal of the Technical Board, whose members also included the director Šimek, the office of the director was divided into two positions, the professional (technical) director and the economic and administrative director. Břetislav G. Šimek continued as the technical director, and Hynek Bezděka was put in charge of economic and administrative matters. This eased the situation.[170]

At that time the Institute had seven departments and laboratories: Chemical and technological processing of coal, Chemical and technological processing of crude oil, Chemical and technological processing of gas, Coal treatment and coking, and the Coal preparation laboratory with the section for the mechanical treatment of coal and ores and the section for the technological treatment of coal and ores. Analytical laboratories were divided by their focus on coal, inorganic chemistry, oils, gases and coke and the physics section.[171]

After February 1948 the purchase of books from abroad was restricted, and as the Institute was not allowed to "receive foreign currency", it was impossible even to buy some instruments from abroad.[172] On the contrary, construction investments and some research tasks were lavishly sponsored by the Ministry of Industry. In line with the political trends, efforts were being stepped up to change the association-type status of the Institute into an institute under the direct competence of a ministry or a national enterprise. The status was eventually cancelled in July 1949 when the Institute was incorporated under the general directorate of the national enterprise Czechoslovak Mines within the competence of the Ministry of Industry, from 1950 the Ministry for Heavy Industry.[173]

Scientific Activities in the Institute in the Late 1940s

In the first years after the war the development of the Institute's scientific activities was reflected by the head count. The Institute's staff also published some of the papers that they had worked on back during the occupation. Research tasks were aligned with the new requirements of the time, with an increased focus on coal preparation and mineral research in particular. The year 1947 saw a series of successful events. The Institute renewed its international links, it represented the Czech Republic, for instance, at the World Power Congress in The Hague in September 1947 and talks were launched on scientific and technical cooperation with the Polish coal industry

170 NTM Archives, František Špetl collection, box 22, personal file, professional assessment.
171 NA Archives, Czechoslovak Mines, national enterprise, General Directorate collection, box 244, inv. no. 562, Zpráva o činnosti Ústavu pro vědecký výzkum uhlí a nerostů v roce 1948 [Report on the Development of the Institute for Scientific Coal and Mineral Research in 1948].
172 NA Archives, Czechoslovak Mines, national enterprise, General Directorate collection, box 175, inv. no. 374, Vysvětlivky k hospodaření za rok 1948, rozbor nákladů na rok 1949 [Explanatory notes on the economy for 1948, cost analysis for 1949].
173 NA Archives, Czechoslovak Mines, national enterprise, General Directorate collection, box 175, inv. no. 374, Zápis o XIV. valném shromáždění Ústavu pro vědecký výzkum uhlí a nerostů [Record on the 14th general meeting of the Institute for Scientific Coal and Mineral Research], 29 June 1949.

Photograph from a session of the Coal Committee – coal classification committee. František Špetl in the photograph, 1949. Photo by J. Cadoux Photographie.
NTM Archives, František Špetl collection, box 22, personal file.

research institutes in Katowice and Gliwice. Besides this, the Institute was visited by experts from the USA, Holland, Poland, Bulgaria, England, France, Romania, Australia and India. Even cooperation with the Soviet Union, at that time all the more encouraged, was not overlooked. The director Šimek and others established contacts with some Soviet scientists and the Institute was also a member of the Technical Section of the Society for Cultural and Economic Links with the Soviet Union.[174]

In scientific terms, the Institute saw a major expansion and within two years after the war it held patents for a catalyst production method, magnetite electrodes production method, flotation method, briquetting methods and a fuel briquetting facility.[175] In 1948 the fourth volume of *News* was issued (the preceding three volumes had been published in the 1930s) and the Institute also contributed to the

174 Czech: Společnost pro kulturní a hospodářské styky se SSSR, 1925–1948. NA Archives, Czechoslovak Mines, national enterprise, General Directorate collection, box 187, inv. no. 421, Zpráva o činnosti Ústavu pro vědecký výzkum uhlí a nerostů v Praze v roce 1947 [Report on the Development of the Institute for Scientific Coal and Mineral Research in Prague in 1947].
175 NA Archives, Czechoslovak Mines, national enterprise, General Directorate collection, box 187, inv. no. 421, Zpráva o činnosti Ústavu pro vědecký výzkum uhlí a nerostů v Praze v roce 1947 [Report on the Development of the Institute for Scientific Coal and Mineral Research in Prague in 1947].

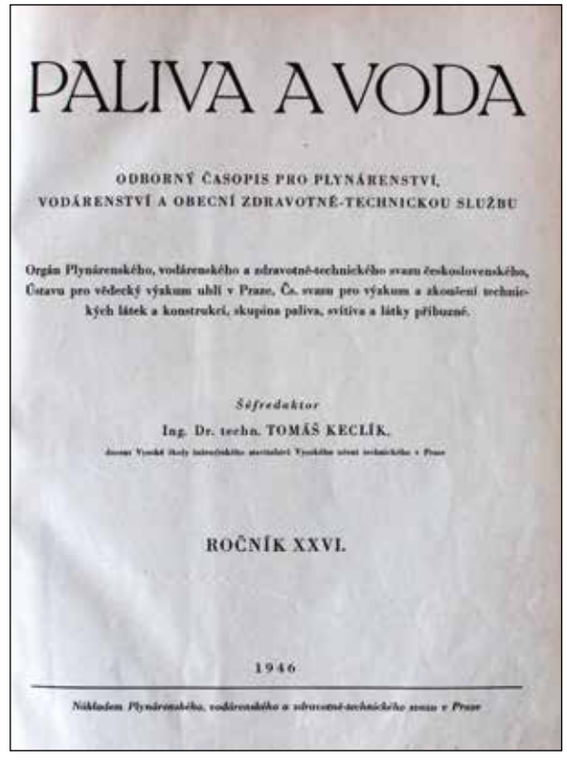
publishing of the *Fuels and Water*[176] journal.[177] Active cooperation was developing with numerous domestic enterprises, such as the Czechoslovak Chemical Enterprise, Stalin Enterprise in Záluží-Horní Litvínov, Czechoslovak Foundries, Czechoslovak metalworking and machinery works, Dehtochema, Ostrava Chemical Enterprises, and others.[178]

Cooperation with industry was also at the focus of the Institute as part of the Two-year National Economy Plan (1947–1948), which aimed at renewing and reconstructing Czechoslovakia after World War Two. The plan anticipated increasing industrial production, improving work efficiency and following up on older research results, especially as regards lignite research, tar pitch, coking, caking capacity of coal, briquetting and brown coal desiccation, which was in line with the needs of the enterprises involved (this was another reason why much less attention was paid to black coal than brown coal).

The analytical laboratory worked intensively on determining the content of ash matter and combustible matter in fuels and the sulphur content in pyrites, and now also analysed the composition of ores and black lead. The newest coal preparation laboratory still lacked suitable instruments, which led to a considerable degree of improvisation in research work.[179] The situation of the coal preparation department, however, gradually improved, also thanks to generous funding from the Ministry of Industry in 1948.[180] With the assistance of some national enterprises, plans were made to build the test briquetting plant, to enable the briquetting process to be improved. The Institute was now supposed to work, for instance, on the analysis and research of crude oil in cooperation with Czechoslovak Oil Mines and the Czechoslovak Crude Oils Refinery.[181] This research also received a great deal of support from the Ministry.[182]

However, due to time constraints, the Institute did not start work on certain of the numerous tasks anticipated by the Two-year Plan, such as research of humins.

176 Czech: *Paliva a voda (1946–1949)*.
177 NA Archives, Czechoslovak Mines, national enterprise, General Directorate collection, box 175, inv. no. 374, Vysvětlivky k hospodaření za rok 1948 [Explanatory notes on the economy for 1948].
178 Czech: Československé chemické závody, 1945–1951; Stalinovy závody v Záluží – Horním Litvínově (name in use 1946–1949); Československé hutě (name in use 1946–1951); Československé závody kovodělné a strojírenské, 1945–1949; Dehtochema, 1945–1965; Ostravské chemické závody, 1928–1950; NA Archives, Czechoslovak Mines, national enterprise, General Directorate collection, box 187, inv. no. 421, Zpráva o činnosti Ústavu pro vědecký výzkum uhlí a nerostů v Praze v roce 1947 [Report on the Development of the Institute for Scientific Coal and Mineral Research in Prague in 1947].
179 NA Archives, Czechoslovak Mines, national enterprise, General Directorate collection, box 121, inv. no. 276, Zpráva o činnosti Ústavu pro vědecký výzkum uhlí v Praze, 1947 [Report on the Development of the Institute for Scientific Coal Research in Prague in 1947].
180 NA Archives, Czechoslovak Mines, national enterprise, General Directorate collection, box 175, inv. no. 374, Vysvětlivky k hospodaření za rok 1948 [Explanatory notes on the economy for 1948].
181 Czech: Československé naftové doly, established 1946; Československá rafinerie naftových olejů.
182 NA Archives, Czechoslovak Mines, national enterprise, General Directorate collection, box 175, inv. no. 374, Vysvětlivky k hospodaření za rok 1948 [Explanatory notes on the economy for 1948].


PALIVA A VODA

ODBORNÝ ČASOPIS PRO PLYNÁRENSTVÍ, VODÁRENSTVÍ A OBECNÍ ZDRAVOTNĚ-TECHNICKOU SLUŽBU

Orgán Plynárenského, vodárenského a zdravotně-technického svazu československého, Ústavu pro vědecký výzkum uhlí v Praze, Čs. svazu pro výzkum a zkoušení technických látek a konstrukcí, skupina paliva, svítiva a látky příbuzné.

Šéfredaktor
Ing. Dr. techn. TOMÁŠ KECLÍK.

ROČNÍK XXVI.

1946

Nákladem Plynárenského, vodárenského a zdravotně-technického svazu v Praze

Cover page of the *Fuels and Water* journal.
IRSM; Library.

Although the staff were interested in working on this, they warned that it would be a time-consuming task with no instant practical results. In 1945–1947 a physical and chemical laboratory was built in the Institute and some important instruments were purchased, namely a mass spectrograph to analyse gaseous and liquid hydrocarbon mixtures, an emission spectrograph to analyse ores and metals, an infrared spectrograph for absorption analysis of organic liquids, such as benzol, and a registering microphotometer to measure spectral images. A major lack of instruments, on the other hand, greatly hampered any research and analysis of gases.[183]

Life in the institute at that time was affected by the permanently makeshift situation as new laboratories were being built and the existing ones restored. The Institute often resembled a construction site, especially when several laboratories were being built at once, and at the same time work was underway to completely

183 NA Archives, Czechoslovak Mines, national enterprise, General Directorate collection, box 121, inv. no. 276, Zpráva o činnosti Ústavu pro vědecký výzkum uhlí v Praze, 1947 [Report on the Development of the Institute for Scientific Coal Research in Prague in 1947].

replace the roof. There were also provisional replacements in staff, which was subject to extensive fluctuation, especially as regards new graduates and students. One new aspect associated with the war and post-war development of the country was that more girls were taken on as laboratory operators.[184]

184 NA Archives, Czechoslovak Mines, national enterprise, General Directorate collection, box 244, inv. no. 562, Zpráva o činnosti Ústavu pro vědecký výzkum uhlí v Praze pod národní správou v roce 1945 a 1946 [Report on the Development of the Institute for Scientific Coal Research under the National Administration in 1945 and 1946].

II. INSTITUTE FOR THE RESEARCH AND USE OF FUELS (ÚVVP)[185]

A Period of Rapid Changes (1949–1952)

The year 1949 can be seen as the beginning of a new era for the Institute. The association-type organisation was definitively abolished, and this raised the question of how the Institute would continue to be financed. From the middle of the year Jaroslav Tichý, the government's commissioner for fuels, began to exert an even stronger influence on the Institute. He promoted the idea that the Institute would merge with the Holešovice-based Institute for the Efficient Use of Fuels under the Ministry of Technical Engineering. The director Břetislav G. Šimek was certainly not in favour of the idea, and it should be said that some representatives of the ruling Communist Party were initially of the same opinion; however, under constant pressure from J. Tichý the first discussions of the possible merger were held. J. Tichý argued that the scheme would result in investment savings and eliminate duplicity in some research tasks. He planned that after the merger into a big institute with its headquarters in Libeň (V Holešovičkách 41, formerly Rokoska 94), 30% of the work of the new institute would be coal preparation and coal technology and 70% would be research into chemistry and the power industry.[186]

Many conflicting matters arose during the discussions. What was particularly unclear was the organisational framework of the intended merger of the two institutes, while the competence of Czechoslovak Mines national enterprise was considered, as well as direct subordination to the Ministry of Industry.[187] Diverse opinions were also voiced as regards the question of whether one big institute should be created for several disciplines or whether several specialised institutions should be maintained. Moreover, housing one big institute in the premises in Libeň, which initially seemed so simple to achieve, became somewhat complicated, as the anticipated relocation of the Gramophone Records company from Rokoska to Loděnice,[188] near Prague, was already delayed, and at the same time extensive alteration works on the buildings

185 Czech: Ústav pro výzkum a využití paliv.

186 NA Archives, Czechoslovak Mines, national enterprise, General Directorate collection, box 175, inv. no. 374, Záznam pro generálního ředitele. Věc: Začlenění výzkumných ústavů [Record for the managing director on the incorporation of research institutes]. 10 December 1949.

187 NA Archives, Czechoslovak Mines, national enterprise, General Directorate collection, box 175, inv. no. 374, Zápis o schůzi u Československých dolů, národní podnik [Minutes from the meeting at the Czechoslovak Mines enterprise]. 19 July 1949.

188 NA Archives, Czechoslovak Mines, national enterprise, General Directorate collection, box 187, inv. no. 421, Zápis o schůzi Technického výboru Ústavu pro vědecký výzkum uhlí a nerostů

were underway for the Institute of Applied Radiology[189]. An emergency solution, consisting of converting several of the Institute's apartments, did not appear to be purposeful, either.[190] The records taken at the meetings imply that two opposite views were conflicting here: The concept of a grand research institute was opposed by the concern that after the joint institution had been created, the Institute would be unable to respond to all the requirements of the mines, which would logically generate pressure to establish another institute solely for the needs of the mining industry.[191]

However, Jaroslav Tichý eventually pushed his vision through and after the merger of both institutes at the beginning of 1951 he became the new director of the newly established Institute for the Research and Use of Fuels (ÚVVP). The staff from the former Institute, who had vigorously opposed the change, lost their supporting figure when B. G. Šimek had to stand down as technical director, and the new management considerably curtailed the importance of research for mines. The atmosphere in the institution was certainly not helped even by the struggle for rooms inside the premises, when the quickly expanding coal preparation department was suddenly relocated to a different building. The employees also objected when the construction of the test briquetting plant was halted just before completion, while the project had been running from 1946. The Institute offered the briquetting plant to mines and there was a real threat that its remnants would end up as scrap metal and the institute would even lose the experimental press it needed so badly. Another decision taken by the new management that met with disfavour was a partial halt to ore dressing works.[192]

As the former director Břetislav G. Šimek pointed out, the merger of the two institutes was not clear in legal terms. He stated that the legal dissolution of the Institute for Scientific Coal and Mineral Research actually occurred as of 1 October 1951 when the Ministry for Heavy Industry was abolished. Its agenda was divided among five successor ministries, including the Ministry for Fuels and the Power Industry[193] under whose competence the new institute was placed. Due to conflicts at his workplace and disagreements with the new management, Břetislav G. Šimek became an employee of the Institute for Mineral Deposit Research[194] in Kutná Hora in June 1951, but continued to carry out some research tasks for his previous employer.[195]

[Minutes from the meeting of the Technical Board of the Institute for Scientific Coal and Mineral Research]. 4 June 1948.

189 Czech: Ústav pro užitou radiologii.

190 NA Archives, Czechoslovak Mines, national enterprise, General Directorate collection, box 175, inv. no. 374, Záznam pro ředitele Táborského, věc: Začlenění výzkumných ústavů [Record for director Táborský: Incorporation of research institutes]. 20 December 1949.

191 Ibidem.

192 NTM Archives, František Špetl collection, box 22, personal file, professional assessment.

193 Czech: Ministerstvo paliv a energetiky, 1951–1955.

194 Czech: Ústav pro průzkum nerostných ložisek.

195 NA Archives, Ministry for Fuels and the Power Industry collection, box 1, inv. no. 4, Letter from Břetislav G. Šimek, 17 April 1952.

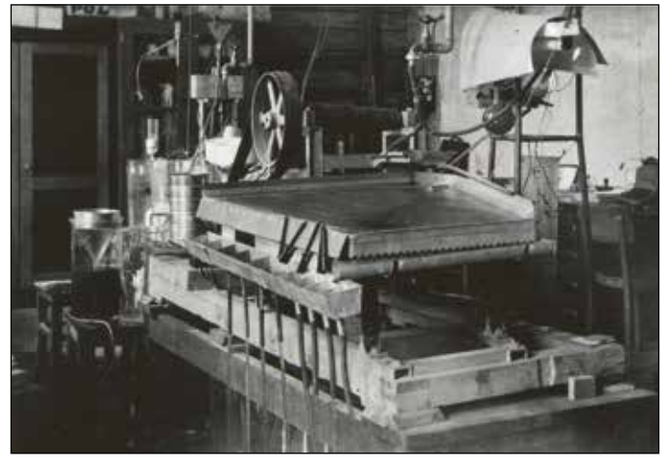
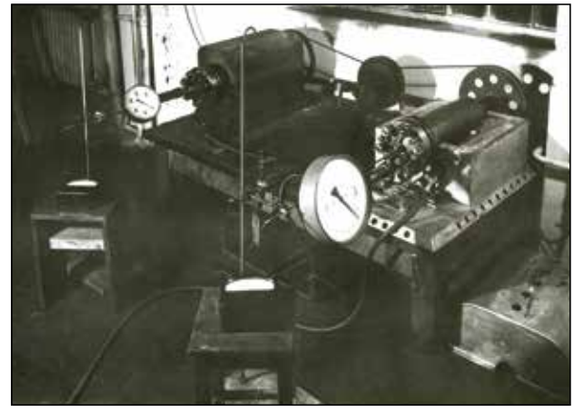


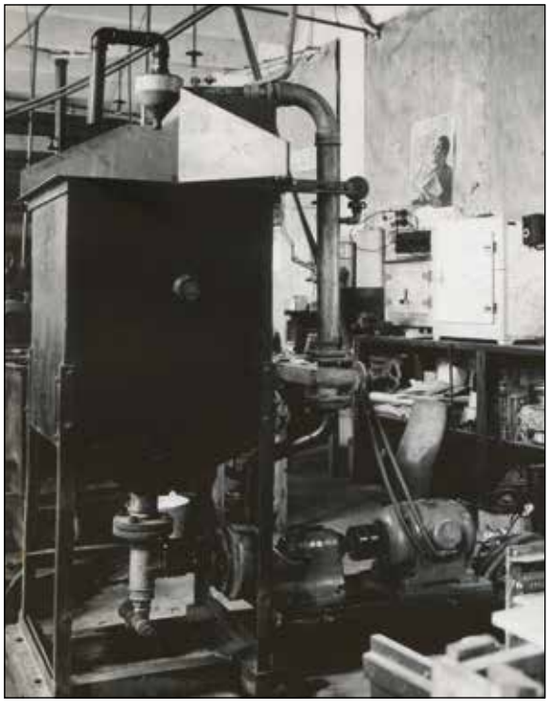
Table on which grain smaller than 0.5mm in size was prepared. Coal Preparation Laboratory. Photograph from the Institute's 1952 annual report.
NA Archives, Ministry for Fuels and the Power Industry collection, box 110, inv. no. 84.



A device used for pressurised coal extraction at the Department of Liquid Fuels. Photograph from the Institute's 1952 annual report.
NA Archives, Ministry for Fuels and the Power Industry collection, box 110, inv. no. 84.

To facilitate operation and organisation, the Institute split into two groups in November 1951: the group for scientific coal research, which was to be headed by Břetislav G. Šimek, and the group for the efficient use of fuels, with Jaroslav Tichý as the expert leader.[196] However, B. G. Šimek did not in fact perform his duties as he was an employee of another institute at that time, and a management reshuffle followed. In December 1951 Stanislav Kraus was appointed as the deputy director to Jaroslav Tichý and the head of the use of fuels group, Jaroslav Ludmila became the head of scientific research and Jaroslav Žákovec became the head of administration.

196 NA Archives, Ministry for Fuels and the Power Industry collection, box 110, inv. no. 84, Návrh technického výboru Ústavu pro výzkum a využití paliv [Proposal from the Technical Board of the Institute for the Research and Use of Fuels].



Overall layout of the cyclone thickener. Coal Preparation Laboratory.
NA Archives, Ministry for Fuels and the Power Industry collection, box 110, inv. no. 84.

At the end of the year, the institute had 155 employees, of whom 130 were expert staff, 14 administrative staff and 11 auxiliary staff.[197]

In line with the total reorganisation of the Institute and the establishment of the new ministry under whose control the Institute was, the Technical Board was re-appointed, with Artur Kanczucki as the chairman and František Špetl as the statutory representative who was also in charge of coal preparation and coking. Other board members were Josef Zajonc, in charge of black coal, Emil Petýrek, responsible for brown coal research, Josef Formánek, in charge of coal briquetting and valorisation, and the mine representatives Antonín Kozina (Ostrava-Karviná mines) and Jaroslav Lokvenc (North Bohemian Brown Coal Mines).[198] Even though the composition of the Technical Board can be seen as kind of a compromise to alleviate the uneasy atmosphere, this did not appease some of the former ÚVVUN employees who were unhappy with the new state of affairs. B. G. Šimek, facing hostility, even hatred be-

197 NA Archives, Ministry for Fuels and the Power Industry collection, box 17, inv. no. 20, Stav zaměstnanců MPE k 27. 12. 1951 [Head count of the Ministry for Fuels and the Power Industry as of 27 December 1951].

198 NA Archives, Ministry for Fuels and the Power Industry collection, box 110, inv. no. 84, Ustavení výboru technického [Establishment of the Technical Board], 1 November 1952.

Studies on the diffusion of methane and CO_2 were carried out in vertical cylinders or in a horizontal laboratory tunnel. Department of Gas. Photograph from the Institute's 1952 annual report.
NA Archives, Ministry for Fuels and the Power Industry collection, box 110, inv. no. 84.

cause of his opinions, stated in his letter to the management dated April 1952, that *"... the tradition of the Institute for Scientific Coal Research which has gained world-wide renown has not been appreciated as such by yourselves and is foreign to you, so under these circumstances it would hardly be appropriate for you to profess it."*[199]

The creation of the Institute for the Research and Use of Fuels made the concerns of those who had forecast that several smaller institutions would be established a reality. However, an influence was also exerted by the overall reorganisation of the Ministry for Heavy Industry prompted by the increased preferences for selected industries. The Institute of Ore Research[200], based in Hodkovičky, therefore soon separated from the ÚVVP, and at the same time other institutes were created, or plans were made to create them: the Scientific Coal Research Institute in Radvanice, near Ostrava, the Institute of Mine Mechanisation in Prague, the Institute for Crude Oil Research in Brno, the Scientific Coal Research Institute in Most,[201] and the Power Industry Research Institute in Prague.[202]

The fact that the concept of a great joint institute was a mistake was already confirmed by the Minister's Advisory Board in December 1951, which discussed the

199 NA Archives, Ministry for Fuels and the Power Industry collection, box 1, inv. no. 4, Letter from Břetislav G. Šimek, 17 April 1952.

200 Czech: Ústav pro výzkum rud, established 1952.

201 As early as in 1951 it was assumed that this institute would be founded and would acquire some tasks from the ÚVVP; it was eventually established in 1953 as the Výzkumný ústav pro hnědé uhlí [Brown Coal Research Institute] in Most.

202 Czech: Vědecko-výzkumný ústav uhelný; Ústav pro důlní mechanizaci; Ústav pro naftový výzkum, 1951–1965; Vědecko-výzkumný uhelný ústav and Výzkumný ústav energetický, all established in 1952 except where stated otherwise.

Jaroslav Tichý

SOkA Zlín Archives, Zlín Photographs collection, No. 4144. Photo by Řehák.

Jaroslav Tichý was born on 5 January 1896 in Vimperk, South Bohemia, and later lived with his family in Příbram. At the end of 1915 he was drafted into the Shooting Regiment in Písek and soon went to the Russian front where he was seriously injured. In 1917 he started studying chemistry at the chemical department of the Imperial Czech Technical University in Prague (from 1920 known as VŠCHTI – the College of Chemical Engineering and Technology, a part of the Czech Technical University). After the establishment of the Republic he served as a volunteer in the Czechoslovak army and in the summer of 1919 he fought in battles in Slovakia.[1] After that he continued his studies; in 1922 he passed the second state exam[2] and went to the Mining College in Příbram where he worked as an assistant.[3] Soon afterwards he began working for the Institute for the Efficient Use of Fuels (ÚHVP) where he was allowed to take study journeys to Germany, England and France. He worked in the Chemical Department, where he specialised in the chemical processing of coal. In 1927 he even applied for a patent for a method of using silver slag mixture.[4] At the end of the 1920s, a part of the Chemical Department was transferred to the Institute for Scientific Coal Research, based in Libeň, a district of Prague; however, Jaroslav Tichý did not move there at the time as he began to work at the Ervěnice power station. There he apparently advocated using the coal from the Most mine district more efficiently than merely burning it in power stations.[5] Later he worked for the T. & A. Baťa company in Zlín, Moravia.

Immediately after the end of the war he was appointed as the head of Baťa Auxiliary Works[6] in Otrokovice and shortly after that he became a member of the District National Council in Zlín. In May 1945 he was appointed one of the main state administrators of the nationalised Baťa company and two months later he became the commissioner for the engine fuels plant in Horní Litvínov, where he began work in September 1945.[7] The plant in Litvínov was renamed to Stalin Works in Záluží[8] at the beginning of 1946, and Jaroslav Tichý made a great contribution in its reconstruction after the serious damage it had suffered from allied bombardment during the war.

After a short career in the Stalin Works, he joined the Czechoslovak Chemical Enterprise where he was appointed as deputy director. In February 1948 he was promoted to Managing Director and, following the government decree dated 3 May 1949, he became the government's commissioner for fuels.[9] In this position, he advocated, besides other things, the merger of the Institute for Scientific Coal Research and the Institute for the Efficient Use of Fuels, in which he succeeded and became the director of the newly established Institute for the Research and Use of Fuels in 1951. However, he was withdrawn from all his posts in 1952, dismissed from the Ministry of Fuels and the Power Industry and was even investigated in connection with the extensive political trial in which Rudolf Slánský was executed.[10] He was reprimanded, for instance, for badly organising an event aiming at fuel savings[11] and his professional expertise was generally called into question. The recollections of his colleagues and co-workers vary greatly as regards his personality. An article on the Stalin Works by Evžen Patera is highly unfavourable as regards J. Tichý[12], while elsewhere he is deemed a skilled organiser[13] and a skilled fuel chemist[14]. Others say that his reputation was damaged by his rash behaviour.[15] At the end of his career he worked for the national enterprise Energotrust Praha.[16]

1 ČVUT Archives, Czech Technical University collection. Lists of attendants, 1917/1918, 1918/1919, 1919/1920.
2 ČVUT Archives, College of Chemical Engineering and Technology collection. Second State Exam files, 1919–1922.
3 NTM Archives, František Špetl collection, box 22, personal file, professional assessment.
4 Československé přihlášky patentové [Czechoslovak Patent Applications]. *Chemické listy pro vědu a průmysl*, Vol. 23, No. 22 (25 November 1929), p. 594.
5 A AV ČR Archives, Stanislav Landa collection, box 4, inv. no. 120, Výzkum [Research], p. 8.
6 Czech: Baťovy pomocné závody.
7 NA Archives, Ministry for Fuels and the Power Industry collection, box 110, inv. no. 84, Námitky do výměru MPE z 30. listopadu 1952 ve věci rozvázání služebního poměru [Objections filed against the Ministerial decree dated 30 November 1952 on the termination of employment].
8 Czech: Stalinovy závody.
9 NA Archives, Ministry for Fuels and the Power Industry collection, box 110, inv. no. 84, Námitky do výměru MPE z 30. listopadu 1952 ve věci rozvázání služebního poměru [Objections filed against the Ministerial decree dated 30 November 1952 on the termination of employment].
10 Ibidem.
11 NA Archives, Ministry for Fuels and the Power Industry collection, box 110, inv. no. 84, Připomínky k akci vládního zmocněnce s. Dr. Ing. Tichého [Comments on the event held by the government's commissioner Dr. Ing. Tichý], 4 January 1952.
12 PATERA, Evžen: Vzpomínky na „Hydrák" v Záluží u Mostu [Recollections of the "Hydro Plant" in Záluží u Mostu]. Praha: E. Patera, 2000, pp. 38–40.
13 HRABÁK, Miloslav: Hydrák a Staliňák v časech minulých. Výstavba a obnovení závodu na výrobu motorových paliv z uhlí v Záluží u Litvínova v historickém období 1939–1948. Fakta a vzpomínky [The "Hydro Plant" and "Stalin Plant" in times past. The construction and restoration of the plant for the production of engine fuels in Záluží, near Litvínov, in 1939–1948. Facts and Memories]. Litvínov, 2013, pp. 121–122.
14 A AV ČR Archives, Stanislav Landa collection, box 4, inv. no. 120, Výzkum [Research], p. 8; NTM Archives, František Špetl collection, box 22, personal file, professional assessment.
15 NTM Archives, František Špetl collection, box 22, personal file, professional assessment.
16 ABS Archives, Registry of Persons of Interest, Jaroslav Tichý's index card.

need to divide the institution between the brown coal institute in Most and the black coal institute in Ostrava-Radvanice, while director Tichý was asked to supply a proposal for the division of the ÚVVP. Opinions were also voiced that there was no reason to have a scientific research institute in Prague.[203] The creation of a large ÚVVP started to appear senseless in many respects, and there was the impression that the main point was in fact to acquire better premises for the former Institute for the Efficient Use of Fuels, disregarding the purpose and needs of the Institute for Scientific Coal and Mineral Research. The intention to merge the two institutions can be attributed to the power ambitions of Jaroslav Tichý, but perhaps also to the incorrect assumption that the institute could operate under the newly established Ministry for the Chemical Industry (MCHP)[204] and focus better on basic research in cooperation with chemical enterprises. In his memorandum of February 1952, J. Tichý actually suggested that the institute convert into the Institute for Chemical Research of Coal, Crude Oil and Gases under the MCHP.[205]

However, affairs took a completely different course in the meantime. As early as in January 1952, František Slavík, a working-class director, was entrusted to manage the Institute. His main task was to bring the Institute back to serving the mining industry, which became Czechoslovakia's key industrial branch in the first half of the 1950s, also from the viewpoint of foreign policy. According to František Slavík's report for the Ministry, the atmosphere in the Institute was somewhat tense, as very soon there was another change in the management as well as in the officials of the Communist Party unit in the Institute, and in the trade unions.[206] There was a comical element to this rapid turnaround in the situation, when an activity plan had to be reworked, prepared during the management of Jaroslav Tichý who, totally out of concept, attempted to expand the institute's activities into many tasks that were technologically feasible but completely unrelated to the institute's principal scope. Eventually there were difficulties in replacing the task of drying hops, fruits, tobacco and vegetables in the plan with the task of cataloguing and classifying coal seams in the Ostrava-Karviná coal district.[207]

203 NA Archives, Ministry for Fuels and the Power Industry collection, box 16, inv. no. 20, Záznam ze schůze kolegia ministra paliv a energetiky [Minutes from the Meeting of the Advisory Board of the Minister for Fuels and the Power Industry], 7 December 1952.
204 Czech: Ministerstvo chemického průmyslu, 1951–1968.
205 NA Archives, Ministry for Fuels and the Power Industry collection, box 110, inv. no. 84, Dopis J. Tichého, Návrh organizačního řádu chemického ústavu paliv [Letter from J. Tichý: Proposal for the organisational statutes of the Chemical Institute of Fuels], 5 February 1952.
206 Czech: Revoluční odborové hnutí (ROH); a nationwide, and the only, trade union in Czechoslovakia in 1946–1990. Membership was usually obligatory and automatic for employees.
207 NA Archives, Ministry for Fuels and the Power Industry collection, box 110, inv. no. 84, Informace pro s. ministra o situaci v ÚVVP – Rokoska [Information for comrade Minister on the situation in the ÚVVP at Rokoska], 4 February 1952.

Scientific Activities at the ÚVVP before the Great Reorganisation

The establishment of the Institute for the Research and Use of Fuels raised great questions concerning its professional scope. The original concepts from 1951 anticipated that the Institute's activities would be dedicated to the chemical, technological and physical research of coal, research of the typical properties of the original rocks, the chemical cataloguing of coal, standardisation of fuels, research and use of fuels in industrial furnaces, coal classification from the fuel utility point of view, the thermal economy of combustion and desiccation systems, and would draft technical standards.[208] This was basically the aggregate of the activities of the two former institutes. After the initial confusion, followed by management reshuffles, the Institute began to refocus on the mining industry.

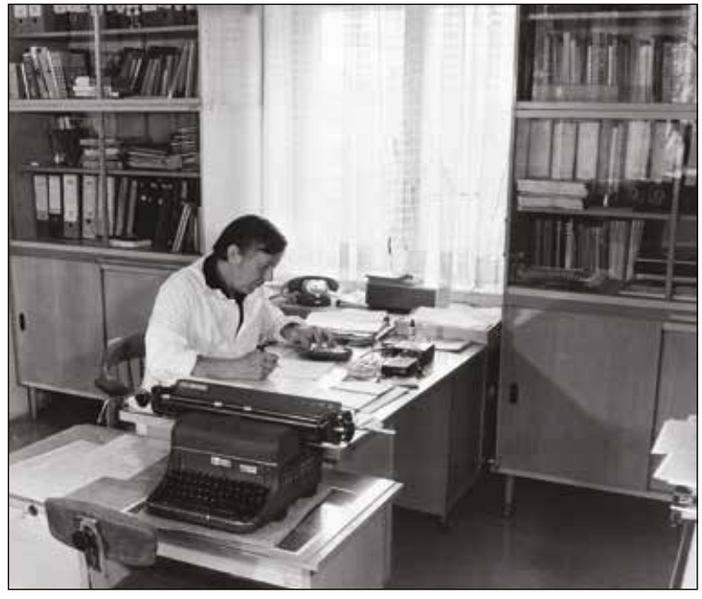
However, the basic division into two branches, i.e. research into fuel technology and research into thermal energy, still persisted. The experienced chemist Jaroslav Ludmila was in charge of research into fuel technology, and his competence also included the sections of Coal Preparation (headed by František Bareš), Briquetting (post initially vacant), Coking (Bohumil Tejnický), Liquid Fuels (Jaroslav Košťál), Gaseous Fuels (Vladimír Procházka), Inorganic and Organic Analytics (Josef Hubáček), Analytics of Solid Fuels (Bedřich Straka), and Physical and Chemical Research (Miroslav F. Kessler). Thermal power research, headed by Stanislav Kraus, included the sections of Burning and Gasification (Jan Novák), Generators and Furnaces (Jan Roller), Steam Boilers (František Sünderhauf) and Heat Management (Česlav Lipka).

As already mentioned above, the Institute found itself in a difficult situation at the beginning of the 1950s when it was in fact unable to complete its older tasks, and even openly admitted that some of them were quite beyond its capabilities. After the situation had stabilised, the Institute focused on the technological construction of the coal preparation plant in Komořany, and processing pyrites was another major topic. In the light of the preceding events, a great deal of energy had to be invested in the renewal of the briquetting facility and the necessary equipment. Coke production was a traditional topic, also becoming the subject of discussions with Soviet experts.[209] In the area of the gasification of solid fuels, the Institute cooperated with the newly established Gasworks Institute[210] in Běchovice, a district of Prague, and also established a new pilot plant site in Ostrava-Kunčičky, to be used in coal preparation (in addition to this, the Institute also had a pilot plant at the Ervěnice power plant and planned to establish a specialised office in Most).

208 NA Archives, Ministry for Fuels and the Power Industry collection, box 14, inv. no. 16, Návrh na organizaci výzkumných ústavů v resortu ministerstva paliv a energetiky [Proposal for the organisation of research institutes within the competence of the Ministry for Fuels and the Power Industry].

209 NA Archives, Ministry for Fuels and the Power Industry collection, box 181, inv. no. 113.

210 Czech: Plynárenský ústav, established 1946.



Miroslav Ferdinand Kessler. *IRSM, collection of photographs.*

And vice versa, Dusíkárny Ostrava[211] had its detached office in the premises of the Institute at V Holešovičkách 41, formerly Rokoska 94. Besides technological tasks in applied research, the Institute also carried out basic research in coal preparation, briquetting and petrography.[212]

The Institute's staff, however, came up with new tasks from time to time, in response to scientific and technological developments. The Physical and Chemical section focused on basic research in polarography and spectral and X-ray research. A new activity was added – research into the production of carbon matters for the production of aluminium.[213] The Coal Preparation section in particular, from 1955 headed by Gustav Šebor, became more important over time and was focused, for

211 Could be translated as Nitrogen Works, established 1950, name in use until 1958. A AV ČR Archives, ČSAV Mining Institute collection, box 4, inv. no. 28, Zařazení pracovníků do vědeckých kvalifikačních stupňů [Scientific qualification classification of employees].

212 A AV ČR Archives, ČSAV Mining Institute collection, box 1, inv. no. 16, Návrh budoucího uspořádání výzkumu v resortu ministerstva paliv [Proposed future organisation of research under the Ministry for Fuels]; A AV ČR Archives, ČSAV Science Planning Institute collection, box 166, sign. no. 3/73, Prověrky výzkumných ústavů – Ústav pro výzkum a využití paliv [Checks upon research institutes – Institute for the Research and Use of Fuels].

213 NA Archives, Ministry for Fuels and the Power Industry collection, box 110, inv. no. 84, Účast Ústavu pro výzkum a využití paliv na výstavbu hliníkového průmyslu [Participation of the Institute for the Research and Use of Fuels in the building up of the aluminium industry].

Thermal and technical research group. An instrument for research into the ignition of solid fuels in a layer. Photograph from the Institute's 1952 annual report.
NA Archives, Ministry for Fuels and the Power Industry collection, box 110, inv. no. 84.

instance, on coal flotation, obtaining pyrite from flotation waste and also the sedimentation of coal mud and waste sludge.[214] In the mid-1950s the Institute's activities were divided up as follows: 45% of its work involved technical and technological research activity, scientific research comprised 15%, design and construction work made up 20%, test operations 5%, scientific and technical assistance to enterprises comprised 10%, and 5% was taken up by tasks assigned by the Ministry.[215]

As of 31 October 1955 the Institute had 292 employees, 204 of whom were in the technical sciences, 32 administrative staff, 38 blue-collar and 18 other employees. At that time, the Institute had 6 departments with research sections, laboratories and research groups: the department of Coal Valorisation with four groups (Coal Preparation, Briquetting, Brown Coal, Ervěnice Pilot Plant); the department of Research in Coke Chemistry (Coke Industry, Research of Chemical Products); the department of Basic Research (Analytical Chemistry, Physical and Chemical Research, Petrography); the department of Thermal Equipment Research (Combustion Process Research, Furnace Research, Gasification); the Technical department (Design, Mechanical Workshop, Electric Workshop, Joiner's Workshop and Glassmaking Workshop); and the department of Technical Standards.[216]

In the mid-1950s the Institute promised to publish seven professional publications on coal chemistry, petrography, briquetting technology, fuel economy and

214 A AV ČR Archives, ČSAV Mining Institute collection, box 4, inv. no. 28.
215 A AV ČR Archives, ČSAV Science Planning Institute collection, box 166, sign. no. 3/73, Prověrky výzkumných ústavů – Ústav pro výzkum a využití paliv [Checks upon research institutes – Institute for the Research and Use of Fuels].
216 Ibidem.

Thermal and technical research group. Experimental laboratory equipment for research into the combustion process in a fuel layer on a grate, developed in 1951. Photograph from the Institute's 1952 annual report.
NA Archives, Ministry for Fuels and the Power Industry collection, box 110, inv. no. 84.

carbon materials technology;[217] however, only *Theory of Coking and Its Operational Applications*[218] was published. The widely conceived *Coal Chemistry* had to wait for publication until 1962.[219]

Over time, calls were made for the creation of a scientific institute that would cover basic research in the extraction, processing and use of minerals. The ÚVVP partially met this requirement; however, as the Czechoslovak Academy of Sciences (ČSAV)[220] was established in 1952, serious consideration was given to the idea of establishing an institution that would focus solely on basic research, and even the idea of transferring the ÚVVP under the competence of the Ministry for the Chemical Industry was outlined again. The plan anticipated that the coal preparation activities would be transferred to Ostrava and Most, basic research would become the competence of the

217 SLAVÍK, František: Úkoly a činnost Ústavu pro výzkum a využití paliv [Tasks of the Institute for the Research and Use of Fuels]. *Paliva*, 1954, Vol. 34, No. 6, pp. 162–164.
218 TEJNICKÝ, Bohumír, CHARVÁT, Vladimír, MÜLLER, Vladimír: *Theorie koksování a její provozní aplikace. Určeno inženýrům a technikům koksoven a studujícím vys. škol [Theory of Coking and Its Operational Applications. Designed for Engineers and Technicians of Coking Plants and University Students]*. Praha: SNTL, 1954.
219 HUBÁČEK, Josef, LUDMILA, Jaroslav, TEJNICKÝ, Bohumír, KESSLER, Miroslav Ferdinand: *Chemie uhlí [Coal Chemistry]*. Praha: SNTL, 1962.
220 Czech: Československá akademie věd, 1952–1992.

Josef Koutník

Josef Koutník was born on 19 June 1920 in Doubravice, near Turnov. He attended the grammar school in Turnov from where he graduated in 1939, and in October he was admitted to the College of Chemical Engineering and Technology of the Czech Technical University in Prague. However, one month later the Czech universities were closed and Josef Koutník was unable to continue studying until after the war. In 1945–1948 he completed his studies, passed the graduation exams in March 1948 and spent the next two years in the army.[1]

At the beginning of the 1950s he began to work for the Institute for the Research and Use of Fuels, where he was the officer in charge of research into anodic matter and carbonaceous materials from 1952.[2] In the late 1950s he became involved in the topic of coal gasification. Despite the fact that his publication and scientific work was not yet particularly extensive, he was appointed as the director of the Institute in 1956, when he replaced the working-class director František Slavík after four years.

At that time the debate on the possible incorporation of the Institute into the Czechoslovak Academy of Sciences was fully under way. Although Josef Koutník came up with his own concept, according to which the Institute would not lose the substance of its existing activities under the ČSAV, eventually a proposal was approved that a brand new institution focused on basic research would be created, for the needs of which only some of the departments were eventually transferred from the existing Institute. Moreover, the transferred employees lost their special benefits as mining employees after they became part of the ČSAV staff. The remaining parts of the Institute merged with the Gasworks Institute to jointly establish the Institute for the Research and Use of Solid and Gaseous Fuels based in Běchovice, near Prague, which was a specialised institute of the Ministry of Fuels. Its director was Vítězslav Slíva, the former director of the Gasworks Institute, while Josef Koutník remained the key researcher in the task of underground gasification and a member of the coordination group for the task entitled Comprehensive Use of Fuels Applying the Power Technology Method (1958–1960).[3]

In the following years he developed cooperation especially with the Brown Coal Research Institute (VÚHU) in Most, even though he continued to work for the Běchovice-based Institute, by then renamed the Institute for the Research and Use of Fuels (ÚVVP), where he was even the deputy director for technology and scientific research in the mid-1960s.[4] After that he became a member of the Czechoslovak Scientific and Technical Society[5] (ČSVTS) where he worked on the Central Committee of the Fuel Use Section, and was also a member of the editorial board of *Gas*[6] magazine.

1 ČVUT Archives, College of Chemical Engineering and Technology collection, Lists of attendants 1939/1940, 1945/1946, 1946/1947, 1947/1948; ČVUT Archives, College of Chemical Engineering and Technology collection, Druhá státní zkouška [Second State Exam], 1947–1948.
2 NA Archives, Ministry for Fuels and the Power Industry collection, box 110, inv. no. 84, Účast Ústavu pro výzkum a využití paliv na výstavbu hliníkového průmyslu [Participation of the Institute for the Research and Use of Fuels in the Development of the Aluminium Industry].
3 A AV ČR Archives, ČSAV Mining Institute collection, box 6, inv. no. 33, Návrh na reorganizaci výzkumu paliv v rámci stěžejních úkolů státního plánu ČSAV [Proposal for reorganisation of fuel research as part of the key tasks of the ČSAV's state plan].
4 BROŽ, Václav a kolektiv: Hospodářsko-politická rukověť. 1. díl. Ústřední správa a výroba [Economic and Political Handbook. Part 1, Central Administration and Production]. Praha: Pragopress, 1968, p. 175.
5 Czech: Československá vědeckotechnická společnost.
6 Czech: Plyn.

ČSAV and research into the chemical processing of coal and carbohydrates would be the task of an institute under the competence of the Ministry for the Chemical Industry. As part of the nationwide research plan dated 1956, the Institute was assigned to the discipline of mining, and further intense talks began over its future.[221] Agreements on the division of the ÚVVP were already underway during the directorship of Josef Koutník, who undertook the directorial position in 1956 and later continued to work in that part of the Institute that remained under the competence of the Ministry of Fuels.

221 *Zpráva o prověrce resortních výzkumných ústavů [Report of the Check on Ministerial Research Institutes]*. Praha: ČSAV, 1956, p. 30; KESSLER, Miroslav Ferdinand: Výzkum chemie uhlí v letech 1945–1960 [Research of Coal Chemistry in 1945–1960]. In *Věda v Československu 1945–1960* (1. svazek. Pracovní zasedání 22.–23. 10. 1980). Praha: Ústav československých a světových dějin ČSAV, 1982, pp. 531–548.

Life in the Institute in the 1950s

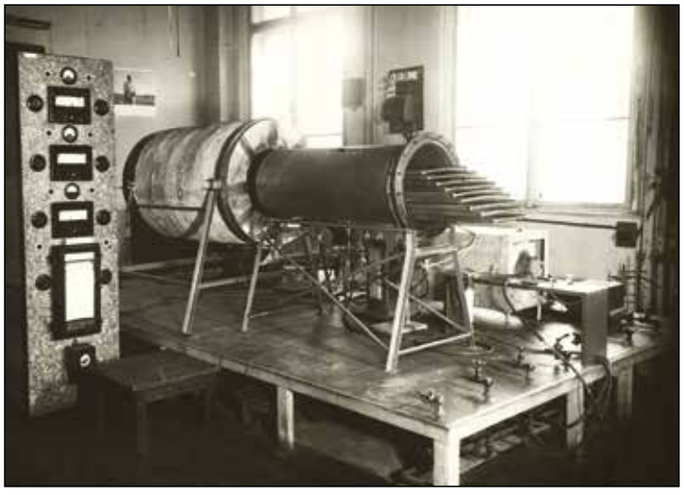
As indicated above, the late 1940s and early 1950s were characterised by a certain overall tension in the Institute. The appointment of the working-class director František Slavík eased the situation somewhat and the life of Institute was no longer just about worksite and personal conflicts. Various events were held to make life in the Institute more vivid, such as discussions attended by state prize laureates and Order of Labour[222] bearers from among mining experts and mine workers. And even if it is unclear to what extent these discussions among scientists and miners were fruitful and interesting, as stated in the period reports, they certainly boosted the day-to-day rhythm of work.

As part of efforts to improve the quality of employees' leisure time, the trade unions then took on a fairly active role (even though the employees were repeatedly criticised for not being more involved in political and trade union activities) when they established their club and the Sokol gymnastics unit and provided the Institute with a summer sports ground in Prague 8 and a recreational chalet in the Krkonoše Mountains.[223]

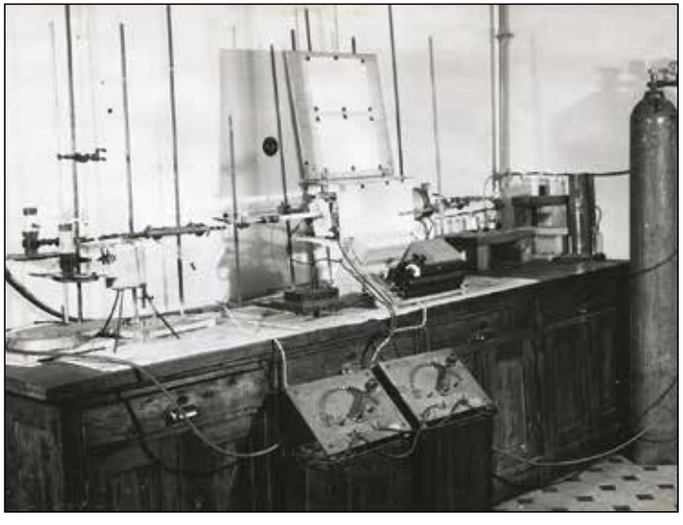
The working conditions in the Institute itself also gradually improved. In the middle of 1952 the Institute finally acquired the canteen and the former recording studio from the Gramophone Records company, converting it into laboratories, offices and employee apartments.[224] A block of flats with garages was also built for employees in nearby Davídkova St.

Like the country as a whole, the Institute's employees were also affected by the 1953 currency reform. In the late 1950s the director's monthly salary was 4000 Kčs[225], and the salaries of scientific staff were between 2700 and 3800 Kčs per month, depending on how long they had been employed in the Institute and the scope of their work, while their most usual salary was around 3100 Kčs. The salaries of the most numerous group of employees, technicians, varied widely from 700 to 3500 Kčs. Blue-collar employees ordinarily earned some 1500 Kčs, and the administrative staff earned a little less.[226] At that time the average monthly salary of workers employed in "socialist enterprises" was 1243 Kčs per month.[227]

222 Czech: Řád práce. A Czechoslovak state order awarded from 1951 for merits for "the building up of the state".
223 It was typical for the 1950s and 1960s that recreational premises were provided for various state institutions and national enterprises, determined for the employees and their families to spend holiday. This related to the period efforts to promote the collectivised features even in spending one's leisure time and also to the limited possibility of travelling. Most of these premises (chalets in the case of mountains) were sold off in the 1990s.
224 NA Archives, Ministry for Fuels and the Power Industry collection, box 110, inv. no. 84, Zpráva o činnosti ústavu za rok 1952 [Report on the Institute's Activities for 1952].
225 Czech: koruna československá, official currency in 1918–1992.
226 A AV ČR Archives, ČSAV Mining Institute collection, box 4, inv. no. 26, Platové zařazení zaměstnanců [Employee Pay Grades], 1957.
227 *Statistická ročenka Republiky Československé 1957 [Statistical Yearbook of the Czechoslovak Republic, 1957]*. Praha: Státní úřad statistický Republiky Československé – Orbis, 1957, p. 69.



Electric resistance furnace with a fully adjustable supply of nitrogen and hydrogen. Photograph from the Institute's 1952 annual report.
NA Archives, Ministry for Fuels and the Power Industry collection, box 110, inv. no. 84.



Equipment to determine oxygen. Photograph from the Institute's 1952 annual report.
NA Archives, Ministry for Fuels and the Power Industry collection, box 110, inv. no. 84.

For Czechoslovak science, the 1950s in general saw the break-up of the broad network of international relations and information channels especially with the so-called capitalist countries, which had seen such promising development namely after World War Two. This had an adverse impact on all scientific disciplines. Extensive restrictions that went hand in hand with the worsening condition of the national economy and the accompanying shortage of foreign currency had an impact on all foreign trips and internships; the exchange of publications ceased and, last but not least, it became impossible to organise events with a major international attendance.

František Špetl

A AV ČR Archives, Photographs collection, Portraits of Academicians

František Špetl was born in Dolní Kalná, Northeast Bohemia, on 18 October 1903 as the youngest of the four children of the baker František Špetl. After graduating from grammar school in nearby Nová Paka in 1922, he went to Prague to study at the CTU's College of Chemical Engineering and Technology. He passed the state exam with distinction in 1926 and was an assistant at the Mining College in Příbram for the next two years. There he assisted Professor František Pavlíček, whose daughter Milada he later married, in writing the book *Chemie uhlí [Coal Chemistry]*, published in 1927. In 1928 he became a plant operation engineer in the Ignát coking plant in Moravská Ostrava where he, amongst others, directed the construction of the new Rheo-box coal preparation plant. The technological procedure he developed for washing coal was already highly acclaimed at the time. He also published various professional articles on coke and coal preparation and in 1933 he defended his dissertation whose conclusions he published as *Ash Materials in Coal and Coke*[1].

In the 1930s there were numerous attempts made by Czech coal preparation plants to introduce the pneumatic or dry treatment of cokeable coal types with low natural moisture to reduce water consumption. František Špetl dedicated some time to this topic and his patent entitled *Methods and Equipment for the Pneumatic Separation and Washing of Coal and Other Loose Materials*[2] was even adopted by the Škoda Works for the production of pneumatic tables. In 1936 he was assigned to the directorate of the Mining and Metallurgical Company in Moravská Ostrava as the head expert of all the preparation plants and coking plants in the company. In 1940–1945, following the political changes, he was transferred to the position of operational engineer.

After the post-war nationalisation of the Czechoslovak industry in 1945, he was appointed as the deputy director of the merged coking plants in Ostrava and Karviná, but in the following year he finally moved to Prague. There he worked at the general directorate of the Czechoslovak Mines state enterprise as an expert in plants for coal preparation, ore dressing and coking plants for the whole country.[3] Shortly after the war, František Špetl also made his mark on the history of the Institute for Scientific Coal Research, first as a member of its Technical Board and then in 1947–1949 as the statutory representative of the "Institute for Scientific Coal and Mineral Research" association. He continued to work on the Technical Committee also after the reorganisation and subsequently worked on the Institute's Scientific Board.[4] In the late 1940s and early 1950s, in connection with the technological treatment of pyrite, he initiated the establishment of the Institute of Ore Research.[5]

His organisational talent was fully manifested in the post-war period. He contributed to the construction of ore dressing plants in Chvaletice and the coal preparation plant in Komořany. In 1951 he joined the newly established Ministry of Fuels and the Power Industry (later Ministry of Fuels) where he continued to work on coal preparation as the head of the Preparation Plants and Coking Plants section. In 1953, he was also appointed as the head of the State Committee for the Development of the Coking Industry[6], and as a renowned expert was elected a corresponding member of the recently established Czechoslovak Academy of Sciences. He prepared technological procedures for coal preparation plants, checked their construction work and had them commissioned. In the 1950s he was successful in his research into the treatment of fluorite and molybdenite and was awarded the Order of the Red Flag of Labour[7] in 1954 and the Merit for Development award in 1956 for his extraordinary results in the construction of the coal preparation plant in Komořany.

After the establishment of the Academy of Sciences, he began to advocate, as a renowned expert, the idea of establishing the ČSAV Mining Institute, while he was the head of the ČSAV Mining Committee and the deputy chairman of the Technical Section of the Academy. In 1958 he was appointed the deputy director of the newly established Mining Institute, and eventually replaced the director Emil Petýrek in 1970 as part of the "political normalisation" of the Academy of Sciences. In terms of his scientific work in the Institute, František Špetl ›

1 Czech: O popelovinách v uhlí a koksu.
2 Czech: Způsob a zařízení k pneumatickému třídění a praní uhlí a jiných sypkých hmot.
3 A AV ČR Archives, Personal Files of ČSAV Members collection, box 82, František Špetl's personal file.
4 NA Archives, Czechoslovak Mines, national enterprise, General Directorate collection, box 121, inv. no. 276.
5 Czech: Ústav pro výzkum rud.
6 Czech: Státní komise pro rozvoj koksárenského průmyslu.
7 Czech: Řád rudého praporu práce, awarded after 1955.

› focused on research into coal preparation and ore dressing, for which he received several awards, for instance the bronze plaque For Merit for Science and Mankind (1963), the Emil Votoček Medal for Merit for Development of Science and Technology[8] (1972) and the Ferdinand Schulz Medal for Extraordinary Merit for the Development of Technology of Fuels[9] (1977). He was also active in international terms in the 1960s as the deputy chairman of the Comecon Scientific and Technical Board for Coal Preparation.

His pedagogical work was also important. From 1945 he lectured at the Mining University in Ostrava (VŠB) in coal preparation, ore dressing and coking processes. He was appointed an associate professor at the VŠB and in 1945–1954 he was the external head of the Institute of Preparation and Coking[10]. He also lectured in the same disciplines from 1953 at the University of Chemistry in Prague (later the VŠCHT), where he was appointed a professor in 1968. He worked there until his death on 18 May 1978.[11]

8 Czech: Za zásluhy o rozvoj vědy.
9 Czech: Za mimořádné zásluhy o rozvoj technologie paliv.
10 Czech: Ústav úpravnictví a koksárenství.
11 A AV ČR Archives, Personal Files of ČSAV Members collection, box 82, František Špetl's personal file.

III. MINING INSTITUTE OF THE CZECHOSLOVAK ACADEMY OF SCIENCES (HOÚ ČSAV)[228]

Mining Committee

On 1 January 1953, the Czechoslovak Academy of Sciences (ČSAV), set up as the supreme national scientific institution focusing primarily on basic research, officially began to work. The creation of new academic institutions and the merger of existing ones into the ČSAV was discussed by the so-called Government Committee for the Building of the Czechoslovak Academy of Sciences in 1952. The question of how basic research in mining could be organised was discussed during its plenary sessions from the very beginning, and it turned out that, for the time being, only the mining committee could be established, as the necessary material support for a scientific mining institute, i.e. location, instruments, staff and wages, was lacking. However, mining research had no specific position in this respect: At the time the ČSAV was established, its Technical Section's only institute was the Institute of Theoretical and Applied Mechanics,[229] while a reduced form of institutionalisation through committees (such as the Transport Committee), laboratories (such as the Machinery Laboratory) and cabinets (such as the Metallurgical Cabinet, not set up) was used with the other technical disciplines that were covered by the new Academy of Sciences.

The so-called Preparatory Committee for Mining, renamed in May 1953[230] to the Mining Committee, sometimes also referred to as Committee for Mining[231], was chaired by František Špetl; its other members were František Čechura, Emil Petýrek, Josef Formánek, Ladislav Čepek, Karel Šulc, Alois Říman, Josef Hlisnikovský and from 1954 also Bohumil Hummel, Vladimír Kovář and Hynek Bezděka. The Committee's task was to primarily deal with issues relating to material and personal

228 Czech: Hornický ústav Československé akademie věd.
229 Czech: Ústav teoretické a aplikované mechaniky. It was mostly built up from Kloknerův ústav [the Klokner Institute] which had already existed for decades.
230 This happened at the 11th session of the 5th Technical Section of the ČSAV held on 27 May 1953 at the proposal of the Section's chair Theodor Ježdík.
231 Czech: Hornická komise.

support for the future mining institute, and to determine specific areas of its activities. The Committee was to render the necessary advisory or consulting services as required by Czechoslovak institutions and industrial enterprises.

Despite the Committee's several proposals to create a smaller institution or a mining laboratory whose staff could start work on the first of the outlined tasks, namely the study in the degree of hardness of rocks, ores and coal to facilitate mining work,[232] suitable conditions to establish a scientific mining institute did not arise until five years later.

Institution for the Prevention of Pneumoconiosis

At its session held on 25 March 1953, the Czechoslovak government decided that there was a need to protect miners against silicosis and assigned this task to the ČSAV, which was supposed to cooperate with the ministries of health, the metallurgical industry and ore mines, fuels and the construction industry.[233] The 5th Technical Section of the ČSAV therefore appointed a group of experts in 1953 to focus on research in silicosis, i.e. pulmonary dust disease. Vladimír Kovář, a member of the Mining Committee, submitted his proposal, referring to analogous situations in other countries, to create the ČSAV Institute for Research into Dust Levels in Mines. However, its suggested parameters were too ambitious for the time, and eventually only the Technical Section of the ČSAV was extended with a two-member unit called "site for research in the prevention of silicosis" (also known as "site for the prevention of pulmonary dust disease"), which was headed by František Špetl, as was the Mining Committee. Vladimír Kovář, mentioned above, was the second member.[234]

Covering the Current Needs of the State

One of the characteristic features of the direction taken by the Czechoslovak economy after World War Two was quick industrialisation focused on development and heavy industry. Besides engineering and metallurgy, mining in particular was becoming a strongly preferred area in many respects. In this, science was perceived as the key driving force behind the technical advancement and development of production. The rapid surge in the extraction of minerals, together with a sharp increase in their consumption, inevitably led to calls for a theoretical basis to ensure their more effective use. The efforts of the Mining Committee to set up the mining

232 A AV ČR Archives, 5th Section of the ČSAV – Technical Section collection, box 24, inv. no. 81, Mining Committee, Letter from František Špetl to the Technical Section of the ČSAV, 17 September 1953.

233 A AV ČR Archives, 5th Section of the ČSAV – Technical Section collection, box 24, inv. no. 86, Committee under the 5th Section, Meeting on the topic of pneumoconiosis summoned by the 5th Section of the ČSAV.

234 A AV ČR Archives, 5th Section of the ČSAV – Technical Section collection, box 24, inv. no. 47, Site for Prevention of Pneumoconiosis. Proposal to establish the site.

institute therefore gained important support at the highest level especially in the latter half of the 1950s. Government Resolution 454 dated 22 February 1956, entitled *On the tasks of science in securing development and improving the technical standards of Czechoslovak industry*, expressly mentioned the founding of a "Mining Research Institute" as part of the ČSAV, in which space was to be given for the wide development of basic research in rock mechanics, rock pressure, seismic effects and new extraction methods to assist in improving the low efficiency of applied research.[235]

At the national conference of scientific and research staff held on 12–13 April 1956, specific objectives were defined for scientific mining research on which the appropriate institutions were expected to focus: basic geologic research in order to discover new deposits of coal, oil, ores and other raw materials; more in-depth research in efficient mining methods and processing minerals extracted in the country; research in rock pressure, rock movement and the mechanical properties of rocks; more intense research in methods of reducing dust in mines; research in the inorganic and organic raw material base for the chemical industry and its efficient and comprehensive use, especially research into the use of by-products from the chemical processing of brown and black coal and rock gases for the production of primary chemical products.[236]

The ČSAV Mining Institute (HoÚ) was established following a resolution passed by the Central Committee of the Communist Party of Czechoslovakia dated 22 February 1956 and a Government resolution dated 22 February 1957. On 28 August 1957 the Government of the Czech Socialist Republic ordered the Czechoslovak Academy of Sciences to establish the Mining Institute as of 1 October 1957. However, its actual activities did not start until 1 January 1958.[237] As a result of that, the Mining Committee lost the main reason for its existence, and even though its members made some attempt to change its purpose, for instance by focusing on holding conferences on mining topics,[238] it ceased to exist at the end of the 1950s.

Inconsistence of Czechoslovak Basic Mining Research before the Establishment of the Mining Institute

Before the ČSAV Mining Institute was established, there were many institutions in Czechoslovakia whose primary scope was applied research in mining and, to a limited extent, also basic research. There was no institution focused solely, or at

235 NA Archives, Presidium of the Government of the Czech Socialist Republic / Czechoslovak Socialist Republic collection, uncatalogued, Resolution of the Government of the Czech Socialist Republic No. 454 of 22 February 1956.

236 *Celostátní konference pracovníků vědy a výzkumu (12.–13. dubna 1956) [National Conference of Scientific and Research Staff (12–13 April 1956)]*. Praha: Nakladatelství ČSAV, 1956, p. 9.

237 A AV ČR Archives, ČSAV Presidium collection, box 13, Minutes from the 20th session of the Presidium of the ČSAV dated 25 October 1957.

238 A AV ČR Archives, 5th Section of the ČSAV – Technical Section collection, box 24, inv. no. 81, Committees under the 5th Section; Mining Committee.

least primarily, on basic research in mining. The Government Committee for the establishment of the ČSAV was also aware of the fact that: *"Basic research in the mining discipline is still carried out mostly by institutions under the competence of ministries, meaning that the solutions to research tasks cannot be merged into one unit in economic terms"*.[239]

The aforementioned institutions primarily included the Institute for the Research and Use of Fuels in Prague, Institute of Mine Mechanisation in Prague, Brown Coal Research Institute in Most, Scientific Black Coal Research Institute in Ostrava-Radvanice, Crude Oil Research Institute in Brno, Institute for Research of Coal Deposits in Prague, Ore Research Institute in Praha-Hodkovičky, Institute of Ore Enrichment in Praha-Vysočany and Institute for Research into Industrial Minerals in Karlovy Vary. There was a small Institution for the Prevention of Silicosis at the Technical Section of the ČSAV and a Mining Section at the Czechoslovak-Soviet Institute. In addition to these, there were two universities, the Mining University in Ostrava and the Faculty of Mining at the Technical University in Košice (now Slovakia). Some research tasks which related partially to coal were also carried out by the Stalin Works Central Laboratories in Záluží u Mostu, the Urx Works Central Laboratory in Ostrava, the Gasworks Institute in Běchovice and the Faculty of Fuels at the College of Chemical Engineering and Technology in Prague.[240]

Allocations for the ČSAV Mining Institute

The plans to build the ČSAV Mining Institute through allocations of portions of already existing institutions were grand and were frequently met with reluctance, certainly not unfounded, on the part of those institutions that were to lose their staff, wages or equipment.

A decision was taken that a substantial part of the existing Institute for the Research and Use of Fuels (ÚVVP), then under the competence of the Ministry of Fuels, would become the core of the future Mining Institute. The management of the ÚVVP sent a letter objecting to the future allocation on 16 May 1957, stating

239 A AV ČR Archives, Government Committee for Building Up of the ČSAV collection, box 6, inv. no. 2, Technická sekce, Zpráva o stavu technických věd a plnění dokumentu o vědě v oblasti hornictví. Vybudování výzkumného ústavu hornického ČSAV. [Technical Section, Report on the state of the technical sciences and fulfilment of the science document in mining. Building up of the ČSAV Mining Research Institute].

240 Czech: Ústav pro výzkum a využití paliv v Praze, Ústav pro důlní mechanizaci v Praze, Výzkumný ústav pro hnědé uhlí v Mostě, Vědecko-výzkumný ústav pro černé uhlí v Ostravě – Radvanicích, Ústav pro naftový výzkum v Brně, Ústav pro průzkum uhelných ložisek v Praze, Ústav pro výzkum rud v Praze – Hodkovičkách, Výzkumný ústav pro zušlechťování rud v Praze – Vysočanech, Výzkumný ústav nerudných surovin v Karlových Varech, pracoviště pro boj proti silikose, Československo-sovětský institut (oddělení pro hornictví), Vysoká škola báňská v Ostravě, Báňská fakulta Vysoké školy technické v Košicích, Centrální laboratoře Stalinových závodů v Záluží u Mostu, Centrální laboratoř Urxových závodů v Ostravě, Plynárenský ústav v Běchovicích, Fakulta paliv Vysoké školy chemicko-technologické v Praze.

that the separation of some of its parts would make the complete institution unable to function; however, even this did not prevent its division. The separating units, namely sections carrying out physical and chemical research including all basic research tasks relating to coal substance, petrographic research, coal preparation research and briquetting research, including the workshops and other auxiliary services, were incorporated into the emerging Mining Institute, while the group for coal combustion and gasification (except for coal use in power technology), the economic section and tasks associated with the purification of gas for industry purposes, with the appropriate staff and pilot plants, merged with the Gasworks Institute in Běchovice. This new institution was named the Institute for the Research and Use of Solid and Gaseous Fuels[241] (the name was changed back to Institute for the Research and Use of Coal in 1963) with its headquarters in Běchovice, a district of Prague. A decision was taken at the meeting of the Minister for Fuels' advisory board that the new institute would be the legal successor of both previous institutions.[242]

The ČSAV Mining Institute and its future successor institutes therefore are not, in the legal sense, the institutional successors of the original Institute for Scientific Coal Research, founded in 1927, and the Institute for the Research and Use of Fuels which followed (see above); however, in real terms they undoubtedly are, as they seamlessly continued in and further developed the activities of the previous institutes. The undeniable continuity also includes the premises at V Holešovičkách 41, which were allocated to the ČSAV, including most of the instruments that were located there.

The ČSAV Mining Institute, however, did not include only the former departments of the Institute for the Research and Use of Fuels. The model on which it was based, in line with the then political doctrine, was the "Institut gornogo dela" of the Academy of Sciences of the Soviet Union, which was established in 1935 and was considered the top Soviet institution for mining research and mining equipment.[243] After consultation with staff from the Soviet Academy of Sciences, other institutes or their parts were subsequently incorporated into the Mining Institute:

241 Czech: Ústav pro výzkum a využití tuhých a plynných paliv. It should be noted that the original Institute for the Research and Use of Coal also had a pilot plant site in Ostrava-Kunčičky, which was transferred to the Scientific Coal Research Institute in Ostrava-Radvanice together with the task of cataloguing black coal seams, and the section for underground gasification of coal, which was transferred to the Brown Coal Research Institute in Most together with the task of cataloguing brown coal seams and operational research in coal preparation and briquetting.

242 A AV ČR Archives, ČSAV Mining Institute collection, box 1, inv. no. 16, Zrušení Ústavu pro výzkum a využití paliv a jeho delimitace do Hornického ústavu ČSAV, 98. schůze kolegia ministra paliv z 26.11.1957 [Dissolution of the Institute for the Research and Use of Fuels and its allocation to the ČSAV Mining Institute. 98th session of advisory board of the Minister of Fuels, 26 November 1957].

243 A AV ČR Archives, ČSAV Mining Institute collection, box 1, inv. no. 16, Zrušení Ústavu pro výzkum a využití paliv a jeho delimitace do Hornického ústavu ČSAV, dokument: Hornický ústav ČSAV 3/58 [Dissolution of the Institute for the Research and Use of Fuels and its allocation to the ČSAV Mining Institute. Document: ČSAV Mining Institute 3/58].

the section of Rock Pressure and Soil Mechanics from the Institute of Mine Mechanisation in Prague,[244] the section of Theoretical and Applied Rock Mechanics in Kyje, near Prague, from the Institute of Ore Research in Praha-Hodkovičky (even though in 1956 the Ministry for Metallurgical Industry and Ore Mines was originally dismissive in this matter), or the section of Paraffin Production with Fischer-Tropsch Synthesis, including its pilot plant equipment, from the Gasworks Institute in Běchovice. Other tasks, including the relevant staff, were later transferred to the Mining Institute from other institutions, such as basic research tasks in the extraction and preparation of industrial minerals from the Research Institute for Industrial Minerals in Karlovy Vary and basic coal preparation tasks from the Institute of Ore Research in Praha-Hodkovičky.

In the course of 1957 an agreement was made in the government and later also with the ČSAV Presidium that the Mining Institute would now also include the "Institution for the Prevention of Silicosis". On the contrary, the ČSAV Laboratory of Inorganic Chemistry, which also carried out basic research in the preparation of minerals, was not incorporated into the Institute and became the foundation for the ČSAV Institute of Inorganic Chemistry.

Finally, on 15 April 1958 the allocation agreement between the ČSAV and the Báňské projekty Teplice came into effect, envisaging the transfer of a portion of their Geomechanical Laboratory and the necessary offices from the Project Design section of the Production Department of the Soil Mechanics, based in Prague, to the ČSAV Mining Institute as of 1 May 1958, with a total staff of 6.

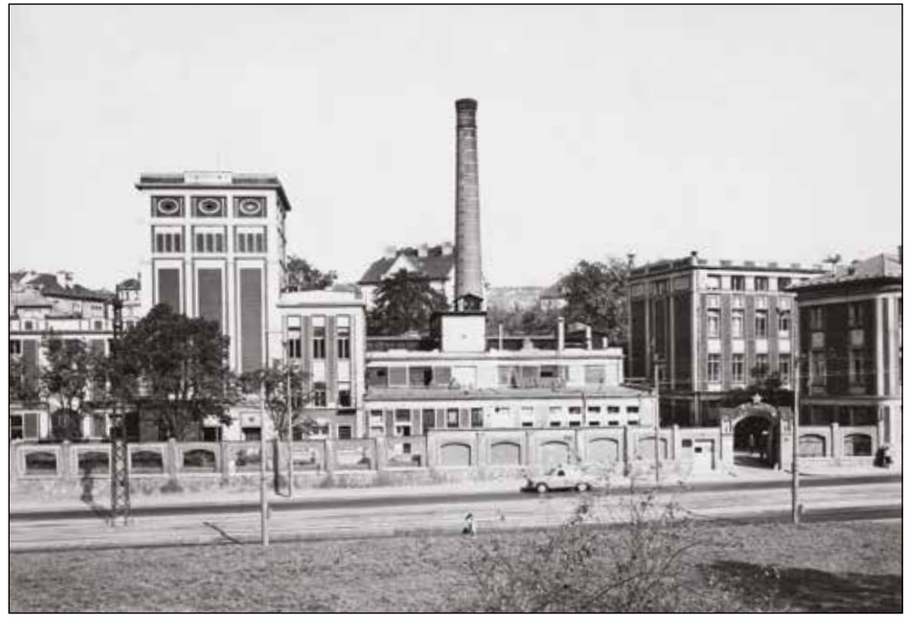
Location of the ČSAV Mining Institute

Initially it was thought that the newly emerging Mining Institute would be located in one of the large mining districts, with Ostrava, Most, Příbram and Kladno being most frequently mentioned places for this. Representatives of the Mining Committee and the Scientific and Technical Society for Mining affiliated with the ČSAV[245], however, pushed through the idea that the Mining Institute should take its place alongside the other academic institutes in Prague.[246] The key argument for that was that the necessary development of the science of mining requires close links with research at other ČSAV institutes (mining as a science essentially has much in common with other scientific disciplines, such as geology, mineralogy, cartography, development,

244 A AV ČR Archives, ČSAV Mining Institute collection, box 42, inv. no. 131, Delimitace horských tlaků z ÚDM do HÚ-ČSAV, 19.12.1957 [Transfer of Rock Pressure unit from ÚDM to HÚ ČSAV, 19 December 1957].

245 Czech: Hornická komise; Vědecká technická společnost pro hornictví při ČSAV, 1955–1959 (transferred to the national Trade Union organisation).

246 A AV ČR Archives, 5th Section of the ČSAV – Technical Section collection, box 13, inv. no. 34, Výstavba hornického ústavu – dokument sestavený Františkem Špetlem a Ladislavem Bubem, 22. 3. 1956 [Building up of the Mining Institute. Prepared by František Špetl and Ladislav Bub, 22 March 1956].



View of the premises of the Mining Institute, 1966. Photo by Jiří Plechatý.
A AV ČR Archives, ČSAV and CAS Reportages collection, sign. FOP 844, no. 10.

chemistry, engineering, electrical engineering, biology and others) and also requires easy access to big libraries. The claim was also made that if one of the mining districts were selected, the Mining Institute's activities would favour the needs of that district while work on topics important for other districts would be put aside.

As a result of that, suitable premises began to be sought in Prague. At first, in 1956, the site of the Institute of Ore Research in Kyje, then at Mánesova 675, was considered and anyway a part of that institute was supposed to be incorporated into the Mining Institute. Talks were held with the Ministry of Fuels to allocate several rooms in the unfinished structures at Na Lhotce, and the ČSAV Presidium was sent a request to free up 4–5 rooms in the ČSAV's premises at Opletalova 45.[247]

Eventually the complex of buildings at V Holešovičkách 41, formerly Rokoska 94, became the headquarters of the Mining Institute. It was still the seat of the Institute for the Research and Use of Fuels, a part of which was to be incorporated into the Mining Institute and another part into the Institute for the Research of Solid and

247 A AV ČR Archives, 5th Section of the ČSAV – Technical Section collection, box 24, inv. no. 81, Zápis o poradě hornické komise ČSAV, 9. 11. 1956 [Minutes from the meeting of the ČSAV Mining Committee, 9 November 1956].

Gaseous Fuels (ÚVVTPP) based in Běchovice. However, the ÚVVTPP was very slow in moving from its Prague address, and contrary to initial expectations, it took several years before it vacated the premises. That complicated the Mining Institute's plans to move in the laboratory of its Geomechanics section, which was still housed in a dilapidated building in Kyje. In 1968 the head of the laboratory sent a report to the director of the Mining Institute describing the unsatisfactory conditions of the building in Kyje and stating the need for prompt action, either to move the laboratory to the Institute's headquarters, to reconstruct the building or to build a new site on land belonging to the ČSAV, also in Kyje.[248] Eventually the first option was chosen and the laboratory was moved at the beginning of 1969.

More or less throughout the entire existence of the Mining Institute in Prague, it was unclear what would be based at V Holešovičkách 41 and for how long. Besides the Mining Institute and the ÚVVTPP, or ÚVVP, some parts of the premises were rented out to the Central Bohemian Printing House and a part of the ČSAV Publishers,[249] and some were sublet to the Central Institute of Geology and the Central Geological Administration,[250] each of them facing the same shortage of premises as the Mining Institute.[251]

In the mid-1960s, moreover, one of the bigger buildings used by the Mining Institute came under threat of demolition due to the construction of the north-south ring road, namely the part leading through V Holešovičkách Street. Even though it was assumed that the Mining Institute would be allowed to build a new structure within its premises, the allocation of funds for this investment was taking a long time. The Institute's director sent a letter to the Department of the Head Architect of the City of Prague on 30 October 1965, suggesting that the intended ring road be routed closer to the slope of Bulovka, which would save many millions on demolition costs and the necessary investments.[252] The building was eventually saved, but the ring road next to the Institute is still busy with heavy traffic today.

In the 1960s major refurbishments of the buildings used by the Mining Institute were undertaken due to the lack of space and increasing deterioration. These works still accompany the Institute's activities even today. At the end of 1966, for instance, work started to convert a former grain silo into offices, thus eventually creating six storeys with a total usable area of 420 sq.m.

248 A AV ČR Archives, ČSAV Mining Institute collection, box 42, inv. no. 131, Návrhy na umístění dislokovaných pracovišť HoÚ ČSAV v Praze [Proposals for the placement of separate sites of the ČSAV Mining Institute in Prague], 1968.

249 Czech: Středočeské tiskárny; Nakladatelství ČSAV.

250 Czech: Ústřední ústav geologický, 1953–1990; Ústřední správa geologie.

251 A AV ČR Archives, Basic ČSAV Institute Documents collection, uncatalogued, Hornický ústav ČSAV, Zpráva o činnosti HoÚ ČSAV 1958–1960 [Activity report of the ČSAV Mining Institute, 1958–1960].

252 A AV ČR Archives, ČSAV Mining Institute collection, box 42, inv. no. 131, Dopis Emila Petýrka Útvaru hlavního architekta města Prahy [Letter from Emil Petýrek to the Prague Head Architect Department], 30 October 1965.

V Holešovičkách 41 Premises

The core of the buildings that are now inside the premises of the Institute of Rock Structure and Mechanics of the Czech Academy of Sciences was built in 1912 when the entrepreneur František Vydra finished adapting his factory for the production of consumables, a process that took almost two years. At the time, it was on the outskirts of Prague: *"Take electric line No. 14 almost to the edge of Prague. In the gardens next to the big building of Prague's nursing home, an institute caring for epilepsy sufferers, in the future villa quarter, there is Rokoska, a former sugar refinery, now our factory, very close to the last station on the electric line."*

NTM Archives, Vydra Consumables Factory collection, inv. no. 29.

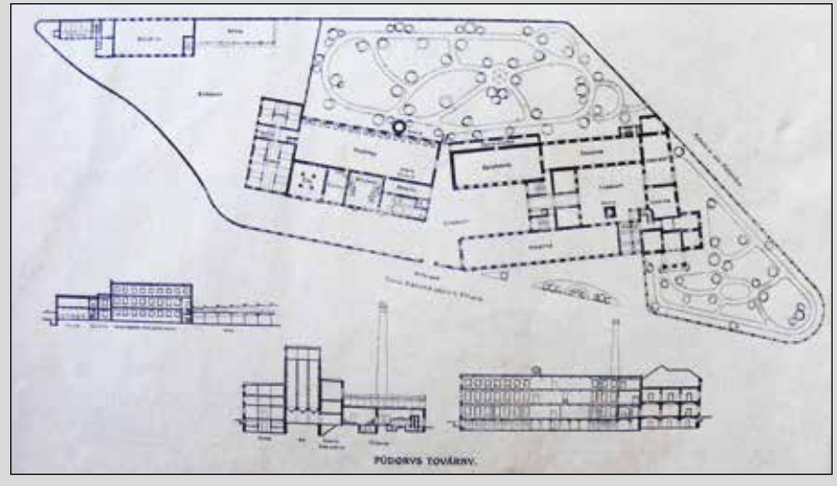
The main gate to the premises led to what was known as the first yard, where one of the chimneys of the former sugar refinery used to stand at that time. To the right of the gate was a fruit press shop with a hydraulic fruit press. Next to it was a chemical laboratory and also a room for providing first aid to the injured and sick. Beyond the chemical laboratory the adjacent stairway led to the neighbouring four-storey buildings, on the ground floor of which there was a laundry, a bath room for male workers and a dishwashing room for the wafer plant. The wafer bakery, in which four ovens were operated by 24 female workers with 240 tongs, faced north. A heating corridor was built along the side of the wafer plant building, which distributed heat to the ovens and prevented contamination of the production areas with coal dust.

Doors from the workshops where soup spices and canned soups were produced also led to the first yard. Beside these workshops was the branch of the Post Office for Prague 23 with the chief postmaster, three officials and three servants who received only parcels from the factory, sometimes more than 1500 per day. *"The Vydrovka coffee packs are transferred directly by a lift from the workshop through the yard and then slide down a simple chute to the handling table, where they are labelled and loaded onto the post lorry that drives them to the station where the railway lines ending in Prague meet. There can be ten such lories per day."*[1] The mustard plant was next to the post office branch on the other side.

On the first floor in the southern part of the premises were an extensive counting house and the office of the factory owner František Vydra. *"The counting house is so long that if I want to talk to director Karas without a telephone, I have to take 70 steps from my desk"*, wrote František Vydra when describing this part of the building in his promotional leaflet entitled *Under the New Roof Frame*, published in 1912.

The floor above the bakery was where the renowned Vydrovka rye coffee was produced. The roasting plant was in the next building, from where the roasted coffee was transferred by a conveyor to the third floor where it went through the cleaning machines and was subsequently manually sorted, weighed and packed.

1 NTM Archives, Vydra Consumables Factory collection, brochure entitled *Pod novým krovem [Under the New Roof Frame]*, 1912.



NTM Archives, Vydra Consumables Factory collection, inv. no. 27.

Rye roasting plant.
NTM Archives, Vydra Consumables Factory collection, inv. no. 22.

The second floor housed the production of fizzy sweets, the Buchtin workshop and the room where the cloth sacks for Vydra's products were sewn and printed. The third floor was allocated to the publishing shop and the preparation of paper and company magazines (folding, stitching and trimming). In the corner of the northern building there was a mill for children's flour which occupied three floors and provided supplies for the families of 12 000 children given supplementary feed.

Next to the roasting plant, which was 42 m long, was an adjacent refinery where new rye was stored. From there it was transported by a lift to the first floor and put into a great cylinder where the primary cleaning process was carried out to remove dust, straw, weeds, grit and other debris from the corn. After that, the rye was transferred to the cleaning station for further cleaning. Finally, any remaining dust was removed with special brushes and the rye was put in a silo.

The reinforced concrete silo, designed for the capacity of 100 rail wagons of corn and 26 m in height, was designed by the civil engineer Vladimír Vlček (1878–1922). The whole structure, including the roof, was cast from reinforced concrete with nine chambers. Under the roof there was a mechanism allowing the chambers to be adjusted. To prevent deterioration, the rye was regularly poured from one chamber to another.[2] It was moved to a two-storey grange for processing and from there to the floor where it was washed and dried over. After that, it was ready to roast.

A very important part of the factory was the engine room with a 100 HP steam engine, which powered all the mechanisms in the factory. Smaller machines were driven by electric motors powered from the generator in the engine room. The lights in all the rooms were powered by a dynamo, and the company was also connected to Prague's municipal power station in case the dynamo failed and for partial nighttime operation. The western corner of the premises was a place for a cask shop, and above that was a two-storey apple store. The coachmen's houses and a horse stable were also here.

The adjacent main street leading to the centre of Prague was built in 1920 by joining several smaller roads and given the name V Holešovičkách in 1925; until then, it was designated as "nameless street" in plans and drawings. The second bigger road in the factory's vicinity close to house no. 94, today Zenklova, was called Fügnerova during entrepreneur Vydra's time, until it was renamed to Kirchmayer Street in 1940 during the Protectorate of Bohemia and Moravia. After the war, the original name of Fügnerova was restored; however, it only lasted one year.[3]

Vydra's original development plans also included a project for a railway siding connected to the nearby Ouzice – Bohnice – Vysočany line, dated 1910. This siding, however, was apparently never built in the end, and no details on its possible construction have been preserved.

After František Vydra died in 1921, his factory ceased to prosper, and its premises were bought by the newly emerging Institute for Scientific Coal Research (ÚVVU) for 3 million crowns in 1928. Another major investment was the adaptation of the buildings to suit the needs of the Institute[4], launched in July 1928, and approximately one year later the scientific and research activities of the ÚVVU were able to begin there.

The Institute was housed in the southern wing and in the central wing connecting the front and rear parts of the complex of buildings, occupying 31% of all of the original factory's available area. Much of the interior layout of the main building (53 m in length, 9 m in width, 14 m in height) was redesigned by rearranging the internal partition walls. The cellars were newly insulated on the outer foundation walls and fitted with bigger

2 NTM Archives, Vydra Consumables Factory collection, brochure entitled *Pod novým krovem [Under the New Roof Frame]*, 1912.
3 LAŠŤOVKA, Marek. Pražský uličník: Encyklopedie názvů pražských veřejných prostranství [Prague Street Guide: Encyclopaedia of Names of Prague's Public Areas], Praha: Libri 1997–2012, pp. 464–465.
4 To be able to buy Vydra's factory premises, the Institute had to take out a loan of 2 mil. crowns. The loan was provided by mine districts which then allocated the creditor's share among its members. See NA Archives, Ministry of Public Works collection, box 1007, inv. no. 1998, Minutes from the meeting of the ÚVVU board of trustees, 19 June 1928.

windows and light wells, after which they could be used for work. They housed a fine mechanics workshop, two large workshops with mills, centrifuges, presses, etc., a joiner's workshop, stock of flammable materials, a room for tube furnaces, a room to store bigger coal samples and a room for gas meters.[5]

Two laboratories began operating on the ground floor, along with the room for work with putrid gases, an elementary analysis workroom, a weighing room and a washroom. There was also a large test room and a room for machines with equipment for liquefying air, for a central vacuum source and pressurised air source, an ice-making machine and a battery charging station. A glass veranda was built in the yard with a large and fully-equipped table for work with strongly irritating substances, such as sulphuric dioxide. The veranda was accessible from the yard and from both laboratories.

Another two laboratories were located on the first floor, where was also a room for gas analysis, a washroom, office, library, conference room and the office of the Institute's director connected to his apartment. The whole of the second floor was used for storage.

The connecting wing housed a laboratory (on the ground floor); calorimetry room, laboratory for physical tasks and a room *"to store the finer physical and chemical apparatuses"*, a dressing room and the toilets (mezzanine); three rooms used as counting rooms or drawing rooms, a room to store chemical reagents and a bathroom (first floor); and three darkrooms for optical and photographic jobs, a stock of glass and chemicals and a room for X-ray equipment (2nd floor).[6]

Five pipe systems were installed throughout the whole Institute on carrier rails underneath the ceiling (on the ground floor) or inside ceilings (on all other floors): gas (yellow), water (green), pressurised air (blue), vacuum (black) and test gas (red). The installations also included electric lines, laboratory hood ventilation and air conditioning, pipes to discharge wastewater from work tables and floors and ten telephones. The buildings were heated by steam.

A 57-m long wall was built along the premises, which was connected to the wall around the garden in front of the apartments and was the same in appearance. The chimney of the original sugar refinery in the first yard had been unused for many years, and was therefore pulled down and used as material to build a brick wall surrounding the premises from the Kobylisy side (a district of Prague). Other major development work carried out on the premises at the end of the 1920s included

A AV ČR Archives, ČSAV and CAS Reportages collection, sign. 72.

the construction of a stairway leading up to the 2nd floor, which separated the wing occupied by the Institute from the rear parts of the complex.

The Institute rented out all the remaining parts of the former Vydra factory, thus providing itself with a regular source of income. The building in which the joiner's shop used to be located was hired by Alfred Pollak for his glass cutting plant and the free parts of the main building were used by the Rapid company. Other rooms were used by State Road Building Institute[7], the Mirora company which manufactured mirrors and the Ultraphon music publishers.

The Institute gained an important tenant in the printing house of the Union of Czech Mathematicians and Physicians (abbreviated as JČMF).[8] Even before World War One, the JČMF was already one of the biggest Czech publishers of textbooks for secondary schools and universities, books and magazines on mathematics, physics, descriptive geometry and other related disciplines.[9] The effects of the economic crisis at the beginning of the 1930s, however, also affected the entrepreneurial activities of the JČMF, whose printing house therefore merged with that of the Union of Mining and Metallurgy Engineers which was also facing bankruptcy. As a result of the merger, the Prometheus company was established as a specialised publisher and an important centre for the publication of mathematical, physical and technical literature.[10]

In the 1930s and until the mid-1940s, renovations were basically carried out, and more up-to-date equipment was

5 Ústav pro vědecký výzkum uhlí v Praze *[Institute for Scientific Coal Research in Prague]*. Praha 1930.
6 Ibidem.
7 Czech: Státní ústav pro stavbu silnic.
8 Czech: Jednota českých matematiků a fyziků. It was established in 1862 as Verein für freie Vortrage aus der Mathematik und Physik [Association for Free Lectures in Mathematics and Physics] and its mission was to improve the teaching of mathematics and physics in schools of all levels and types and support the development of these two disciplines. It also paid great attention to the publication of professional literature.
9 VESELÝ, František: *100 let Jednoty československých matematiků a fyziků [100 Years of the Union of Czech Mathematicians and Physicians]*. Praha: Státní pedagogické nakladatelství, 1962, p. 83.
10 BEČVÁŘOVÁ, Martina: Jednota českých matematiků a fyziků [Union of Czech Mathematicians and Physicians]. In *Jednota českých matematiků a fyziků ve 150. roce aktivního života*. Dolejší, Jiří – Rákosník, Jiří (eds.). Praha, 2012, p 12; VESELÝ, František. *100 let Jednoty československých matematiků a fyziků [100 Years of the Union of Czech Mathematicians and Physicians]*. Praha: Státní pedagogické nakladatelství, 1962, p. 84.

provided, only in the existing laboratories. In the latter half of the 1940s, all the building roofs were renovated.

In February 1956, a decision was passed to establish the Mining Institute of the Czechoslovak Academy of Sciences, also taking a part of the Institute for the Research and Use of Fuels as a basis to support its foundation. The complex of buildings of the former Vydra factory was therefore also considered as the possible headquarters of the new academic institution from the very beginning. Other locations in big mine districts outside Prague were considered, too; however, given the proximity of the other academic institutes and big libraries and the need for impartiality regarding the requirements of each mine district, Prague was eventually chosen, with the site at V Holešovičkách 41.

There were thus numerous movements and relocations at the end of 1957 and during 1958. In the first stage, the 2nd floor of Building B (above the canteen) and the 2nd floor of Building E were freed up for the Mining Institute. If necessary, the Mining Institute was also to have been provided with some other rooms on the ground floor of Building B. During the course of 1958, the Mining Institute built its own chemical laboratories in the rooms it used, and at the end of the 1950s a new boiler room was built in the premises as the old one, more than 50 years old, was insufficient.

The Institute for Research and Use of Solid and Gaseous Fuels, later to be based in Běchovice, was slower than expected in leaving the premises at V Holešovičkách, which further complicated the Mining Institute's plans to move there the laboratory of the department of Geomechanics, which was then housed in a dilapidating building in Praha-Kyje. The original plans assumed that the Institute would fully occupy the premises in 1962 and the laboratory was to be moved there in 1963. Eventually the relocation did not take place until the very end of the 1960s.

Although the Institute was granted the premises of the former ÚVVU from the Ministry of Fuels and Power Industry, the idea of moving it outside the capital kept arising from time to time. However, given the complexity of the move in terms of finance and time, it was supposed to occur "at some time in the future": *"Given the variability and distribution of coal mining and ore mining areas in Czechoslovakia, it is expedient that this academic institute be located so as to represent the interests of the mining areas scattered all over the state in research carried out by the Mining Institute according to their effectiveness for the national economy, not according to the interests of the relevant area in which the Mining Institute would be located. Considering these circumstances, the Technical Section preliminarily suggests that the Mining Institute of the Czechoslovak Academy of Sciences be relocated in the future into a mining area in Central Bohemia, for instance to Jílové (where the Institute of Ore Research is being built) or Kladno, which would have the advantage of close links to other institutes of the Czechoslovak Academy of Sciences, given the desired comprehensive approach to the research tasks. […] It must also be considered that the buildings at the disposal of the Mining Institute are estimated to be worth approximately 25 mil. crowns, and such is also the amount that should be anticipated to build the new institute, plus the investments necessary to accommodate some 200 employees. The design work and the construction of the new institute will require some 5 years. The relocation of the Mining Institute could therefore be seriously considered no earlier than during the 4th – 5th Five Year Plan."*[11]

One of the alternatives discussed was to locate the Mining Institute in the complex of buildings of the academic institutes at Na Mazance, Prague which was supposed to be completed in 1971. However, as early as in 1956 the 5th Technical Section of the Czech Academy of Sciences, which also included the Mining Institute, began negotiations aimed at obtaining a lot with the acreage of some 15 hectares at the site where the ČSAV Institute of Physics[12] was originally planned. The construction of the Mining Institute at the site was preliminarily scheduled for Stage 3, even though no firm decision to carry it out had yet been made.

In the mid-1960s, the premises of the former Vydra factory became endangered due to the construction of the north-south ring road, namely the part leading through V Holešovičkách Street. One of the Institute's bigger buildings was to be demolished and the Mining Institute would be allowed to build a new structure within its premises. Fortunately, and also thanks to intervention by the Institute's director at the Department of the Head Architect of the City of Prague, no demolition work was carried out and the ring road was routed closer to the slope of Bulovka.[13]

In the mid-1960s, too, a major refurbishment of the former silo was undertaken as one of the most complicated reconstructions in the premises in technological terms. The concrete structure needed to be cut with a plasma torch, which had to be preceded by a trial cut and highly precise computations with meticulously prepared design work. Given the nature and complexity of the construction works, an employee from the ČSAV Institute of Physics was hired to be in charge of technical supervision. By redesigning the silo, the Mining Institute gained six storeys with the total utility area of 420 sq.m., 35 sq.m. of which had no direct light.

This was followed by adaptation and renovation works on other buildings within the premises, either due to their poor technical condition or in an effort to resolve lack of space in some departments. Reconstruction works were therefore carried out, for instance, on the so-called Small Tower and the briquetting plant, which was extended. Discussions over the use of renovated or newly constructed rooms, however, were not easy as almost all the departments raised their own requirements and not all of them could be satisfied immediately. The situation was all the more difficult because besides the Mining Institute, numerous other institutions and enterprises had their headquarters at the same address, i.e. V Holešovičkách 41, such as Central Bohemian Printing House, The ČSAV Publishers, Central Geological Institute, Central Geological Administration[14], later, for instance, the Archaeological Institute of the Czech Academy of Sciences, Archives of the Czech Academy of Sciences and the Library of the Czech Academy of Sciences. In the 1990s, the ÚSMH acquired new utility rooms by converting the former workshops and the briquetting plant, and by acquiring the premises used by the former Prometheus printing house.

The Archives of the Czech Academy of Sciences (today Masarykův ústav a Archiv AV ČR, v.v.i. [Masaryk Institute and Archives of the Czech Academy of Sciences]) hired several rooms here from 1991, and at the beginning of the new millennium it acquired a part of the lot of the former Vydra factory from the Institute of Rock Structure and Mechanics where it subsequently built its own building, inaugurated in 2005 and recently largely extended. The institution also uses other rooms on a long-term lease from the IRSM to lodge its archival materials and library collections.

The most recent major construction works in the premises were for a new conference centre, opened in 2018.

11 A AV ČR Archives, 5th Section of the ČSAV – Technical Section collection, box 12, inv. no. 27 – Statement from the Board of the Technical Section to the office of the presidium of the Czechoslovak Academy of Sciences on the Principles for the Development of the Scientific Research Base in 1961–1965; 7 January 1960.

12 Czech: Fyzikální ústav ČSAV.

13 A AV ČR Archives, ČSAV Mining Institute collection, box 42, inv. no. 131.

14 A AV ČR Archives, Basic ČSAV Institute Documents collection, non-catalogued, ČSAV Mining Institute, Report of the activities of the ČSAV Mining Institute 1958–1960.

Staffing of the Mining Institute

Four employees of the Ministry of Fuels were appointed as the first staff of the newly established Mining institute in 1957: Emil Petýrek, the Head of the Scientific and Technical Board; František Špetl, the Head Technologist; Václav Síbek, the Head of Technical Development, and Leopold Konečný, a secretary.[253] Emil Petýrek was newly entrusted with managing the Mining Institute as of 1 October 1957. František Špetl was appointed as the deputy director, Václav Síbek became the head of one of the sections and Leopold Konečný worked as the economic and administrative head.[254]

In 1958, the Mining Institute had a staff of 162 and this number mostly continued to increase until the end of the 1960s. However, it was affected by political vetting checks in the first year of its existence, as were most other academic and university institutions, which resulted in the forced departure of many leading Czech scientists from managerial posts and many important employees from the Academy of Sciences. In the Mining Institute these class-struggle political checks apparently led to eleven employees losing their jobs, namely Jaroslav Boudník, Jan Cenefels, Jarmila Cisariková, Bohumír Filípek, Vilém Friebel, Jan Jeřábek, Josef Kos, Miloslav Máslo, Věnceslav Nývlt, Anna Rojková and Petr Smutný.[255]

253 A AV ČR Archives, ČSAV Presidium Board collection, box 5, Zápis z 51. zasedání z 6. 11. 1957, b. XXI [Minutes from the 51st meeting on 6 November 1957, Item XXI] .

254 A AV ČR Archives, ČSAV Presidium Board collection, box 4, Zápis ze 44. zasedání z 4. 10. 1957, b. VI [Minutes from the 44th meeting on 4 October 1957, Item VI].

255 A AV ČR Archives, ČSAV Mining Institute collection, box 1, inv. no. 16, Seznam pracovníků pro zaslání dopisu o morální rehabilitaci [Staff mailing list for the moral rehabilitation letter].

František Špetl and secretary Ms. Jakubcová, 29 May 1961. Photo by Jiří Plechatý.
A AV ČR Archives, ČSAV and CAS Reportages collection, sign. FOP 397, no. 82.

Václav Síbek's team, 29 May 1961. Photo by Jiří Plechatý.
A AV ČR Archives, ČSAV and CAS Reportages collection, sign. FOP 397, no. 6.

In contrast, at the end of the 1950s, Karel Charbula returned to the Institute after serving time in prison on a fabricated charge. He was a mining engineer and after completing his university studies that had been interrupted by the war, he came to the ČSA mine in the Kladno district, and became its director in 1950. Yet just two years later he was involved in a political trial conducted by the Communist Party of Czechoslovakia against the production head of the Kladno coal mines, Alfons Glatz, who was allegedly linked to a so-called anti-state conspiracy centre and sought to sabotage the national economy. As part of the fabricated evidence, Karel Charbula and the head engineer of the ČSA mine Ales Hájovský were to contaminate Field 103 of the ČSA mine in Rynholec with carbon monoxide by purposefully overriding safety regulations. This was to prevent the local coal seam from being mined. Subsequently in 1954 Karel Charbula was sentenced for criminal conspiracy as per Section 166 of the Crimes Act 86/1950 Coll. to seven years of imprisonment, the confiscation of all his property and the withholding of his civil rights for five years. His appeal to the Supreme Court was rejected, as were the vast majority of all other appeals.[256] He was released from prison somewhat earlier on the grounds of the presidential amnesty of 1957 and found a job at the Mining Institute, where he

256 ABS Archives, Investigation Files – Headquarters collection, file V-2289 MV, State security group investigation file against Karel Charbula and his companions.

Karel Charbula and Jan Sklenář, 29 May 1961. Photo by Jiří Plechatý.
A AV ČR Archives, ČSAV and CAS Reportages collection, sign. FOP 397, no. 7.

Miroslav Perla and his colleagues around the photoelasticity meter, 29 May 1961. Photo by Jiří Plechatý.
A AV ČR Archives, ČSAV and CAS Reportages collection, sign. FOP 397, no. 32.

was the scientific secretary in the 1960s and the head of the Geotechnical section in the 1970s.[257]

The most important increase in staff was seen at the Mining Institute at the beginning of 1960, when the second allocation agreement with the Ministry of Fuels transferred 24 employees to the Institute to conduct briquetting research.[258]

The highest number of employees at the Mining Institute is reported as of 1968, with the head count of 239. The first bold plans conceived by the ČSAV had predicted that a staff of 321 would be the Institute's optimum. The promising development, however, was brought to an end by the events that followed the invasion of the republic by the armies of the Warsaw Pact countries. The so-called normalisation of society that followed brought a definite halt to all pro-reform efforts, and the reinforcement of the totalitarian system went hand in hand with political purges at

257 In 1967 the daughter of the then late Alfons Glatz filed a motion to have the criminal procedure renewed, and Karel Charbula and Aleš Hájovský joined in the motion. The special senate of the Regional Court of Prague stated that their case was fabricated and dropped the accusations for all of the affected in January 1969. The same case was renegotiated again in 1970–1971 by the Supreme Court, following a complaint concerning a breach of the law filed by the General Attorney of the Czech Socialist Republic, who questioned the rehabilitation ruling. The Supreme Court, unlike in other such cases, did not review the ruling, which therefore remained in legal force.

258 A AV ČR Archives, ČSAV Presidium Board collection, box 14, Zápis ze 46. zasedání z 16. 12. 1959, b. III [Minutes from the 46th meeting on 16 December 1959, Item III].

all echelons of society. Political vetting interviews were also carried out at the ČSAV, both with Party members and non-members. The mechanism used, i.e. the so-called renewal of party member cards, led to the membership of approximately two-thirds of the existing 46 party members in the Institute being cancelled.[259] Before the interviews, 65 employees[260] had left the Institute, 6 were forced to leave after the interviews and a further 9 decided to emigrate: The technician Jarmila Svobodová left Czechoslovakia without planning to return, as she had gone abroad in November 1968 and sent a letter to terminate her employment as of 1 December 1968. The head scientist Miroslav Perla went on a business trip to Yugoslavia in November 1968, from where he applied for one year of unpaid leave, but did not return to Czechoslovakia when it elapsed and went to Britain to take up an internship at Nottingham University. Another scientist, Hana Romováčková, left for Switzerland at the end of November 1968 and went on to the USA in 1969, having originally applied for two years' unpaid leave but her application was rejected. The head technician František Hlaváček stayed in Switzerland from November 1969 and applied for six months of unpaid leave to improve his qualifications, but his application was rejected, the reason given being that his position must be occupied immediately for operating reasons. The craftsman Jaroslav Matejsek did not appear at work in October 1968 and unconfirmed reports said that he was in Switzerland. Karel Červený went to the USA in March 1969. The craftsman-specialist Jaroslav Černý and auxiliary worker Marie Rezková left for Vienna in August 1969. The head scientist Jan Hrbáč took his wife and son on ordinary holiday leave in 1971 but did not come back to work when the holiday had ended, and shortly afterwards the Mining Institute received a letter from him, stamped at the post office in Landeck, Tirol. The ČSAV management was afraid that he could take classified documents to the West because he had also worked on the ventilation systems for the newly opened uranium mines near Hamr na Jezeře in North Bohemia. However, the director of the Institute thought this was highly unlikely[261], and no later indications showed any grounds for this suspicion.

In the 1970s the head count was stable at around 230, with no major variations. It was also 230 in the last year of its existence, in 1978/1979.

The most serious and long-lasting staffing problem faced by the Mining Institute was its lack of scientific employees. This was due to the fact that graduates from mining faculties were offered considerably better living conditions at industrial enterprises, and also to the fact that under the staff scheme at the time scientists had lower salaries than expert staff.[262] The percentage of scientists in the Mining

259 A AV ČR Archives, ČSAV Mining Institute collection, box 4, inv. no. 29, Využití závěrů komplexního hodnocení v HoÚ ČSAV [Use of comprehensive assessment results in the ČSAV Mining Institute].

260 This relatively high number is also related to the fact that the Mining Institute hired dozens of seasonal staff every year especially for field work, and many of them are included in this number.

261 A AV ČR Archives, ČSAV Mining Institute collection, box 4, inv. no. 27, Dopis ředitele HoÚ Františku Šormovi ze 7. 2. 1969 [Letter from the director to František Šorm dated 7 February 1969].

262 A AV ČR Archives, Basic ČSAV Institute Documents collection, uncatalogued, Hornický ústav ČSAV, Zpráva o činnosti HoÚ ČSAV 1958–1960 [Activity report of the ČSAV Mining Institute, 1958–1960].

Team of the Structure and Properties of Solid Fuels group, 29 May 1961. Photo by Jiří Plechatý.
A AV ČR Archives, ČSAV and CAS Reportages collection, sign. FOP 397, no. 52.

Institute's staff, however, gradually rose also thanks to its own scientific education, as the Institute also trained scientific staff in its discipline and was the site where dissertations were defended. The percentage rose from the initial 6.5% at the end of the 1950s to approximately 12% in the 1970s.

Organisational Units of the Mining Institute and Their History

From its establishment to the end of 1961, the ČSAV had eight so-called sections which controlled the individual institutes depending on their competence. The 5th Technical Section was in control of the Mining Institute. A major reorganisation was carried out at the ČSAV at the beginning of the 1960s, in which the sections were replaced with more specialised scientific advisory boards ("collegia"), which numbered around 25. The Mining Institute was at first controlled by the Scientific Advisory Board for Mechanics (01/01/1962–30/06/1963), then by the Scientific Advisory Board for the Power Industry (01/07/1963–31/10/1966) and finally by the Scientific Advisory Board for Geology and Geography (01/11/1966–28/02/1979).

Emil Petýrek, the Institute's first director, held his directorial office for almost 13 years. He was not withdrawn until the so-called normalisation measures were carried out in order to do away with the promoters of the so-called Prague Spring, a period of political thaw which ended abruptly with the invasion of the Warsaw Pact armies in 1968. At that time there was already a general requirement in place

Emil Petýrek

A AV ČR Archives, Photographs collection. Portraits of Academicians. Photo by M. Hák

Emil Petýrek was born on 25 May 1901 in Bedřichovice, near Vlašim, and graduated from the higher state grammar school in Tábor in 1918. After that he continued at the Mining College in Příbram, where he studied mining. After graduating in 1923, he worked briefly in the Kladno mine district, then as a production engineer in the Most brown coal district mines (1923–1928) and later as a production engineer and production inspector of the Ostrava-Karviná mine district (1928–1939). By that time his publications already dealt with the extraction and use of coal applying new labour methods.

During the German occupation he was a Mine Inspection Officer at the mines of Báňská a hutní company under the Protectorate, and after the war he became a member of the National Administration of this concern. In 1946–1952 he worked for the General Directorate of Czechoslovak Mines as the head of the Department of Black Coal and Brown Coal and the head of Production Inspection.[1] During the years 1945–1951 he was the Chairman of the Technical Board of the Institute for Scientific Coal Research.[2] Besides his organisational activities, he also carried out scientific work. He joined the International Technical Congress in Paris in 1946, and the following year he travelled to the USA and Canada as a mining expert, combining the World Mining Congress in the USA and his study journey around North American coal, ore and crude oil areas.

He left Czechoslovak Mines to work for the Ministry of Fuels and the Power Industry and in 1957 was appointed as the director of the newly emerging ČSAV Mining Institute.[3] He was awarded the Order of the Red Flag of Labour by the president of the Republic, the Order for Merit for Development (1961) and the Academy award For Merit for Science and Mankind (1966). In the 1960s in particular he also gained international renown, for instance as the Chairman of the 3rd International Mining Congress held in Salzburg in 1963 and the Chairman of the 4th International Mining Congress held in London in 1965. As a member of the Czechoslovak delegations, he stayed in a number of countries, such as the Soviet Union, Cuba, Vietnam, Sweden, Switzerland, Germany, etc. and was also the Czechoslovak delegate to the UN Coal Committee.

He was respected as a skilled organiser and hence held numerous positions: he was the deputy chairman of the ČSAV Technical Section, later the deputy chairman of the ČSAV Scientific Advisory Board for Mechanics, and was also a member of the Scientific Advisory Board for Geology and Geography and of the Foreign Committee of the Academy's Presidium. He was a member of the Central Committee for ČSAV Scientific Institutes and Institutions, the scientific secretary of the ČSAV Scientific and Technological Association for Mining, the chairman of the National Committee for Research into Rock Pressure, the Chairman of the National Committee for Rock Mass Mechanics, the chairman of the International Bureau for Rock Mechanics at the German Academy of Sciences in Berlin, a member of the presidium of the Technical and Economic Council at the Ministry of Fuels and the deputy chairman of the Committee for Foreign Relations at the Ministry for Foreign Affairs.

In scientific terms, in the 1960s he focused especially on researching rock pressure, rock mechanics in mines, the stability of mine workings and research into groundwater flow. As the director of the Mining Institute, he often presented popular scientific lectures on the radio or television.[4]

In 1968 he sympathised with the so-called political revival process in Czechoslovakia and in June he signed the *Two Thousand Words* manifesto, published in the *Literární listy* gazette.[5] In 1970 he was withdrawn from the Institute's management and also expelled from the Communist Party of Czechoslovakia. He retired in August 1971; however, his expert and consulting work continued until his death on 4 December 1976.[6]

1 A AV ČR Archives, Personal Files of ČSAV Members collection, box 68, Emil Petýrek's personal file.
2 NA Archives, Czechoslovak Mines, national enterprise, General Directorate collection, box 121, inv. no. 276, Zápis o XII. Řádném valném shromáždění Ústavu pro vědecký výzkum uhlí [Record from the 13th Ordinary General Meeting of the Institute for Scientific Coal Research]; box 244, inv. no. 562, Zpráva o činnosti Ústavu pro vědecký výzkum uhlí v Praze pod národní správou v roce 1945 a 1946 [Activity report of the Institute for Scientific Coal Research under National Administration in 1945 and 1946]; box 175, inv. no. 374, Zápis o schůzi Technického výboru Ústavu pro vědecký výzkum uhlí a nerostů [Minutes from the meeting of the Technical Board of the Institute for Scientific Coal and Minerals Research], 18 March 1949.
3 A AV ČR Archives, Personal Files of ČSAV Members collection, box 68, Emil Petýrek's personal file.
4 Ibidem.
5 Dva tisíce slov, které patří dělníkům, zemědělcům, úředníkům, vědcům, umělcům a všem [Two Thousand Words that belong to workers, farmers, officers, scientists, artists and everyone]. Literární listy, 1968, Vol. 1, No. 18, pp. 1, 3. See also note 337.
6 A AV ČR Archives, Personal Files of ČSAV Members collection, box 68, Emil Petýrek's personal file.

František Špetl and Gustav Šebor. Photo by unknown author. *IRSM, collection of photographs.*

to provide human resources based on political criteria in every discipline, and not only at the ČSAV. As of 30/06/1970 the directors of all ČSAV institutes were withdrawn, 11 of which permanently, 37 were given an interim director post until a more appropriate candidate was found, 45 were given an interim director post and could be fully appointed if they proved suitable, and only 4 directors were allowed to continue their appointment as "well-proven members of the Communist Party".[263] Emil Petýrek was replaced as of 1 July 1970 by his previous deputy František Špetl, who, however, was only given an interim post as the Institute's director. On 1 February 1972 Gustav Šebor, whose political and ideological profile seemed more appropriate for the office at that time, was appointed as the director.[264]

The director's advisory body for serious managerial matters at the Institute was the Institute Council, consisting of the director, his deputy and the heads of the Institute's departments. It discussed plans for scientific research tasks and their fulfilment, considered staffing matters, controlled finances and the education of scientific staff, etc. Besides the Institute Council, there was also the Scientific Board which, besides scientific staff from the Institute, also included external experts. The

263 MÍŠKOVÁ, Alena: Proces tzv. normalizace v Československé akademii věd (1969–1974) [The Process of So-called Normalisation of Society in the Czechoslovak Academy of Sciences (1969–1974)]. In *Věda v Československu v období normalizace (1970–1975)*. Ed. Antonín KOSTLÁN. Praha: Výzkumné centrum pro dějiny vědy, 2002, pp. 149–167.
264 A AV ČR Archives, ČSAV Mining Institute collection, box 1, inv. no. 21, Jmenování ing. Gustava Šebora, DrSc., ředitelem Hornického ústavu ČSAV ke dni 1. 6. 1972 [Appointment of Gustav Šebor as the Director of the ČSAV Mining Institute as of 1 June 1972].

Board was entitled to approve the plans for scientific research work or coordination in defence of candidates' dissertations.

After its establishment the Mining Institute had five departments: 1) Primary Research in Mining Technology, headed by Václav Síbek; 2) Theoretical and Applied Rock Mechanics, headed by Rudolf Kvapil; 3) Basic Research in Coal Preparation, headed by the future director Gustav Šebor; 4) Basic Research in Chemical and Physical Processes in Coal Processing Technology, headed by Jiří Klán; and 5) Basic Research in Solid Fuels and Minerals, with Miroslav Ferdinand Kessler appointed as the head.

The Centre for Scientific, Technical and Economic Information (OS VTEI)[265] was established at the Mining Institute in 1960. It had four organisational units, namely the Scientific and Technical Library, Documentation and Document Research, Publications and Translations, and Reprography. The Centre's task was to provide the Institute with informational and publishing support. The reprographic site moreover allowed copies of publications to be made and, most importantly, low-run publications to be printed using modern printing techniques. One year later, the Mining Institute also opened its own central photographic laboratory.

During the 1960s the chart of the Mining Institute saw some changes which were most often related to improving the scope of activities of its departments. By then there were six of them: 1) the department led by Václav Síbek was renamed as the Department of Rock Pressure and Soil Mechanics, and is mentioned as the Department of Geomechanics from the latter half of the 1960s; 2) the Department of Hydraulics of Groundwater and Rock Stabilisation, lead by Bohuslav Vrbický, changed its name in the mid-1960s to the Department of Hydraulics and Groundwaters; 3) a separate department dedicated to Ventilation and Dust Levels in Mines, from 1972 the Department of Aerology, was led by Lev Pelikán; 4) the Department of Coal Preparation was headed by Gustav Šebor; 5) the Department of Coal Valorisation was led by Jiří Klán from the time it was established; and 6) the Department of Structure and Properties of Solid Fuels, headed for many years by Miroslav Ferdinand Kessler.[266]

Another extensive reorganisation of the Institute was carried out in 1976, as a result of which the number of departments increased to eight: 1) Geomechanics (headed by Václav Skála), 2) Geotechnics (Karel Charbula), 3) Aerology (Jiří Botur), 4) Petrology (Vlastimil Holubář), 5) Chemical Analyses (Halina Voráčková), 6) Coal Preparation (Zdenek Volšický), 7) Coal Chemistry (Vladimír Černý) and 8) Valorisation Processes (Václav Káš).[267]

265 Czech: Oborové středisko vědeckých, technických a ekonomických informací. A AV ČR Archives, ČSAV Presidium collection, box 22, Zápis ze 13. zasedání z 1. 7. 1960, b. VI [Minutes from the 13th meeting on 1 July 1960, Item VI].

266 A AV ČR Archives, Institute Files collection, ČSAV Mining Institute

267 Ibidem.

Department of Studies, staff from the ČSAV Mining Institute library, 29 May 1961. Photo by Jiří Plechatý.
A AV ČR Archives, ČSAV and CAS Reportages collection, sign. FOP 397, no. 58.

In the mid-1960s a change to the Institute's name was discussed both at the Institute and at its supervising authorities. The Mining Institute management was prompted to take this step by numerous requests to carry out the most diverse tasks pertaining to the operation of mines, preparation of investment plans, preparing specific technical and organisational measures, etc., which were not fully within the scope of the Institute's activities, and even by complaints that the Institute, for instance, refused to propose protective pillars for electrical distribution poles around sand quarries or was unwilling to survey old crop lands in so-called rural coal stoping in the vicinity of one of the mines. It turned out that the name Mining Institute was misleading and confusing especially for the technical community, which, understandably, anticipated that the Institute should deal with all matters related to mining activities, i.e. searching for, mining, preparing and selling industrial minerals and rocks.[268]

The Mining Institute therefore presented the Scientific Advisory Board for the Power Industry (VKE)[269] with a proposal to rename the Institute to the ČSAV

268 A AV ČR Archives, Scientific Advisory Board for the Power Industry collection, box 2, inv. no. 26, Dopis HoÚ adresovaný VKE ČSAV navrhující změnu názvu ústavu [Letter from the Mining Institute to the Scientific Power Industry Board suggesting a change to the Institute's name], 17 June 1965.

269 Czech: Vědecké kolegium energetiky (VKE), 1962–1966.

Photo laboratory of the Mining Institute, photographer Renáta Louvarová (Záběhlická). Photo by unknown author. *IRSM, collection of photographs.*

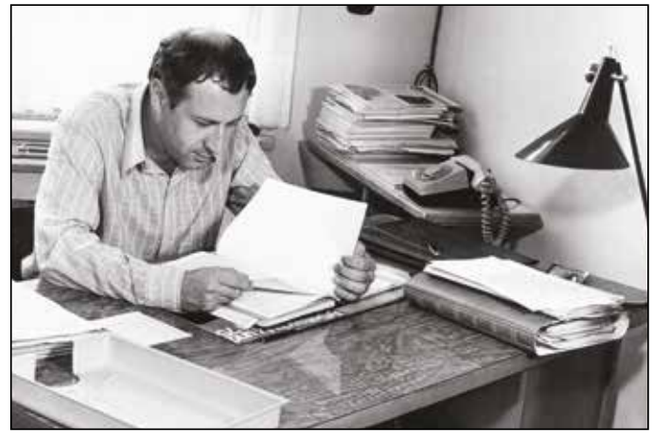
Jiří Klán's team, 29 May 1961. Photo by Jiří Plechatý. *A AV ČR Archives, ČSAV and CAS Reportages collection, sign. FOP 397, no. 60.*

Institute of Geotechnics[270] as of 01/01/1966. The new name was supposed to be much more in line with the Institute's theoretical and research mission as well as the international designation of activities of institutions similar to the Mining Institute and periodicals on the corresponding topics, such as the *Zweigstelle für Geotechnik* published by the German Academy of Sciences in Freiberg or the *Géotechnique* journal published by the International Association of Civil Engineers.[271]

270 Czech: Ústav geotechniky ČSAV (ÚGT), 1990–1993.

271 A AV ČR Archives, Scientific Advisory Board for the Power Industry collection, box 2, inv. no. 26, Dopis HoÚ adresovaný VKE ČSAV navrhující změnu názvu ústavu [Letter from the Mining Institute to the Scientific Power Industry Board suggesting a change to the Institute's name], 17 June 1965.

Jiří Botur. Photo by unknown author. *IRSM, collection of photographs.*



Halina Voráčková. Photo by unknown author. *IRSM, Memorial Book of the Analytics group (1961–1979).*

However, the advisory board rejected the proposal[272]. Therefore, several months later the Institute came up with an alternative that supposedly captured its essence even better: The ČSAV Institute *of Mining Theory and Geotechnics*.[273] Although this

272 A AV ČR Archives, Scientific Advisory Board for the Power Industry collection, box 1, inv. no. 12, Zasedání vědeckého kolegia energetiky dne 18. 6. 1965 [Session of the Scientific Advisory Board for the Power Industry on 18 June 1965].

273 Czech: Ústav báňské teorie a geotechniky ČSAV (ÚBG).

Mining Institute employees Jan Kohoutek and Zdeněk Dekastello modelling, 29 May 1961. Photo by Jiří Plechatý.
A AV ČR Archives, ČSAV and CAS Reportages collection, sign. FOP 397, no. 1.

time the board approved the change,[274] it did so after the deadline determined by the ČSAV Presidium for proposing the approved change.[275] The Mining Institute, or, to be specific, its Prague-based successor institution, was eventually renamed more than a decade later.

Scientific Focus and Primary Tasks of the Mining Institute

The Institute's first activities, besides organisational and staffing matters, were focused primarily on the completion of the unfinished tasks acquired by the Mining Institute together with the buildings and in compliance with the allocation agreement concluded between the ČSAV and the Ministry for Fuels. It was only gradually switched to new research activities focused on obtaining more in-depth knowledge of the properties of the extracted raw materials and the manifestations of the causes and methods of controlling mountain strata groups during extraction processes.[276] To do this, it was also necessary to procure additional instruments, a task that had to be resolved, despite extra investments granted in 1958, mostly by the Institute's own workshops developing special research instruments. This way, over time, for instance, the staff produced a resistance tensometric pressure sensor, convergometer, an induction sensor of rock deformation in a bore, a portable transistor

274 A AV ČR Archives, Scientific Advisory Board for the Power Industry collection, box 1, inv. no. 12., Zasedání Vědeckého kolegia energetiky dne 22. 10. 1965 [Session of the Scientific Advisory Board for the Power Industry on 22 October 1965].

275 A AV ČR Archives, Scientific Advisory Board for the Power Industry collection, box 2, inv. no. 26, Dopis E. Petýrka Čestmíru Štollovi, předsedovi VKE [Letter from Emil Petýrek to Čestmír Štoll, the chairman of the Scientific Advisory Board for the Power Industry], 3 November 1965.

276 A AV ČR Archives, Basic ČSAV Institute Documents collection, uncatalogued, Hornický ústav ČSAV, Zpráva o činnosti HoÚ ČSAV 1958–1960 [Activity report of the ČSAV Mining Institute, 1958–1960].

ČSAV Mining Institute employees Jaromír Houska, Jeník Matějovský and Miroslav Zelenka, 29 May 1961. Photo by Jiří Plechatý.
A AV ČR Archives, ČSAV and CAS Reportages collection, sign. FOP 397, no. 22.

ČSAV Mining Institute employees Žampach and Polák – rock tests in a triaxial device under multiaxial stress, tensometric measurement of deformable characteristics, undated. Photo by Renáta Louvarová (Záběhlická).
IRSM, collection of photographs.

tensometric device, a large centrifuge for modifying photoelasticity measurement models, a mixer for epoxyde resins for the preparation of photoelasticity measurement models, seismographs, a submersible periscope for studying the movement of air bubbles and coal particles in a flotation chamber, etc.

The primary demand for the activities of the Mining Institute in the general sense was to work in those areas of basic mining research which help to deal with the consequences of the rapid surge in mining activities and consumption of the extracted raw materials, and which can be clearly and quickly used for practical purposes in the Czechoslovak mining industry. This went in line with the tasks assigned to the Institute by the state plan, which was conceived for 5-year periods. Cooperation with other academic or university institutions was often involved in these tasks.

Gustav Šebor

IRSM, collection of photographs.

Gustav Šebor was born on 22 June 1920 in Mukařov as the son of a future employee of the Association of Black Coal Mines[1] in Kladno. After graduating from grammar school in Prague in 1938, he studied at the College of Chemical Engineering and Technology in Prague (VŠCHTI). He had to interrupt his studies after the closure of the Czech universities during World War Two and began to work as a chemist at the Institute for Scientific Coal Research in Prague, where he gained valuable knowledge in the chemistry of fuels. He worked there, for instance, on research into technology for the production of phthalic acid anhydride and benzoic acid anhydride, and contributed to the preparation of original analytics for individual products using the polarographic method.[2] He completed his studies at the VŠCHTI after the war in 1946.

In 1946–1955 he worked in managerial positions in various national industrial enterprises in Žilina, Slovakia: the Lučebný a farmaceutický Plant, Štefan Bašťovanský Plant, Kovohuty and Drevoimpregna. In 1955 he became head of the Mineral Preparation Department at the Institute for the Research and Use of Fuels and remained in the same position after the Institute was incorporated into the Mining Institute. From 1972 to 1987 he was the director of the Mining Institute (the ČSAV Institute of Geology and Geotechnics from 1979). He retired in 1988, but continued to work as a scientific worker – consultant for the Institute for several years.

In 1963 he defended his dissertation entitled *Cleaning Waste Water from Coal Preparation Plants*[3] and in 1976 his doctoral thesis entitled *Some New Findings from the Treatment of Very Fine and Small Grains*[4]. In the same year he was appointed the deputy chairman of the ČSAV Scientific Advisory Board for Geology and Geography, to become its chairman two years later. He was also elected a corresponding member of the ČSAV in 1977.

His professional interest lay primarily in the preparation and valorisation of minerals. He was the author of more than a hundred publications, research reports and expert statements and, last but not least, ten patents of international recognition. He was an external lecturer at the Mining University in Ostrava, the Technical University in Košice, Slovakia and the ČVUT Faculty of Civil Engineering in Prague. He received several awards for his work, for instance the ČSAV Merited Academician award in 1979 and the Order of Labour in 1980. He died on 2 April 2009.

1 Czech: Sdružení kamenouhelných dolů.
2 A AV ČR Archives, Personal Files of ČSAV Members collection, box 80, Gustav Šebor's personal file.
3 Czech: Čištění odpadních vod z uhelných úpraven.
4 Czech: Některé nové poznatky z úpravy velmi jemných a drobných zrn.

The Institute's staff published their studies and papers in the *Proceedings of the ČSAV Mining Institute*[277] (1959–1961) and in *News from the ČSAV Mining Institute*[278] (1967–1969), renamed to *Acta Montana* in 1970. Between 1962 and 1967 the Institute contributed to the publication of the journal *Mining Research Results*[279] by the Mining Institute of the Slovak Academy of Sciences.[280]

Specifically, the research conducted by the Mining Institute's staff was focused on the topics of rock pressure and the mechanics of rock masses. The results of this scientific work in this area were applied, for instance, in the introduction of new

277 Czech: *Sborník Hornického ústavu ČSAV.*
278 Czech: *Zprávy Hornického ústavu ČSAV.*
279 Czech: *Výsledky báňského výzkumu.*
280 Slovak: Ústav baníctva SAV.

Jindřich Šimáně with a seismological device. Příbram Ore Mines, Anna Mine, undated. Photo by Renáta Louvarová (Záběhlická).
IRSM, collection of photographs.

Model of a horizontal toroidal press to form coal under very high pressure, 200–300 MPa, undated. Photo by Renáta Louvarová (Záběhlická).
IRSM, collection of photographs.

Measurement of rock deformation using an introscope. Příbram Coal Mines, J. Přidal, employee of the Příbram Coal Mines, undated. Photo by Renáta Louvarová (Záběhlická).
IRSM, collection of photographs.

Petr Glogar measuring the thermal conductivity of rock samples from the Příbram uranium ore deposit. The measurement of this variable was fundamental for the thermal exchange (heating) of the mine atmosphere in the deep horizon where the temperature exceeded 35°C and an expensive cooling system for the atmosphere was therefore required. P. Glogar designed and made this device.
IRSM, collection of photographs.

extraction methods. It further focused on the hydromechanics and hydrogeology of groundwaters, where its work included research into the stability of open pit bottoms threatened by artesian waters, water removal and soil compaction in mine roads, the cleaning of wastewater or the search for suitable indicator substances to monitor groundwater streams flowing above large coal deposits. The Institute also carried out thorough mine atmospheric analyses and proposed measures to mitigate the risk of lung contamination, researched the structure of coal substance using physical and chemical methods, worked on the treatment of extracted minerals, fuel valorisation, research into new methods of using caustobioliths, the production of coke and carbon materials, and the use of radionuclides in mining. At the time, the Mining Institute was the only institution in the country which dealt with briquetting matters.

Cooperation with Industrial Enterprises, Research Institutions and Universities

The Mining Institute developed multilateral cooperation with many institutions, both those with a similar scope of activities as well as those focused on cooperation on solutions to the assigned tasks in their specific discipline.

Cooperation with research institutes usually comprised tasks assigned by the state plan. The Institute's staff were members of scientific advisory boards, members of scientific boards of technical institutes and of ČSAV expert committees, also of professional committees for specific industries, professional committees at the State Committee for the Development and Coordination of Science and Technology and the Czechoslovak Board for Soil Mechanics and Foundation Engineering.[281]

The findings from basic research carried out by the Mining Institute benefited not only the mining industry, be it coal mining, extraction of ores including uranium or extraction of industrial minerals, but also industries with aspects and subjects of interest in common, such as underground development (the Mining Institute, for instance, carried out research to identify underground spaces at the site where the Prague's northern residential areas were to be built, or was involved in the work on the design and development of Prague's underground lines, where it assisted in the injection works during construction or to the research of the interactions between reinforcements and rock using the model method in designing the brickwork), geophysics (for instance geophysical research at Prague Castle), geology, chemical technology, archaeology (for instance identifying the remnants of the church of St. Clement in Kouřim) and speleology (in the Moravian Karst area the Institute was asked to assist in finding a suitable place to establish a safe entrance into a several-kilometre-long cave system on the Punkva sinking river).

281 Czech: Státní komise pro rozvoj a koordinaci vědy a techniky, 1963–1965; Československý výbor pro mechaniku zemin a zakládání staveb.

Long-term rheological tests of rocks under simple compression on spring power presses, Jaromír Houska, undated. Photo by Renáta Louvarová (Záběhlická).
IRSM, collection of photographs.

Bottom stability measurement of the Jiří Mine on a model, Sokolov region, Eva Jeníkovská, Hana Košťálová. Photo by unknown author.
IRSM, collection of photographs.

Zdeněk Lapáček and Luboš Sobol, the Mánes bridge in Prague. Photo by unknown author.
Ludvík Mužík's personal archives.

Zdeněk Sobíšek measuring the dust fallout in underground worksites during the construction of the Prague metro system. Photo by unknown author.
IRSM, collection of photographs.

In 1970 the Czech Mining Office[282] issued a decree[283] which tasked the Institute with acting as a specialized institution for the establishment, operation and use of seismo-acoustic stations to detect the risk of rockbursts. As an example, the Institute produced tensometers and reading devices for the Brown Coal Research Institute[284] in Most, North Bohemia. In the area of Hamr na Jezeře, the Institute's staff applied the equivalent materials method in the local extraction of radioactive materials, and in the approval to use further deposits of brown coal within the protected zone of the Karlovy Vary mineral springs.

The Mining Institute also made a major contribution to the successful relocation of a church building from the town of Most[285], when it identified and indicated the old workings by surveying the specific resistance of groundwater within the premises of the church and the relocation route, carried out a non-destructive identification of the foundation depths of selected pillars and columns, determined the probable geological structures under the floors of the accessible cellars and identified subsurface anomalies on the relocation route.

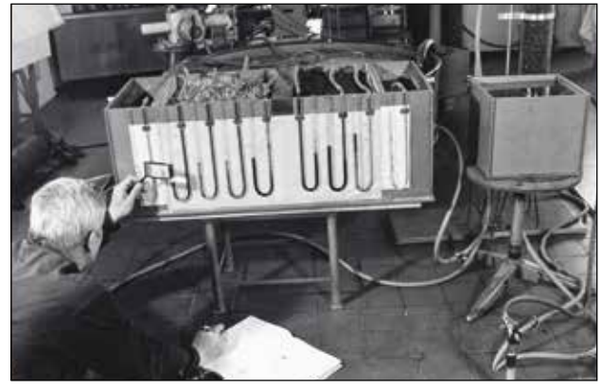
On the grounds of its hydrogeologic research, the Institute also prepared the plans for the dam of the Tušimice II power station ash yard. The results of research into the thermal processing of coal were used, for instance, in managing drying kilns at the directorate of the Brown Coal Mines and Briquetting Facilities[286] in Sokolov.

The team of Libeň-based researchers also prepared a new method of separating gelatine-based raw material which allowed the mechanical separation of both types (bone powder) to the hard and soft component, and enabled them to be processed separately under different parameters of maceration, bleaching, etc., which improved the quality of the products and decreased production losses of raw material. This eventually helped to replace imported Indian bone meal with local resources.

Universities were also a partner to the Mining Institute in providing teaching and scientific education, defence of dissertations, serving on graduation committees, etc. They were especially the Czech Technical University in Prague, the Technical University in Brno, the Mining University in Ostrava, the Technical University in Košice (now Slovakia), the University of Chemistry and Technology in Prague and the Faculty of Mathematics and Physics at Charles University in Prague.[287]

The Mining Institute was often asked to provide training for scientific staff at other institutions, such as the Kladno mines, Prague Underground or Jáchymov mines. It is also worth mentioning consultations to the staff of the ČSAV Institute

282 Czech: Český báňský úřad.
283 Č. j. 1790-520/Má-dr/1970 dated 23 March 1970.
284 Czech: Výzkumný ústav hnědého uhlí.
285 Owing to this, the church was preserved as one of the very few architectural monuments of the old Most, a town completely destroyed in 1982 to make way for brown coal mining.
286 Czech: Hnědouhelné doly a briketárny, established 1946.
287 Czech: České vysoké učení technické v Praze, Vysoké učení technické v Brně, Vysoká škola báňská v Ostravě, Vysoká škola technická v Košicích, Vysoká škola chemicko-technologická v Praze and Matematicko-fyzikální fakulta Univerzity Karlovy v Praze.



Model study into migration of fine particles by measuring changes in the hydraulic gradient. Jan Skalička in the photograph, undated. Photo by Renáta Louvarová (Záběhlická).
IRSM, collection of photographs.

Jadwiga Plocková is measuring a black coal preparation in polarised light for coal classification for pressure gasification; undated. Photo by Renáta Louvarová (Záběhlická).
IRSM, collection of photographs.

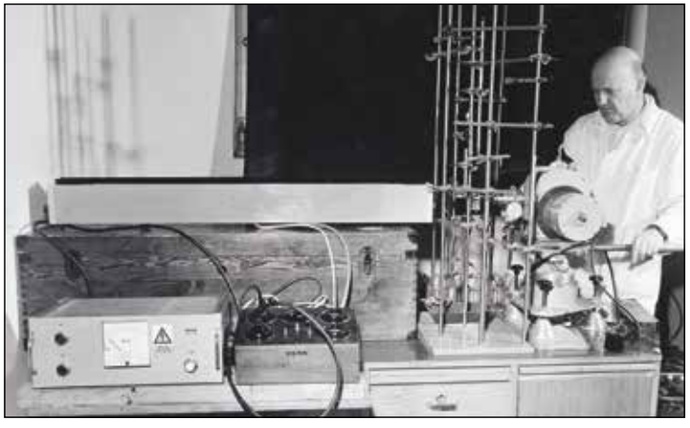
of the Czech Language[288] who worked on the *Dictionary of Mining Terminology*[289], which included specific expressions in coal mining, and a selection of terms from associated disciplines.

Cooperation of the Mining Institute with Foreign Institutions

After years of Czechoslovakia's international isolation, a slow breakthrough came in the late 1950s and early 1960s. This was faster and more intense in the natural and technical than in social sciences. The country's geopolitical segregation by the Iron Curtain became gradually more relaxed in the mid-1950s, both as a result of the

288 Czech: Ústav pro jazyk český ČSAV.
289 SOCHOR, Karel a kol.: *Hornický slovník terminologický [Dictionary of Mining Terminology]*. Praha: SPN, 1961, 184 p.

Measurement of microphoretic mobility of colloid particles. Milan Dočkal in the photograph, undated. Photo by Renáta Louvarová (Záběhlická).
IRSM, collection of photographs.



Model devices for studies of flotation kinetics in combination with a laser source. František Dědek in the photograph, undated. Photo by Renáta Louvarová (Záběhlická).
IRSM, collection of photographs.

de-Stalinisation of the Eastern Bloc and efforts to boost the national economy, which had become considerably less dynamic. However, the promising developments of the 1960s, amplified by the so-called Prague Spring, came forcefully to an end with the August 1968 invasion of the Warsaw Pact armies, and it was not revived more or less until after 1989, even though there were certain promising indications in this respect during the 1980s.

Especially in the 1960s, the Mining Institute therefore developed fruitful international cooperation with nearby as well as more distant countries. It coordinated some national committees of significant international institutions or projects. As early as in 1959, the ČSAV National Committee for Research into Rock Pressure[290] was approved and became a representative of the international organisation Internationales Büro

290 Czech: Národní komitét pro výzkum horských tlaků.

Gamma-gamma well logging kit used to log low-diameter wells bored directly from mine workings. The HOÚ 22 ŠD type was a fully transistor-equipped battery-powered measuring device with numeric indicators in the evaluation module. Undated. Photo by unknown author.
IRSM, collection of photographs.

für Gebirgsmechanik (IBG) der Deutschen Akademie der Wissenschaften with its headquarters in Berlin. The director of the Mining Institute, Emil Petýrek, was appointed the chairman of the Committee and Václav Síbek, the head of the Department of Rock Pressure, its secretary. Other members included scientists and researchers from various institutions and universities in the field of rock mechanics.

The Institute's staff were also members of international disciplinary organisations, such as the International Organising Committee of the World Mining Congresses, International Committee for Coal Petrology, International Bureau of Rock Mechanics, etc. Within Comecon,[291] they participated in the Standing Coal Committee, Scientific and Technical Board for Coal Preparation and Processing (František Špetl was even its head for many years) and in the Coordination Centre for research into new methods of coal utilisation of the Comecon countries in Katowice, Poland.

In 1963, the National Committee of High-speed Photography was established as part of the ČSAV Committee for Scientific and Research Film[292] in which more than 50 members – representatives of various Czechoslovak institutions and enterprises were associated. A scientist at the Mining Institute, František Dědek, was elected the Committee's chairman. The Committee was part of the international organisation of national committees for high-speed photography.[293]

Many foreign experts, both from "socialist" and "capitalist" countries, were interested in many of the working methods that were originally developed by the Mining Institute. These included, for instance, the casting of 3-D models from

291 Czech: Rada vzájemné hospodářské pomoci (RVHP). Comecon was an economic and power entity in which the Eastern Bloc countries associated in 1949–1991.
292 Czech: Národní komitét rychlostní kinematografie; Komise pro vědecko-výzkumný film při ČSAV.
293 A AV ČR Archives, Scientific Advisory Board for the Power Industry collection, box 4, inv. no. 56, Zpráva o zahraničních stycích za rok 1965 [Foreign relations report, 1965].

Photographs from the 7th International Conference on Coal Science, 1968. Photo by unknown author.
A AV ČR Archives, ČSAV and CAS Reportages collection, sign. FOP 989; IRSM, Zuzana Weishauptová's personal archives.

photosensitive materials, deformation measurement using photosensors, registering convergence speed, seismo-acoustic registration of very weak impulses that accompany changes in rock pressure in deep workings and which help to automatically monitor the break-up of rock masses from the first symptoms to the critical condition, i.e. a rockburst, and the concentration of dust particles on the basis of absorption of beta-rays by a trapped dust layer. The method of determining convergence speed and the appropriate device were used highly successfully in the Ruhr coal district in West Germany. The Institut für Geodynamik of the East German Academy of Sciences applied in their research the results from the registration of rockbursts in the Kladno district. Istituto di Arte Mineraria del Politecnico di Torino, Italy used the seismo-acoustic methods and two comprehensive devices designed at the Mining Institute for its work at the Raibl ore mine in Cave del Predil. The Austrian companies Kupferbergbau Mitterberg, Mühlbach near Salzburg,

Bleibergbau in Bleiberg near Villach and, through Omnitrade,[294] also Canadian mining companies were interested in the methodology and instruments for detecting ore mineralisation using the gamma-gamma well logging method. The method of laboratory research of induced seismo-acoustic activities was used by the Faculty of Mining of the Sarajevo University in Tuzla. There was also very close cooperation with Polish institutions, such as the Institute for Mountain Forming Processes of the Polish Academy of Sciences working on the consolidation and sealing of rocks, the effects of thermal factors on the movement of mine winds and research into the spontaneous combustion of coal.[295]

In the early 1960s the Mining Institute was asked by, amongst others, the Cuban Academy of Sciences to assist in research of groundwater communications in the karst formations in Cuba. The staff therefore made a number of trips to the Caribbean, and based on their hydrogeological, hydrogeochemical and hydrologic research, they were able, for instance, to clarify the hydrogeological and hydrochemical relation between salt and fresh water in the southern parts of the island.[296] Finally they made a prognosis and proposal for measures to prevent the intrusion of salt water and to determine areas for future waterworks usage.

An important international success for Czechoslovak mining science was the 3rd session of a group of the International Bureau for Mountain Range Mechanics in Prague in October 1963 where, following a proposal from the Mining Institute, a directive was recommended and approved to determine the compressive strength of rocks, and a year later at the same session a directive for compressive strength tests. Following that, experts from the USA and England were among those who showed interest in the Institute's papers in rock pressure research.[297] It was no wonder that the chairmanship of the 4th International Mining Congress in London in 1965 was entrusted to the Mining Institute.

Perhaps the most important event organised by the ČSAV Mining Institute was the 7th International Conference on Coal Science, held on 10–14 June 1968 in the congress hall of Prague's International Hotel. Besides the ČSAV Mining Institute, it was also held under the auspices of the Ministry for Mining, i.e. the Institute for the Research and Use of Fuels. The six-member organisational committee included Emil Petýrek, František Špetl and Miroslav Ferdinand Kessler on behalf of the Mining Institute, and the conference agenda was defined in three major areas: a) Chemical constitution of coal, including coalification and basis for the

294 A Canadian company mediating East European products and intangible assets for the Canadian market.

295 A AV ČR Archives, Scientific Advisory Board for the Power Industry collection, box 4, inv. no. 54, Zahraniční vědecké styky ve III. pětiletce [Foreign scientific relations in the 3rd 5-year plan].

296 A AV ČR Archives, Scientific Advisory Board for the Power Industry collection, box 4, inv. no. 56, Hodnocení zahraničních styků v oboru působnosti kolegia [Evaluation of foreign relations in the competence of the board].

297 A AV ČR Archives, Scientific Advisory Board for the Power Industry collection, box 4, inv. no. 56, Zpráva o zahraničních stycích za rok 1964 [Foreign relations report, 1964].

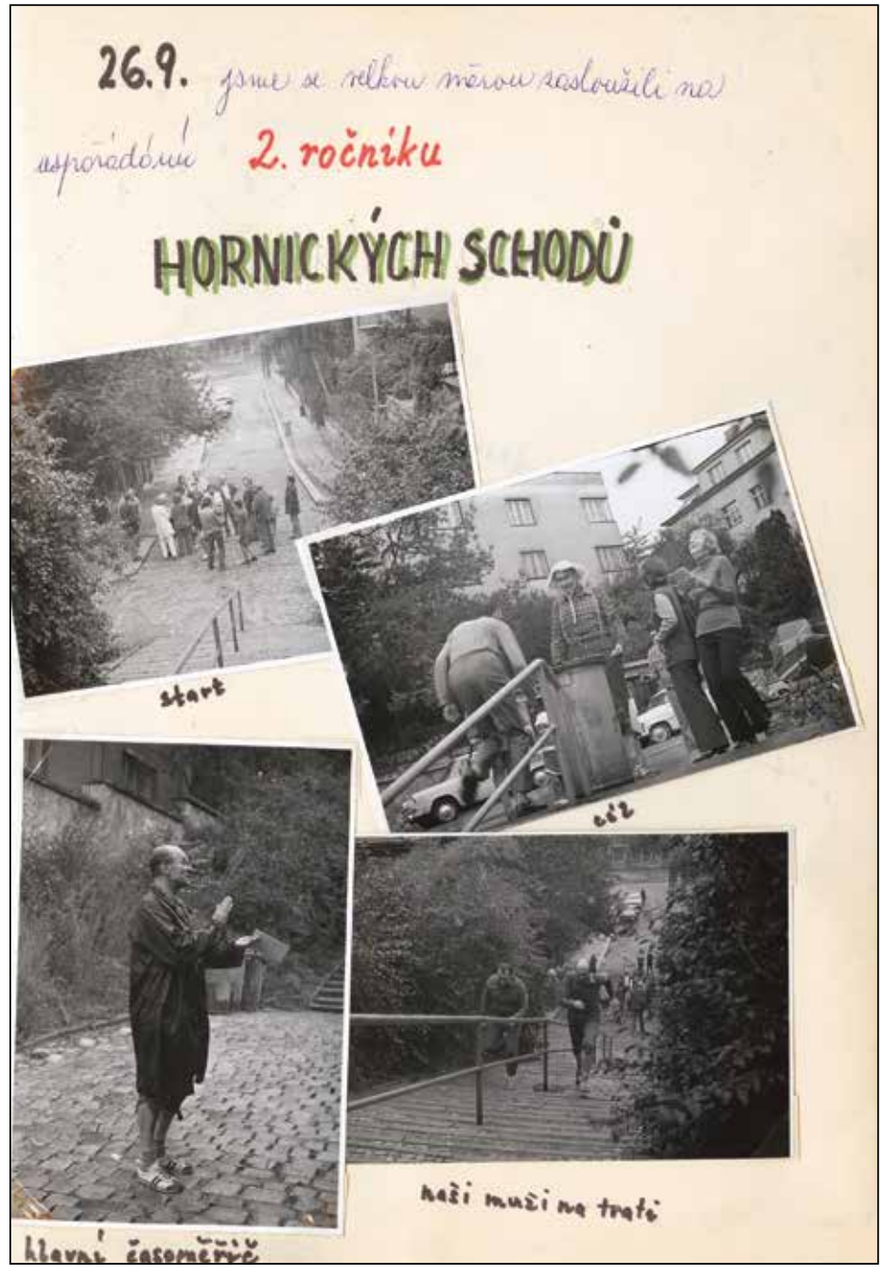
production of chemical products, b) Structure and properties of coal and coke as solid macromolecular substances, and c) Thermal decomposition of coal including the foundations of carbonisation. The whole event met with extraordinary international acclaim.

Some six months later, on 13–16 January 1969, the Institute also held the International Mine Ventilation Symposium in Prague, as a result of which the *International Committee on Mining Occupational Health and Safety* was established as a section with its headquarters in Prague, a part of the standing committee for labour safety and occupational diseases of the International Social Security Association at the International Labour Office in Geneva.

Off-science Life in the Mining Institute

As in the preceding periods, there was also a lot going on in the Institute away from the main area of science. Many activities were organised throughout the year, which in most cases were part of the obligatory team sports or other leisure activities, but the employees often approached them in an entertaining way. The regular events there primarily included meetings of employees to celebrate Miners' Day on 9 September (in 1974, for instance, the well-known Czech singer Naďa Urbánková performed at the event), a run up the steps among the villas below Rokoska, called "Miners' Steps", an orienteering run called "The Miners' Twenty", sports and games in the Mariánská recreational area in the Krušné Mountains, called "GG Games", and Saint Nicholas Day, to which former employees of the Institute, now retired, were invited every year. Joint trips were also organised, whether to visit sites of natural beauty, such as to the famous Czech Paradise area or the Šumava Mountains; historical monuments, such as Karlštejn Castle; or for cultural events,

Diploma and photographs from The Miner's Twenty running contest held on 4 May 1974. Photo by unknown author.
IRSM, Memorial Book of the Analytics group (1961–1979).



Off-science life in the Institute: 2nd year of the run up the Miner's Steps, 26 September 1974. Photo by unknown author.
IRSM, Memorial Book of the Analytics group (1961–1979).

Photograph from the trip to the Tatra Mountains, 1974. Photo by unknown author.
Ludvík Mužík's personal archives.

A trip to Kožlí; in the photograph, the Institute's employees Zdeněk Kotal, Jindřich Šimáně, Ludvík Mužík, Olga Síbková, Jan Sklenář, Milan Brož and Vladimír Roček. Photo by unknown author.
Ludvík Mužík's personal archives.

i.e. trips to museums and theatres. Employee jubilees were also celebrated, and occasional tournaments in table tennis and badminton also appear in the historical records.[298]

Division of the Mining Institute; Its Successor Institutions

The idea that the Mining Institute should be based in Ostrava was discussed even before its establishment. This idea was revived in the considerations of the Ministry of Fuels and Power Industry with the Planning Department of the Czechoslovak Academy of Sciences in the early 1960s. It did not find much support, while the

298 Institute of Rock Structure and Mechanics, Indices at the Secretary's Office, Memorial Book of the Department of Analytics, 1961–1979.

Lubomír Šiška. Photo by unknown author.
A AV ČR Archives, Photographs collection, Portraits of Academicians.

management of the Mining Institute was resolutely opposed to it.[299] However, the situation changed radically in 1974 when the Presidium of the Communist Party of Czechoslovakia instructed the Czechoslovak Academy of Sciences to build scientific bases in the regions of North Moravia, North Bohemia and South Bohemia, and use them to secure the desired development of the Academy but primarily to provide a better link between scientific research and the needs of the practice.[300] The basic research areas which were directly linked to the key local industries in Ostrava were to be transferred there, namely mining, the metallurgical industry, heavy machinery and ecology of industrial agglomeration. For this, especially the Mining Institute, Physical Metallurgy Institute, Superconductivity Laboratory, Institute for Ecology of Industrial Landscape and Development Workshops were considered.[301]

299 A AV ČR Archives, 5th Section of the ČSAV – Technical Section collection, box 13, inv. no. 34, Vyjádření HoÚ k záměru posílení výzkumné základny v ostravsko-karvinském revíru, 14. 4. 1961 [Responses from the Mining Institute on the intention to strengthen the research base in the Ostrava-Karvina coal district, 14 April 1961].

300 A AV ČR Archives, ČSAV Mining Institute collection, box 42, inv. no. 131, Investiční záměr na výstavbu Hornického ústavu ČSAV v Ostravě - Porubě. Praha, březen 1978 [Investment plan to build the ČSAV Mining institute in Ostrava-Poruba, Prague, March 1978].

301 Czech: Ústav fyzikální metalurgie; Laboratoř supravodivosti; Ústav ekologie průmyslové krajiny; Vývojové dílny. A AV ČR Archives, ČSAV Mining Institute collection, box 42, inv. no. 131, Investiční záměr na výstavbu Hornického ústavu ČSAV v Ostravě - Porubě. Praha, březen 1978 [Investment plan to build the ČSAV Mining institute in Ostrava-Poruba, Prague, March 1978].

In 1976 there followed decree 1/1976 of the Czechoslovak government, which, especially with respect to the unclear outlook for improving the location of the Mining Institute, thus also limiting the potential to expand staff numbers, determined that the ČSAV gradually transfer the Mining Institute to Ostrava.[302]

In the first stage, a detached site was to be established in Ostrava as of 1 January 1978, to be promoted to a branch office of the Mining Institute as the Department of Geomechanics of the Carboniferous Mountain Range as of 1 January 1979. Lubomír Šiška, the dean of the Faculty of Mining and Geology at the Mining University in Ostrava, was appointed as its head. Five employees from Prague were assigned to the department, although only one was actually relocated to Ostrava.

However, at the same time, the ČSAV reached the conclusion that general basic mining research matters should stay within the competence of its Prague site, which would not be completely transferred to Ostrava, but would be renamed and have a newly defined scope of activities, clearly differentiated from the office in Ostrava. The ČSAV Mining Institute was therefore renamed, following the decision of the Presidium of the ČSAV, to ČSAV Institute of Geology and Geotechnics as of 1 March 1979, while its headquarters remained at V Holešovičkách 41.[303]

302 A AV ČR Archives, ČSAV Mining Institute collection, box 1, inv. no. 17, Schválení postupu budování Hornického ústavu ČSAV v Ostravě Prezídiem ČSAV v souladu s usnesením vlády ČSSR č. 1/1976 [Approval for the process of building up the ČSAV Mining Institute in Ostrava by the ČSAV Presidium in line with decree 1/1976 of the Czechoslovak government].

303 A AV ČR Archives, ČSAV Presidium collection, box 149, Zápis z 12. zasedání z 13. 2. 1979, b. XIII [Minutes from the 12th meeting on 13 February 1979, Item XIII].

IV. ESTABLISHMENT OF THE ČSAV INSTITUTE OF GEOLOGY AND GEOTECHNICS (ÚGG)[304] IN PRAGUE AND THE ČSAV MINING INSTITUTE IN OSTRAVA

Hazards and Consequences of Reorganisation

At the verge of the 1980s the Institute was facing a very difficult period: It was awaiting the transformation that would end up in the establishment of the ČSAV Institute of Geology and Geotechnics (ÚGG) in Prague and the ČSAV Mining Institute in Ostrava. This was a major intervention into the existing scientific and professional activities of the institute and a considerable organisational burden.

The ČSAV Institute of Geology and Geotechnics was built on the foundations of the existing Mining Institute, into which the ČSAV Geological Institute had been incorporated as of 1 March 1979. This extensive restructuring had its legal grounds in the 12th session of the ČSAV Presidium held on 13 February 1979, when a decision was also adopted to wind up the ČSAV Geological Institute as of 28 February 1979. The reasons for this measure were seen in the overlapping of activities developed in both institutes, in the insufficient cooperation between the two institutes in resolving the creation and exploitation of industrial mineral deposits in Czechoslovakia and in the complicated situation as regards staffing and the location of the ČSAV Geological Institute, which was a major difficulty in providing research in endogenous, quaternary and engineering geology. On 1 March 1979, when the newly established ČSAV Institute of Geology and Geotechnics began work, Gustav Šebor, until then the director of the ČSAV Mining Institute, was appointed as the interim director. One year later he was elected as the due director and he remained in the post until 1987 when he was replaced by his deputy Jaroslav Němec. The transformation of the former Mining Institute to the ČSAV Institute of Geology and Geotechnics was a difficult matter in both organisational and professional terms, as was also implied by the different scopes of activities of both institutes, both working in geosciences but with their specific disciplines, topics, approach to research and methods differing substantially. In 1958–1978 the ČSAV Mining Institute profiled

304 Czech: Ústav geologie a geotechniky ČSAV.

Jaroslav Němec, Gustav Šebor, Jaroslav Šulc and the secretary, undated. Photo by unknown author. I*RSM, collection of photographs.*

itself as a geoscience institution for basic research in geomechanics, geotechnics, special aerology, petrology of caustobioliths and theoretical foundations for the processes involved in the preparation, valorisation and use of minerals. It developed its scientific activities especially in the selected segments of extraction of deposits, preparation and dressing, valorisation and use of minerals.[305]

In contrast, the ČSAV Geological Institute[306] was a scientific institute for basic research in selected disciplines in geology, geochemistry, palaeontology, engineering geology and quaternary geology. Its research capacity focused primarily on research of endogenous (primarily deep-seated) processes and the structure and formation of deeper geological complexes. The outputs of these activities were mostly used for predictions to expand the Czechoslovak raw materials base, the study of the development of organisms or dealing with selected environmental issues in the construction of major engineering works and surface mining.

The reorganisation was aimed at making the activities of the institution more effective and ensuring the more efficient application of scientific results especially in the geological and geotechnical development matters of the Ostrava-Karviná coal

305 A AV ČR Archives, ČSAV Institute for Geology and Geotechnics collection, uncatalogued, box 23, sign. 01, Návrh koncepce činnosti ÚGG ČSAV [Concept proposal of ČSAV ÚGG activities], 1980.

306 The wound-up Geological Institute was established on 1 July 1960 by merging three independent laboratories – Palaeontology Laboratory, Pedology Laboratory and Engineering Geology Laboratory. In 1964 the ČSAV Institute for Geochemistry and Minerals was incorporated into the Geological Institute. Five years later, parts of the Geological Institute, Mining Institute and Institute for Physics of Solid Matters were separated to establish the Institute of Experimental Mineralogy and Geochemistry, which was wound up in 1978 and re-incorporated into the Geological Institute and Landscape Ecology Institute. See A AV ČR Archives, Institute Files collection, ČSAV Geological Institute, ČSAV Institute for Experimental Mineralogy and Geochemistry.

The ČSAV Mining Institute building in Ostrava – Hladnov, undated. Photo by Závada. *CAS Institute of Geonics*

district, the North Bohemian coal district, the uranium industry and the related important construction investments. This requirement also reflected the plan to create a separate Mining Institute in Ostrava. The then management of the Institute, especially the director Gustav Šebor and his deputy Jaroslav Němec, thus faced the difficult task not only of building up the new Prague-based institute, but also creating and running its semi-autonomous branch in Ostrava, expected to gradually grow into an independent ČSAV Mining Institute.

As outlined above, the process of the consistent establishment of the new Institute of Geology and Geotechnics turned out to be relatively difficult not only in professional terms, but also from the organisational point of view, as it was certainly not easy to appropriately and without major delays coordinate and manage the activities of the ten departments of the Mining institute and twelve organisational units of the Geological Institute, which, moreover, had very different head counts.[307]

To facilitate the central management of the scientific and research activities of the new institute, it was divided into four specialised departments ("sectors") in September 1979: 1) Geotechnics (headed by Václav Skála), 2) Geology (Marie Palivcová), 3) Geochemistry, preparation and valorisation of minerals (Petr Skřivan) and 4) Mining (Lubomír Šiška, based in Ostrava). These "sectors" were further divided into the necessary sections, each with its own heads.

The Geotechnics sector was focused on research into the laws of geotechnics as the foundation for new methods of exploiting industrial mineral deposits, especially

307 Cf. A AV ČR Archives, ČSAV Presidium collection, box 149, Zápis z 12. zasedání z 13. 2. 1979, b. XIII [Minutes from the 12th meeting on 13 February 1979, Item XIII. Annex 2 *Návrh opatření k restrukturalizaci pracovišť ČSAV v oblasti věd o Zemi [Proposed measures to restructure the ČSAV institutes in the area of geo-sciences]*.

Václav Skála, undated. Photo by unknown author.
IRSM, collection of photographs.

the research and assessment of the natural conditions for mining in the brown coal basins at the foot of the Krušné Mountains and landslide development laws in connection with extraction and construction works. The Geology sector was to provide research into the structures and laws of the tectonic development of the earth's crust and mantle, describe processes in the accumulation of substances in deep zones and suprazones of the earth's crust and conduct research into fossil ecosystems and their components. The sector of Geochemistry, preparation and valorisation of minerals focused on research into geochemical processes, the migration and accumulation of elements, the genesis and chemical properties of mineralisation, learning the theoretical foundations of preparation and valorisation processes and the use of minerals, especially the composition and structure of caustobioliths, and finally on preparing the theoretical foundations for waste-free processing. The Mining sector (the future independent ČSAV Mining Institute in Ostrava) was expected to prepare the theoretical foundations for deep coal mining issues, especially the geomechanical conditions for mining at depths of over 1000 m, the exploitation of coal seams under the Frenštát sheet and in Ostrava strata, the exploitation of coal seams threatened by mountain shocks, deep mine ventilation and ergonometry.[308]

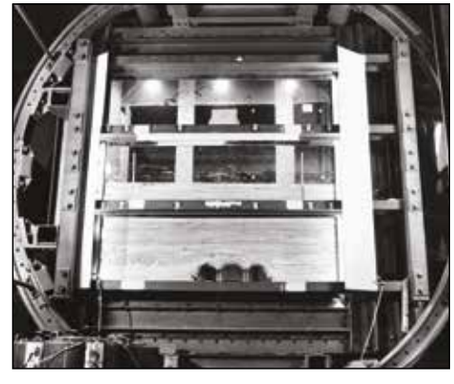
The efficient management of such extensive and demanding research required operative decisions, which also resulted in changes in the number of departments and their internal transformations. As of 1 January 1983 the ÚGG had 12 departments; three years later there were fourteen and at the end of the 1980s thirteen.[309]

308 The ÚGG ČSAV did not deal in underground extraction directly, and the relevant tasks assigned by the state plan were fulfilled through the ministry-controlled institute in Radvanice.

309 A AV ČR Archives, ČSAV Institute for Geology and Geotechnics collection, uncatalogued, box 23, Zápisy ze schůzí ústavní rady v roce 1979 [Minutes from the meetings of the institute council in 1979].

Measurement of gaseous pollutants on a chromatograph, Václav Štochl, undated. Photo by Renáta Louvarová (Záběhlická).
IRSM, collection of photographs.

Zuzana Weishauptová taking measurements with an infrared thermometer to monitor focal points of spontaneous combustion in an opencast mine, undated. Photo by unknown author.
IRSM, Zuzana Weishauptová's personal archives.



Modelling stand for measuring the distribution of deformations along mine workings, undated. Photo by Karel Fink.
IRSM, collection of photographs.

Centrifuge in the photoelasticitymetry laboratory, František Kolář, undated. Photo by unknown author.
IRSM, collection of photographs.

These changes, which although at first seemed inconspicuous, had consequences for staffing, affected the method of assigning and financing tasks, and sometimes therefore required improvisation. Moreover, the Institute provided technical and economic administration for other academic institutions, including the ČSAV Institute of Geography, ČSAV Institute of Psychology and ČSAV Institute of General Power Industry. The administration of the Institute's activities was also considerably affected by the fact that at the end of 1979 the ÚGG was located in up to 38 different places. Its detached offices, warehouses, archives and document administration were in Prague as well as in the Central Bohemian region, namely Pečičky (district of Příbram) or Střítež near Dolní Kralovice, and in Ostrava. The ÚGG management therefore tried to resolve the situation, demanding in terms of logistics, by concentrating the sites into the premises in Libeň at V Holešovičkách 41, formerly Rokoska 94, and the former headquarters of the Geological Institute in Praha-Suchdol. Over time, three main locations were thus created for the ÚGG: Praha 6 – Suchdol, where geological sciences were concentrated; Praha 8 – Libeň, with geotechnologies, preparation and valorisation of minerals, especially humolites, and some geotechnical disciplines; and Praha 6 – Puškinovo Square for other geotechnical disciplines.

The ČSAV Mining Institute in Ostrava

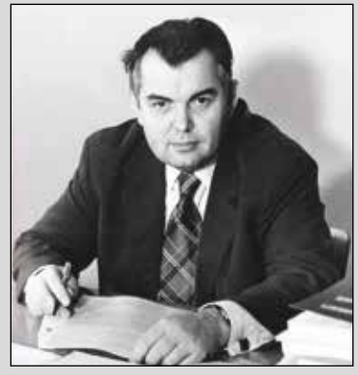
Back in the early 1980s the ČSAV Mining Institute in Ostrava was built up in a relatively short time from the Ostrava branch of the ÚGG. It was established as of 1 July 1982, following a decision of the ČSAV Presidium of 20 April 1982. It consisted of three departments: Mining Geomechanics, Mining Aerology and Geophysics, and Special Measurements Methods. Two major tasks were assigned to this North Moravian institute, with Lubomír Šiška, until then the head of the Ostrava branch of the ÚGG, as the interim director: 1) Geomechanical issues in the exploitation of coal seams in new and difficult conditions (Lubomír Šiška was in charge of this task) and 2) Mine climate and ways of influencing it (Antonín Taufer). The Mining Institute continued in its work on these projects in cooperation with the Institute of Geology and Geotechnics as its former parent institution, the Mining University in Ostrava and the Scientific Coal Research Institute in Ostrava-Radvanice.[310] The Ostrava-based academic institution was also assigned the task of preparing the implementation stage of "Improved precision of location methods for rockbursts in the Ostrava-Karvina coal district", aimed at selecting the best method for locating rockbursts in the district with the available instruments. The proportion of mining carried out under critical conditions was in fact gradually increasing at that time,

310 A AV ČR Archives, ČSAV Presidium collection, box 179, 23. zasedání Prezídia, 18. 3. 1980, Delimitační dohoda ÚGG ČSAV a HOÚ ČSAV, Ostrava [23rd meeting of the Presidium, 18 March 1980, Allocation Agreement between the ČSAV Institute of Geology and Geotechnics and the ČSAV Mining Institute in Ostrava].

Jaroslav Němec

Jaroslav Němec was born on 18 September 1931 in Prague. After graduating from the grammar school in 1950, he worked first in the Prague office of the Spolana national enterprise as a chemist and laboratory operator in the operational and development laboratory for the research and development of insecticides. When the laboratory was closed down in 1951, he began working as a laboratory operator in coke chemistry research at the Institute for the Research and Use of Fuels from where he was delegated to study at university in 1952. He graduated from the Faculty of Technology of Fuels at the College of Chemical Technology and Engineering in 1957 and at the Institute he began to work in the field of coal valorisation. In 1958 he first became a research worker at the newly established ČSAV Mining Institute, later a scientific worker and a deputy head of department. In 1972 he was appointed as the interim deputy director of the Institute and remained in that position until his appointment as the director in 1987. Still as the director, he carried out a major reorganisation of the Institute in 1990, as a result of which the ČSAV Institute of Geotechnics was established.

He was awarded the degree of Candidate of Sciences in 1967 and defended his doctoral thesis in Mining Engineering in 1978. He was a member of the scientific boards and advisory boards of research institutes, a member of scientific boards at universities and worked on committees of the ČSAV Presidium. He was elected a corresponding member of the ČSAV on 3 September 1987, a member of the ČSAV Presidium from October 1987, a member of the ČSAV Committee for Joint Awards of the ČSAV, Academy of Sciences of the Soviet Union, Academy of Sciences of the German Democratic Republic, Bulgarian Academy of Sciences and Polish



IRSM, collection of photographs.

Academy of Sciences in February 1988, and a member of the ČSAV Presidium's Council for International Scientific Cooperation in April 1988. He was also the deputy chairman of the ČSAV Scientific Advisory Board for Montane Sciences and Power Industry in 1990–1991.

As regards his professional activities, he was involved in research into the physical and chemical properties of minerals, studies of the theoretical foundations of the processes involved in the preparation, valorisation and use of minerals, and research into new processes. He later focused his efforts on preparing scientific criteria for the evaluation of the utilisation capacity of mineral deposits both with respect to the geological and geotechnical conditions for their extraction as well as to the processes for their treatment and use. He received several awards for his scientific work, academic and university activities, including the Order of the Red Star of Labour[1] in 1972 and the ČSAV Silver Medal for Merit for Geological Sciences in 1981. He died in 2017.

1 Czech: Řád Rudé hvězdy práce, awarded from 1955.

and the principle for building up a new-generation seismology network was to be defined for areas susceptible to rockbursts, thus also providing an effective preventative measurement network in the coal district to ensure occupational safety in underground mines. A model seismology research site was built at the Zápotocký mine in 1981–1982, and the focal point location methods for rockbursts were analysed in the following year. The devices for parametric seismologic measurements were continuously developed and their functionality verified.[311] The task was completed in 1986. The ČSAV Mining Institute in Ostrava still exists, renamed to the CAS Institute of Geonics[312] on 1 April 1993.

Scientific Research Tasks and Their Practical Application

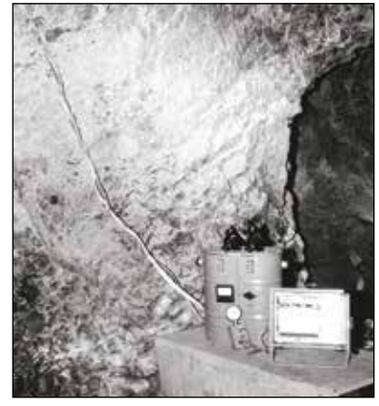
311 Ibidem.
312 Czech: Ústav geoniky AV ČR.

Despite the extensive administrative burden, the professional side of work developed quite satisfactorily at the Institute of Geology and Geotechnics in the 1980s. In the first half of the decade, it worked on four main tasks. The first, "Conditions for the development of the block structure of the Bohemian Massif in relation to the accumulation of minerals", was coordinated by Karel Beneš and determined the laws of the distribution of endogenous deposits of minerals based on the character of the tectonic processes leading to block structure depending on the formation of the earth's crust. Prediction structures were defined for the strategic focus of deposit research and exploration, especially in Czechoslovak conditions.

The next task, "Rock mass – its structure and behaviour in relation to the exploitation of mineral deposits", was controlled by Karel Charbula. The aim was to build on existing knowledge and gain new facts about the laws behind the structure and behaviour of a rock mass in the exploitation of mineral deposits, thus enabling them to be used efficiently. One of the numerous results of this large-scale research task was the method of determining the mechanism of long-term geological processes using photoplastic models, applicable especially to deep creep slope and tectonic deformations, or the monitoring and assessment of slow landslides in selected Western Carpathian locations. Several instruments were developed as part of this task in 1982: a portable seismograph for field measurement of seismic phenomena, a focus accelerograph to record the acceleration curve in the vicinity of earthquake epicentres and, last but not least, a device to measure changes in the temperature field in rocks over time and the temperature and relative humidity of air affected by the interrupted operation of air-conditioning facilities in underground mines, which allowed automatic temperature measurement and recording in 15 places. The research plan coordinated by Karel Charbula also included basic research into the geodynamic phenomenon called pillar shocks, observed in the underground brown coal mines in the North Bohemian coal district.[313] In 1985 the special seismic mine monitoring network therefore began to be built, as a precondition for explaining the mechanism of pillar shocks, objective classification of their energy and places of origin.

The third main task, "Minerals – their geochemistry and processes of preparation, valorisation and comprehensive use", was conducted by Jaroslav Němec. This research improved knowledge of the properties and chemical composition of minerals as the basis for the optimisation of processes for their preparation and processing. New and more effective methods were determined for their preparation and comprehensive use in waste-free processes, which enhanced the utilisation of mineral resources in Czechoslovakia. Along with this, intense research was carried

313 A AV ČR Archives, ČSAV Institute for Geology and Geotechnics collection, uncatalogued, box 23, sign. 1, Stěžejní směr II-6 Geotechnika a zušlechťování nerostných surovin. Zprávy o kontrole plnění SPZV za roky 1981 a 1982 [Leading Discipline II-6 Geotechnics and valorisation of minerals. Performance report on the state plan for 1981 and 1982].



Measurement of the thermal parameters of rocks in a testing gallery in Velká Chuchle, near Prague, undated. Photo by unknown author.
IRSM, collection of photographs.

Mine bottom deformation prediction in connection with the protection of the Karlovy Vary spa mineral springs; Družba Mine, Sokolov region, the 1980s. Photo by Karel Fink.
IRSM, collection of photographs.

out into the spontaneous brown coal combustion process in the seam, and a method was conceived for monitoring ignition temperatures using infrared thermometers. By checking upon various methods used to classify susceptibility to spontaneous combustion, a procedure was proposed that became the basis for a new Czechoslovak Standard.[314] Further research work helped to explain the influence of various substances on the occurrence and development of the spontaneous coal combustion process in the seam, and the course of development of gas during the process of extinguishing burning coal.

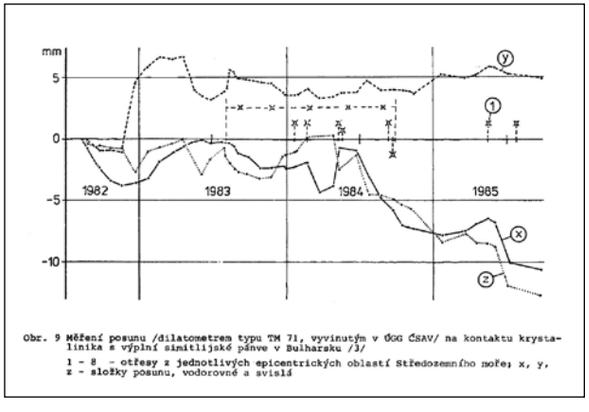
The fourth task which the ÚGG worked on in the first half of the 1980s was called "Fossil biocenoses, their composition and development". This research, which provided the necessary biostratigraphic and palaeoecological underlying data to explain genesis and further improve knowledge of sedimentary complexes important for predictions of mineral deposits, was coordinated by Zlatko Kvaček. As part of this work, the Institute participated in multilateral cooperation within the "Geosynclinal Process" committee, where it focused, amongst other topics, on the field survey of the Cryptozoic in South Bulgaria.

The activities in the latter half of the 1980s in the Institute were closely linked

314 Czech: Československá státní norma (ČSN).

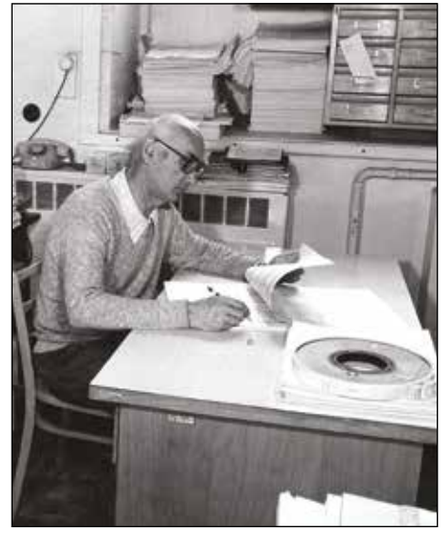
Petr Fučík taking seismicity measurements, undated. Photo by unknown author.
IRSM, Collection of Photographs.

Robert Brož measuring fissures with a geological compass, Příbram Coal Mines, undated.
Photo by Renáta Louvarová (Záběhlická).
IRSM, collection of photographs.

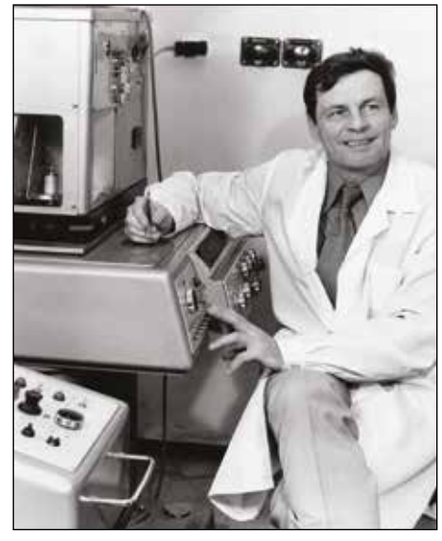


Obr. 9 Měření posunu /dilatometrem typu TM 71, vyvinutým v ÚGG ČSAV/ na kontaktu krystalinika s výplní simitlijské pánve v Bulharsku /3/
1 - 8 - otřesy z jednotlivých epicentrických oblastí Středozemního moře; x, y, z - složky posunu, vodorovné a svislé

Measurement of displacement with the TM-71 dilatometer, developed at the ČSAV Institute of Geology and Geotechnics, on the junction of the crystalline complex and the infilling of the Simitli basin, Bulgaria.
Acta Montana, Vol. 78 (1988), p. 21.



Miloš Vencovský, undated. Photo by unknown author.
IRSM, collection of photographs.

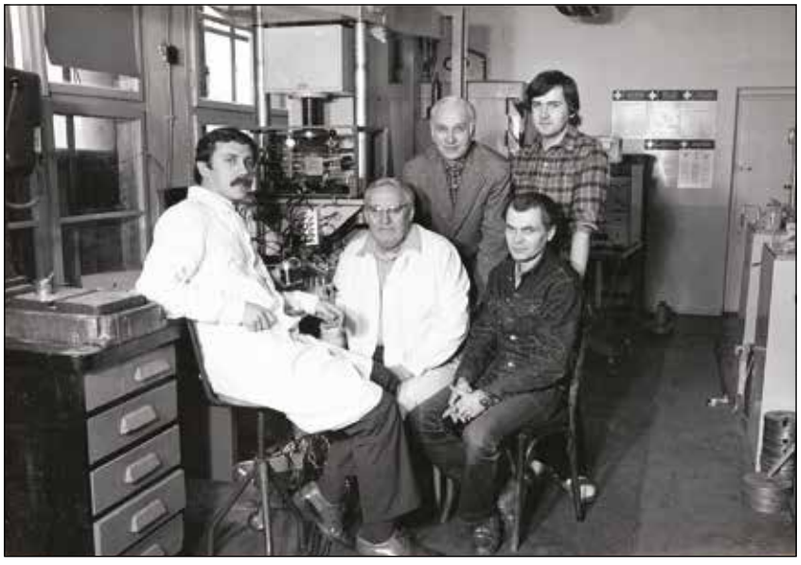


Václav Káš with an instrument, undated.
Photo by unknown author.
IRSM, collection of photographs.

Vladimír Rudajev adjusting seismometers, 1977. Photo by unknown author.
Vladimír Rudajev's personal archives.

to the extraction of minerals. This was a requirement based on the resolution of the Czechoslovak government on the application of science in practice, which resulted in the approval of a new concept for the Institute's activities in May 1988. In it, the Academy management defined three major areas of the future scope for the ÚGG: 1) Scientific predictions of the occurrence of minerals, 2) Geotechnical issues in the opencast exploitation of minerals and in the construction of underground engineering works, and 3) Preparation and comprehensive use of minerals and fundamentals of the processes of industrial carbon production from domestic raw materials. The Institute successfully worked within these limits until the early 1990s. Specific research tasks worth mentioning particularly include that conducted by Miloš Vencovský, concerning the deformation measurement of 3-D models of mine workings, which met with great international acclaim. Many reports on the research work were nominated for ČSAV awards, such as Optimisation of conditions for brown coal briquetting without binding agents, coordinated by Václav Káš. The report on research of seismic methods in anti-shock activities in coal and ore mines in Czechoslovakia, conducted by Vladimír Rudajev and his team, was nominated for a higher state award.

During that decade, the Institute frequently cooperated with industrial enter-



The Institute's employees Houska, Polák and Potužák with a foreign guest, the director of the Institute for Earth Physics of the Russian Academy of Sciences Alexander Ponamarev.
IRSM, Collection of Photographs.

prises, and coordination often extended beyond the state boundaries.[315] It made an important contribution, for instance, to the construction of Prague Metro when it assessed the stability of the tunnel headings or analysed air samples during tunnel excavation works. When excavating the Strahov tunnel in Prague, the Institute analysed the kinematics and stress load of the support foots. In cooperation with Geoindustria, the staff joined an expedition to Libya to conduct a geological survey, and together with Energoprojekt they worked on the seismic protection of nuclear power plants under construction in Czechoslovakia. The state enterprise Stavební geologie received assistance from the Institute in treating the stability of brown coal quarries at the foot of the Krušné Mountains and in 1986 the ÚGG completed a map of recent earth crust movements in North-eastern Bohemia at a scale of 1:200,000. To measure strain changes of models made from equivalent materials, many original tensometric and semi-conductor sensors were developed, with data registered on long-term stable automatic measurement exchanges. The Institute's staff was involved in an international project entitled Geodynamics, where they helped to explain the development of convergent lithospheric plates margins in Central and Southern America,

315 Scientific interaction, constrained by the so-called normalisation, was slowly finding its place again in the ČSAV in the 1980, but the extent and quality of contacts still lagged far behind those that had existed in the 1960s.

Jiří Medek by a glass apparatus.
IRSM, collection of photographs.

for the purposes of, amongst others, the localisation of nuclear plants and preparation of predictions of the occurrence of geothermal energy in Mexico.[316]

It gained extraordinary experience in its participation in the Interkosmos space programme to analyse the lunar regolith and other samples brought from the Moon by the Luna 16, 20 and 24 satellites. ČSAV was the first scientific institution in the Eastern Bloc to which the Soviets entrusted their Moon samples as early as in 1971.

An equally important part of the Institute's activities was also coordination with state authorities, especially the Federal Ministry of Fuels and Power Industry and local authorities, most often in predictions and expert statements. This included, for instance, the evaluation of materials used in the repair works at the St. Vitus Cathedral in Prague, tensometric measurements at Prague Castle and research into the stability of the rock walls along the Děčín–Hřensko highway, thanks to which a site where the rock would collapse was precisely identified in January 1984, five years before the actual incident. The rockfall prediction was then made two months in advance, giving an anticipated span of five days. One month before the incident, the prediction was made even more precise, and eventually differed from the actual

316 A AV ČR Archives, Basic ČSAV Institute Documents collection, uncatalogued, ÚGG ČSAV. Výroční zpráva ústavu za rok 1981 [Annual report for 1981], p. 4.

Vladimír Zoubek

A AV ČR Archives, Personal Files of ČSAV Members collection, sign. 37.

Vladimír Zoubek was born on 21 September 1903 in Heřmanův Městec. After graduating from the Faculty of Natural Sciences of Charles University in Prague, where he studied Nature Science and Geography in 1922–1927, he worked as an assistant at the Geological Institute of Charles University in Prague until 1931. After that he continued as a scientist at the State Geological Institute (later Central Geological Institute) where he worked until 1962. After World War Two he was gradually the head of Department of Basic Geological Research, Department of Geological Surveying, Edition of Geological Maps, and in 1953–1956 he was the Institute director. In 1962 he joined the ČSAV Geological Institute as a scientist and was the head of the Department of Geological Processes. In 1969–1974 he was the director of the Institute. After the merger of the Geological Institute and the Mining Institute within ČSAV he worked for the newly established Institute of Geology and Geotechnics, where he was appointed as the chief scientist – consultant in 1981 and focused primarily on topics relating to subsurface geology.

He was one of the first members of the newly established Czechoslovak Academy of Sciences (from 18 November 1952), first as a corresponding member; ten years later he was elected an academician. He worked in many positions in the top bod ies of the ČSAV: he was a member of the ČSAV Presidium for sciences of Earth and Space, a board member of the 2nd Section until 1961, the chairman of the Scientific Advisory Board for Geology and Geography in 1962–1963 and its member until 1970, a member of the ČSAV National Geological Committee, International Union of Geological Sciences, International Geological Correlation Programme, and many others.

His lifelong topic, elaborated back in his dissertation, entitled *Injection and Igneous Metamorphism around the Town of Pelhřimov*[1], was research into subsurface geological processes, namely the subsurface structure and processes of the Crystalline complexes in Czechoslovakia and Precambrian research. He also worked on research of deposits of minerals, especially graphite and gold, and the foundation of valley dams, where he specified the placement of dams on the central parts of the River Vltava between Vraný and Zlákovice in 1935–1952.

An extensive project which Vladimír Zoubek directed and, to some extent, also implemented in 1955–1960 was the preparation of the comprehensive geological map of the Czechoslovak Republic at a scale of 1:200 000, which met with acclaim both in this country and abroad, and for which the Central Geological Institute received the Order of the Republic, awarded at the International Geological Congress in India. As the leader of the Comecon Geological Survey Subcommittee, he was the guarantor of unification of the project in Czechoslovakia as well in East Germany, Hungary and Romania.

He received many awards and prizes for his extensive scientific work, such as the Klement Gottwald State Prize in 1953, an honorary doctorate from Moscow State University in 1967, the Purkyně Medal for Merit for Geology in 1968, the ČSAV Golden Medal for Merit for Science and Mankind in 1974, the Golden Lomonosov Medal of the Soviet Academy of Sciences in 1974 and the Order of Labour in 1983. He died on 24 May 1995.

1 Czech: O injekčním a kontaktním metamorfismu v okolí Pelhřimova.

incident date only by one day.[317] At that time only one comparably successful prediction of a rockfall was known in the world – the Chuquicamata open pit mine prediction in Chile.[318]

317 ZVELEBIL, Jiří (1984): Time prediction of a rockfall from a sandstone rock slope. In *Proceedings of the Fourth International Symposium on Landslides 16–21 September 1984, Toronto*. Toronto: University of Toronto Press, 1985, pp. 93–95.

318 A AV ČR Archives, ČSAV Institute for Geology and Geotechnics collection, uncatalogued, box 5 (024), Zpráva koordinačního pracoviště o plnění hlavního úkolu SPZV II-6-1 [Report from the coordinating unit on the fulfilment of the state plan, II-6-1 main task], p. 42.

Front row, from left: František Dědek, Alexandra Orlíková, Vilém Procházka, Stanislav Marek; second row: Pavel Mucha, Vladimír Hencl, Věra Němcová, Kateřina Múčková, Eva Špačková, Milan Dočkal, Václav Bortlík, František Špaček, Miroslav Barcal, Vladimír Hošek; top: Zdeněk Volšický. Photo by unknown author.
IRSM, collection of photographs.

Staff of the Special Analytical Methods Department.
IRSM, Memorial Book of Section 26.

Other conceptual and prediction work included the preparation of reports on the prospects of coal mining and use in Czechoslovakia, the assessment of deposits of brown and black coal in each coal district, analysis of the gold-bearing potential of the Bohemian Massif and research into black lead deposits in Bohemia. What became very important for the Czechoslovak national economy, and also strategic from the foreign currency point of view, was industrial carbon. In 1982 the first study was prepared on the possibilities of processing black coal tar pitch into high quality needle coke, and eventually led to the preparation of the underlying documents for the

resolution of the Czechoslovak government's presidium in June 1984, entitled Comprehensive use of black coal tar pitch for the production of industrial carbon.[319]

The ÚGG staff were often invited as experts to committees to investigate the causes of mine accidents and propose measures to prevent them. In 1979 the Institute prepared an expert assessment for Ore Mines in Příbram[320] on the mass accident at the Cínovec ore mine. In connection with the big accident at the Pluto II mine in the North Bohemian coal basin in 1981,[321] a government committee was summoned by the deputy prime minister to investigate the causes of the accident, consisting of mine professionals, representatives of the State Mining Authority, criminal investigation officers, universities and scientific and research institutes. Jiří Medek was appointed as a representative of the ÚGG.[322]

In the 1980s the activities of the Institute's staff earned them numerous awards. In 1979 František Špetl was awarded the 'For Merits for Science and Mankind' medal[323] (in memoriam), and in 1982 Quido Záruba received the same award. Gustav Šebor was awarded the ČSAV Golden Honorable Plaque 'For Merits for Connecting Science with Practice'[324] in 1987, and František Pošepný Golden Medals were awarded to Jaroslav Šulc and Alena Cimbálníková on their jubilees. Jaroslav Němec was awarded the 'For Merits for Development'[325] state award the same year.

Influence of the Political Situation

The 1980s were a time when the economic, environmental and, hand in hand, the political situation began to escalate in Czechoslovakia, as well as in the whole of the Eastern Bloc. Its consequences had an even more specific impact on the everyday life of everyone, including scientists. The regime's efforts to strengthen its faltering position were based on many preventative and repressive measures against those who criticized the communist injustice, such as Charter 77[326] in Czechoslovakia and

319 30. výročí Ústavu geologie a geotechniky ČSAV [30th Anniversary of the ČSAV Institute of Geology and Geotechnics]. *Acta Montana*, Vol. 78, Praha, 1988, p. 48.

320 Czech: Rudné doly Příbram.

321 An accident occurred at the Pluto II mine in Louka, near Litvínov, then part of the North Bohemian Brown Coal District, when coal dust exploded and a fire broke out. A total of 65 miners died, including 15 mine rescue workers, and a further 40 miners were injured. The explosion affected 5 km of mine roads. Damage to mine equipment and repair costs exceeded 50 million Kčs. The rescue operations were very complicated, as can be seen, for instance, in the number of rescue staff used, namely 1298 from September 1981 to January 1982, and the last miner trapped after the explosion was not rescued until 11 December 1981.

322 Cf. PIRUNČÍK, Pavel. Uplynulo 30 let od neštěstí na dole Pluto [30 Years from the Pluto Mine Accident] [online]. 30 December 2011 [accessed 7 April 2017]. Available on www: <http://zachranar.cz/2011/12/uplynulo-30-let-od-nestesti-na-dole-pluto/>.

323 Czech: Za zásluhy o vědu a lidstvo, awarded since 1962.

324 Czech: Zlatá čestná plaketa ČSAV Za zásluhy o spojení vědy s praxí.

325 Czech: Za zásluhy o výstavbu. A Czechoslovak state order awarded in 1951–1990.

326 Czech: Charta 77. An important citizens' initiative in Czechoslovakia in 1977–1992, established in order to identify violations of human and civil rights in the country.

Quido Záruba

IRSM, Photo archives of Quido Záruba and the Department of Engineering Geology.

One of our best experts in engineering geology and the founder of the Czech, or Czechoslovak, engineering geology school which is still recognised abroad, was born on 18 June 1899 in České Budějovice, South Bohemia. In 1919–1925 he studied Civil Engineering at the Czech Technical University in Prague. In 1926 he was awarded the degree of Doctor of Technical Sciences; habilitated five years later in General Geology at the Faculty of Natural Sciences of Charles University in Prague and in 1936 in Ground Works, Highway and Tunnel Construction at the College of Engineering Development in Prague. He was appointed as a full-time professor in geology in 1946. His pedagogical career included both Czech Technical University and the Faculty of Natural Sciences of Charles University.

During his studies, he worked as Radim Kettner's student at the CTU Geological Institute where he contributed to the geological survey of sites assumed for future railway lines in Slovakia and the geological survey in the Lower Tatra Mountains. In 1926 he was accepted as a scientific collaborator of the State Geological Institute and in 1929 he became a fellow scientist in the Institute for Research and Testing of Construction Materials and Structures at the CTU, where he focused on mechanical and physical tests of minerals and tests of allowable capacity of foundation soils.

After completing his studies, Quido Záruba began working for the company Ing. J. Záruba-Pfeffermann a spol. where he established, and for the next twenty years also managed, the department for geological research works. He collaborated on many important projects and structures, such as geological work and land surveying of the River Vltava valley before the construction of dams. In 1957 a ČSAV Laboratory for Engineering Geology was established and he became its director. In 1961 it was transferred into the newly established Geological Institute where Quido Záruba had already worked from 1960 as an external head of Department of Engineering and Quaternary Geology. After his retirement, he remained in the ČSAV Geological Institute (later the ČSAV Institute of Geology and Geotechnics) as a fellow scientist and in 1971–1984 was also employed at the Project Institute for Transport and Engineering Constructions in Prague.

He was one of the first members of the Czechoslovak Academy of Sciences. He became a corresponding member on 18 November 1952 and was appointed as academician on 17 April 1968. He occupied important positions in the managerial bodies of the ČSAV, such as the chairman of the Workgroup for Engineering Geology of the 2nd Section, member of the Scientific Advisory Board for Geology and Geography, member of the ČSAV Committee for Assistance in Water Management, etc. Already between the wars he was a member of the Masaryk Academy of Labour and the Czechoslovak National Research Council and was elected the chairman of the National Geological Committee in 1957.

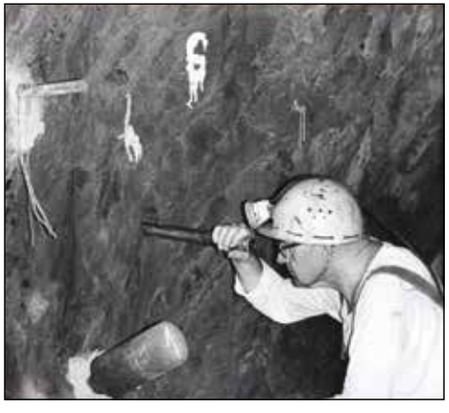
During his life, he started to work on many topics in engineering and Quaternary geology, the most important of which were his works on the River Vltava routes, volume changes in rocks and field tests of rocks. He also studied the geological conditions of Prague and Kutná Hora. In scientific and practical terms, his most significant works are those on the periglacial weathering of rocks, plastic deformation of rocks in valley bottoms and the influence of glauconite on the mechanical properties of rocks. He was also a reputed authority in his discipline abroad, where he also worked as an expert in the construction of dams.

He died on 8 September 1993, leaving an extensive archive of more than 40 thousand photographs, negatives and slides showing the effects of various dangerous geological processes, taken by himself or by his followers, in the present Department of Engineering Geology of the Institute of Rock Structure and Mechanics. It is apparently the only collection of its kind in the world, covering an extensive period from the 1920s to the present day.

Solidarity and the Catholic Church in Poland, where the opposition grew considerably stronger in the 1980s. The academic staff were threatened with punishment if they got hold of any *"printed materials of anti-state or political nature, wherever obtained…"*[327]

327 A AV ČR Archives, ČSAV Institute for Geology and Geotechnics collection, uncatalogued, box 23, Zápisy ze schůzí ústavní rady [Minutes from the meetings of the institute board], 19 November 1979.

The study room at the Institute's library, undated. Photo by Renáta Louvarová (Záběhlická). *IRSM, collection of photographs.*



Alois Přikryl measuring rock deformation with an introscope. Příbram Coal Mines, undated. Photo by Renáta Louvarová (Záběhlická). *IRSM, collection of photographs.*

Miloš Svatoň, the long-term library head, undated. Photo by unknown author. *IRSM, collection of photographs.*

and did not *"immediately submit them to the special department or the director of their institute"*.[328] Business trips of academic staff to Poland were given unprecedented attention by the state authorities.[329]

328 A AV ČR Archives, ČSAV Institute for Geology and Geotechnics collection, uncatalogued, box 23, Zápisy ze schůzí ústavní rady [Minutes from the meetings of the institute board], 21 May 1979.

329 Cf. A AV ČR Archives, ČSAV Institute for Geology and Geotechnics collection, uncatalogued, box 23, Zápisy ze schůzí ústavní rady [Minutes from the meetings of the institute board], 23 March 1981.

The period atmosphere may also be illustrated in the limits that were newly imposed on the consumption of electrical energy. From the end of the 1970s fines were charged for failure to comply, which would have to be paid by that department of the Institute which exceeded the limit.[330] In the 1980s, too, the long-term shortage of qualified professional staff reached a peak in the Institute, mostly as regards laboratory technicians, as especially young and prospective employees *"in some cases resign due to better pay in other, especially production enterprises, or the chance of obtaining a flat there"*.[331]

ČSAV Institute of Geotechnics

In the late 1980s the opinion began to prevail not only in the ÚGG that the merger of the Mining Institute and Geological Institute a decade ago was not an organic and prospective measure, and at the beginning of 1990 the sectors of Structural geology, Palaeontology and Geochemistry initiated their withdrawal from the joint institution.[332]

The independent ČSAV Geological Institute was therefore re-established as of 1 March 1990, with Jiří Fiala as the director, who was put in charge of basic research in structural geology, petrology, palaeontology and geochemistry. The remaining disciplines became the competence of the ČSAV Institute of Geotechnics, which was established by extending the scope of activities of the original Mining Institute to include the department of Engineering Geology.[333] There were three major research activities: 1) Earth sciences, used in the studies of complex issues of the mutual interaction of natural phenomena and human activities, 2) Chemical sciences, focusing primarily on research into coal and its products, and 3) Technical sciences, dealing with technological issues of treating minerals, wastewaters, carbonisation and the preparation of carbon materials.

On 1 January 1991 a new organisational chart of the ČSAV Institute of Geotechnics became effective. There were seven scientific departments directly controlled by the director, and a further five departments in the Geotechnics division controlled by the deputy director (then Ludvík Mužík). The director Viktor Dobal directly controlled the departments of Preparation (headed by Vladimír Hencl),

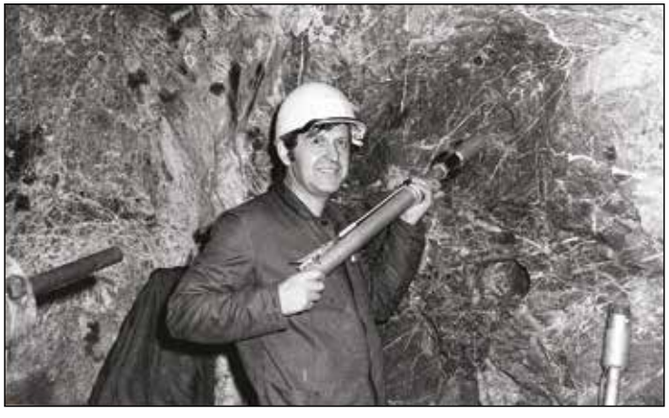
330 A AV ČR Archives, ČSAV Institute for Geology and Geotechnics collection, uncatalogued, box 23, Zápisy ze schůzí ústavní rady [Minutes from the meetings of the institute board], 26 January 1979.

331 A AV ČR Archives, Basic ČSAV Institute Documents collection, uncatalogued, ÚGG ČSAV. Výroční zpráva ústavu za rok 1981 [Annual report for 1979], p. 24.

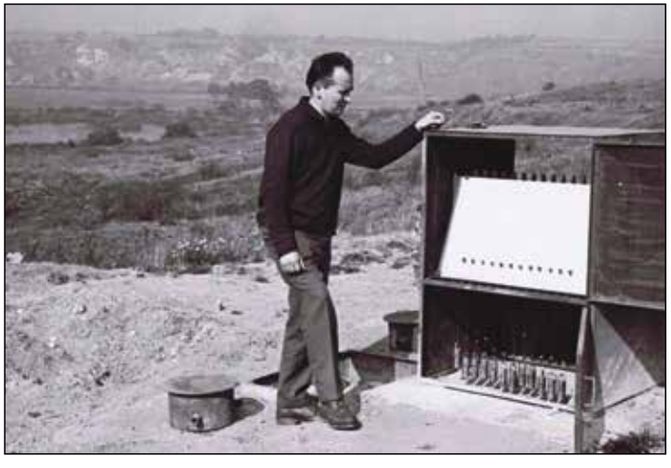
332 Institute of Rock Structure and Mechanics, Indices at the Secretary's Office, Minutes from the 1st session of the scientific board of the ÚGG ČSAV, 30 January 1990. The proposal to separate the aforementioned departments was approved by the Institute and the statement was sent to the ČSAV Presidium and the Chamber of Elected Deputies.

333 A AV ČR Archives, ČSAV Presidium collection, box 243, 23. zasedání Prezídia [23rd session of the Presidium], 7 February 1990. Návrh opatření k restrukturalizaci pracovišť ČSAV v oblasti věd o Zemi [Proposed restructuring of ČSAV institutes in earth sciences].

Viktor Dobal (centre), undated. Photo by unknown author.
Ludvík Mužík's personal archives.

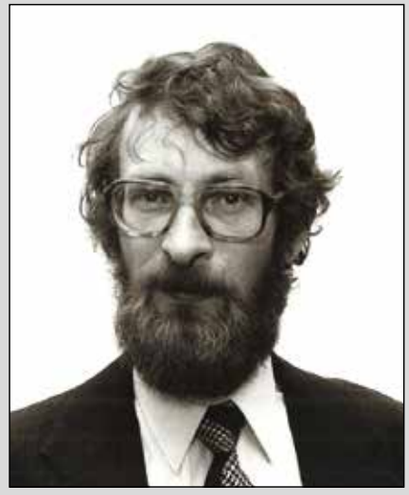


Ludvík Mužík in the field, undated. Photo by unknown author.
IRSM, collection of photographs.



Jan Rybář, undated. Photo by unknown author.
IRSM, collection of photographs.

Viktor Dobal



PSP Archives, Viktor Dobal's personal file.

Viktor Dobal was born on 11 March 1947 in Nitra, Slovakia and worked in the field of fuel technology and the power industry, but was also a politician and in the 1990s he was an MP in the Czech National Council and the Chamber of Deputies of the Czech Republic.

After graduating from grammar school in 1965 he studied at the Faculty of Technology of Fuels and Water of the University of Chemistry and Technology in Prague, from which he successfully graduated in 1970. After his studies he worked for one month as an expert assistant at the ČSAV Geological Institute and was drafted for military service. After that, he worked for the ČSAV Mining Institute from October 1971 as an expert assistant. In 1972–1975 he did his postgraduate course in Physical Chemistry at the Faculty of Chemical Technology of the University of Chemistry and Technology in Prague, thanks to which he was reclassified as a professional in the Mining Institute and later became a technical researcher, then at the ČSAV Institute of Geology and Geotechnics. In the spring of 1986 he moved to the Research Institute for Pharmacy and Biochemistry[1] in Prague, namely to the Department of Pharmacokinetics, where he researched pharmacokinetics and the metabolism of active substances in human organisms.[2]

In October 1988 he joined the signatories of the Movement for Civil Freedom[3] and after the 1989 Velvet Revolution he became an MP in February 1990 in the Czech National Council as a representative of the Citizens' Forum initiative. He was a founding member of the Citizens' Democratic Alliance[4] for which he became an MP in 1992 in the Czech National Council, where he also worked on the Constructional and Legal Committee.[5] From June 1990 he was also the official director of the ČSAV Institute of Geotechnics. However, his political involvement kept him so occupied that he was removed from his office at the Institute from 1 January 1992 until the termination of his mandate, while Vladimír Rudajev acted as his fully authorised substitute.

He was an MP until 1996 and in the 1992–1996 electoral term he was the deputy chairman of the Club of ODA's MPs. He was involved especially in the topics of church restitution and the restitution of Jewish property. In the second government of Prime Minister Václav Klaus (1996–1998) he became the deputy of the Minister without a Portfolio Pavel Bratinka and contributed to the activities of the Government Council for Research and Science.[6] In 1998–2003 he worked as the secretary of the Centre for Theoretical Studies of Charles University and Czech Academy of Sciences. Viktor Dobal died of a serious disease on 7 February 2008.

1 Czech: Výzkumný ústav pro farmacii a biochiemii.
2 PSP Archives, Viktor Dobal's personal file.
3 HLUŠIČKOVÁ, Růžena – CÍSAŘOVSKÁ, Blanka. Hnutí za občanskou svobodu 1988–1989. Sborník dokumentů [Movement for Civil Freedom 1988–1989. Collection of Documents]. Praha: Ústav pro soudobé dějiny AV ČR – Maxdorf Publishers, 1994.
4 Czech: Občanská demokratická aliance, abbreviated as ODA.
5 Viktor Dobal: https://cs.wikipedia.org/wiki/Viktor_Dobal.
6 Ibidem.

Carbon (Karel Balík), Carbochemistry (Luděk Brož), Pyrolysis (Jaroslav Buchtele), Physical Methods (Ivana Sýkorová) and Analytics (Alena Vodičková).

The Geotechnics division had the departments of Geodynamics (Vladimír Roček), Modelling (Miloš Vencovský), Engineering Geology (Jan Rybář), Prototype Workshops and Maintenance (Ladislav Anger) and Design (Jiří Pulchart).

On 1 April 1991 there were already changes to the chart, the most important of which was the splitting of the scientific departments into three divisions: 1) Geotechnics, 2) Analytical Methods and 3) Fuels and Carbon.

Czechoslovak Academy of Sciences after 1989

Representatives of the Czechoslovak Academy of Sciences also proactively participated in the so-called Velvet Revolution[334] in 1989. Many employees joined in the protests, strike committees were established in the institutes and Citizens' Forums were established. On 28 November 1989 the Citizens' Forum[335] was also established at the Institute of Geology and Geotechnics.[336] It primarily focused on the rehabilitation of colleagues subject to political persecution and established a committee to remedy the injustice. It helped in the posthumous moral rehabilitation of Emil Petýrek, the former director of the ČSAV Mining Institute, who was stripped of his directorship in 1970 because he had signed the declaration 'Two Thousand Words'[337] in 1968.

The change in society affected the environment of the ČSAV immediately in the new democratic elections of the new leadership of the Academy, the preparation of the amended act on the ČSAV and the new Statutes of the ČSAV, enabling the democratisation processes to start at the individual institutes, usually taking on the form of elections of the institutional bodies and their directors.

Still at the end of 1989, the Chamber of Elected Deputies of ČSAV Institutes[338] was established as the first democratic body in the Academy which invoked and controlled the transformation of the ČSAV into a scientific institution, modern, democratic and self-governing. It also established new managerial and supporting mechanisms, including, for instance, a grant system.

The directors of all the institutes were withdrawn in 1990 and tenders for their positions were announced. Jaroslav Němec was thus replaced by Viktor Dobal[339] as of 1 June 1990, while the previous director was appointed as the director's advisor for study and prediction materials.[340] A new Institute Council was also elected, and a new organisational order was approved.

334 This term is used to describe the events on 17 November – 29 December 1989 in Czechoslovakia which led to the downfall of the communist totalitarian regime.

335 Czech: Občanské fórum. A political movement established on 19 November 1989 aiming to remove the communist totalitarian regime and implement a plurality democracy system in Czechoslovakia.

336 The Citizens' Forum branch in the Institute was headed by Ludvík Mužík, Bohuslav Růžek and Blahoslav Košťák.

337 A AV ČR Archives, Central Committee for the Remedy of Injustice collection, box 2, inv. no. 19, Corresponding member of the ČSAV Emil Petýrek. – The declaration entitled Dva tisíce slov [Two Thousand Words] was created as part of the revival process in Czechoslovakia in 1968 at the instigation of the ČSAV scientists. It called for political and social changes and was eventually signed by over one hundred thousand citizens.

338 Czech: Komora volených zástupců pracovišť ČSAV.

339 The tender for the directorial position at the Institute of geology was attended by Jaroslav Němec and Viktor Dobal. The ballot granted them 10 and 17 votes, respectively.

340 Institute of Rock Structure and Mechanics, Indices at the Secretary's Office, Minutes from the management meeting of the UG ČSAV, 4 June 1990.

In the early 1990s, at a time when efforts were made to launch a large-scale restructuring process of the national economy and society as a whole, the Czechoslovak Academy of Sciences had to face many invectives questioning the justifiability and purposefulness of its existence. Opinions were voiced that the time and manner in which it was established predetermined it for nothing more than to play the role of a Stalinist anachronism which must be abolished now that the communist regime had collapsed. The Academy eventually won this fight for survival, but it was apparent that it could no longer do without a wide-scale reform.

All of its institutes were therefore subject to in-depth assessment; new concepts for their activities were prepared and evaluated,[341] followed by a major staff reduction and the closure of some institutes, and, hand in hand with that, severe cuts to the ČSAV budget. The unclear future of the biggest scientific institution in Czechoslovakia then resulted in the massive departure of academic staff, either to other scientific and research institutions, away from science, or abroad. The figures state that in 1989–1992 the ČSAV head count decreased by 3500, i.e. by almost 30%.[342]

Long debates over the method and possibilities of financing science led to the preparation of a grant system, in which the success rate in receiving grants and their fulfilment was also to be used in the future as one of the criteria for evaluating the scientific quality of academic staff. The institutional support was then based primarily on the quantity and quality of the institutes' publishing activities as well as those of individual scientists over every past five years.[343]

The Institute of Geotechnics was therefore in a very difficult financial situation at the beginning of the 1990s, also because the aforementioned evaluation criteria did not consider the fact that before 1989 a major portion of the Institute's activities were outputs of expert assessments that could not be published as they were classed as state secrets. One way out of this unfavourable scheme, albeit quite a demanding one, was to seek cooperation with foreign, especially western, institutions which could provide the necessary funding for top quality and internationally conceived research jobs. Opportunities for international cooperation increased in quantity and intensity, adding to the free character of society in post-November Czechoslovakia.

The results of the parliamentary elections in 1992 clearly defined the approaching dissolution of Czechoslovakia, as a result of which Act 283/1992 on the establishment of the Czech Academy of Sciences (AV ČR)[344] was adopted in May 1992, making it the legal successor of the Czechoslovak Academy of Sciences for the Czech Republic.

341 The system of institutes was to be reduced by approximately one third.

342 FRANC, Martin, MÁDLOVÁ, Vlasta: *History of the Czech Academy of Sciences in Pictures. Dějiny Akademie věd v obrazech*. Praha: Academia, 2014, p. 389.

343 Institute of Rock Structure and Mechanics, Indices at the Secretary's Office, Advisory board of the director, resolution 6/91.

344 Czech: Akademie věd České republiky, abbreviated as CAS in English.

V. CAS INSTITUTE OF ROCK STRUCTURE AND MECHANICS (1993–2017)

Establishment of the CAS Institute of Rock Structure and Mechanics

The Institute was incorporated into the Czech Academy of Sciences still as the Institute of Geotechnics. As a result of long discussions concerning the need to make the Institute's scope of activity and organisation consistent with the new circumstances in society and the economy after 1989, however, at its 16th session held in September 1993 the Academic Council of the CAS decided to rename it to the Institute of Rock Structure and Mechanics (ÚSMH)[345], effective as of 1 January 1994.

The institute's originally close links to the topic of mining were gradually phased down, while on the contrary attention was increasingly paid to research into landslides, the causes of natural, i.e. tectonic earthquakes, the factors influencing rock mass stability especially in the areas around proposed nuclear waste storage sites and underground gas reservoirs, and the general risk assessment of seismic activities in the Czech Republic, especially around nuclear power stations. Considerable development was also seen with research of modern composite carbon-carbon based materials, including exploring the possibilities for their use as biomaterials or in resolving environmental issues related to research of toxins in waters, especially heavy metals, and methods of removing them.

The year 1989, however, was not only accompanied by debates on the direction our scientific work could take, but also extensive restructuring transformations of the academic institutions which more or less affected every institute of the Academy of Sciences. There was primarily a major staff reduction in each institution, resulting in the departure of not only non-production employees but also to a considerable degree top and promising staff who, for existential reasons, sought – and found – new jobs elsewhere.

The fall in the head count at the Institute of Geotechnics, and later the IRSM, was typical for the given circumstances: while in 1990 the head count was 269, over the next five years it dropped by more than 55%. In 1991 the Institute officially had 193 employees; one year later it was 164, and the breakup of the Federation and

345 Czech: Ústav struktury a mechaniky hornin AV ČR; abbreviated as IRSM in English.

establishment of the Czech Republic in 1993 was experienced by 138 employees. Another 20 left before 1995.[346] It must be noted, however, that most of those who had left still maintained a certain form of contact with the Institute, for instance as partners in joint inter-institutional grants, through cooperation in scientific preparation, on a contractual basis, etc.

In 1997 the government launched a major expenditure cuts package that further decreased the budgets of research institutions and thus also led to a considerable phasing-down of the activities of all the Academy's institutes. However, it did not take the Czech Academy of Sciences long to recover from the recession and to become an attractive employer for young promising scientists, and even to lure back those colleagues who were furthering their scientific careers abroad.[347] It is worth mentioning that after successful 15 years of work in the USA and Great Britain, Leo Eisner returned to the IRSM in 2009, while the Academy was affected by another cut in the state budget in the same year.[348]

The newly established Technological Agency of the Czech Republic was then supposed to bring about a certain financial stabilisation not only in the CAS, and its activities were to complement the Grant Agency of the Czech Republic, by then already active for 16 years and built on the foundations of the ČSAV Grant Agency established back in November 1990.[349] In many cases the material requirements of the institutes linked to the need to establish new teams and intensify domestic and foreign cooperation could have been met through the grant system.

The Academy expected an improvement in the quality of the institutes' work as it had begun to regularly evaluate their scientific activities with the participation of the world's leading experts. Extensive organisational restructuring, for instance, was carried out in the IRSM at the recommendation of the evaluation committees at the end of the millennium and again in 2006, which helped to make the Institute's work more efficient and more in line with foreign institutions with a similar scope of activities.

Research Activities

The research activities conducted at the Institute of Geology, or later the IRSM, with Vladimír Rudajev as the director for the entire time between 22 February 1993 and 2001, were divided in two main areas in the 1990s: Geosciences, which included the topics of engineering geology, geodynamics and seismology; and chemistry, including geochemistry and the structure of minerals, coal and its derivatives. The scientific departments in the Institute were therefore divided into two divisions: Division A, comprising the sections of Geodynamics, Modelling, Engineering Geology, Geofactors and the scientific team for mathematical modelling, and Division B, which consisted of the Preparation and Dressing section, Coal sec-

346 A AV ČR Archives, Basic ČSAV Institute Documents collection, uncatalogued, Ústav geotechniky / Ústav struktury a mechaniky hornin, Výroční zprávy o činnosti a hospodaření za roky 1990–1995 [Annual Reports and Economic Reports for 1990–1995].

347 Cf. MÍŠKOVÁ, Alena, FRANC, Martin, KOSTLÁN, Antonín (eds.): *Bohemia docta*. Praha: Academia, 2010, pp. 478–479.

348 DRAHOŠ, Jiří: Křižovatky české vědy [The Crossroads of Czech Science]. Akademický bulletin 2010, Vol. 2, [online]. http://abicko.avcr.cz/2010/02/03/.

349 KOVÁŘ, Pavel: *Věda v Čechách po dvaceti letech (Ve spirále, nebo na kruháči?). Rozhovory s přírodovědci v akademických funkcích [Science in Bohemia Twenty Years Later (In a Spiral or at a Roundabout?) Interviews with Natural Scientists in Academic Offices]*. Praha: Academia, 2010, p. 85.

Vladimír Rudajev

Vladimír Rudajev's personal archives.

Vladimír Rudajev was born on 3 November 1938 in Prague. After graduating from the grammar school in Poděbrady, he studied Physics at the Faculty of Mathematics and Physics of Charles University in Prague in 1956–1961, specialising in Geophysics. From 1962 he worked for the ČSAV Mining Institute as a scientific intern. In 1966 he defended his dissertation entitled *Seismicity of the Kladno Shock Areas*[1] and after some time worked his way up to become a leading scientific worker. From 1978 he was the head of the Geophysical Laboratory and ten years later he defended his doctoral thesis on *Seismicity of Rockbursts*[2] at the Mining University in Ostrava.

After the events of 1989 he became the scientific secretary of the Institute. In 1991–1992 he was the deputy director and in 1993 he was elected and appointed as the director of the ČSAV Institute of Rock Structure and Mechanics, a position he held for two terms of office until 2001. After that he was the deputy director in 2001–2003 and the chairman of the Scientific Board of the Institute in 2001–2005. In 1992–2005 he was also the chairman of the editorial board of the *Acta Montana*, or later *Acta geodynamica et geomaterialia*, magazine and remained a member of the board until 2015. In 2006 he began his work for the ČSAV Geological Institute, where he was the Head of the Department of Physical Properties of Rocks until his retirement in 2012.

Beginning in 1990, Vladimír Rudajev was a member of the scientific boards of several academic institutions, namely the Institute of Geonics, Geophysical Institute and Geological Institute; in 2001–2009 he was a member of the Scientific Board of the Czech Academy of Sciences and in 2000–2006 and 2010–2014 the deputy chairman of the Grant Agency of the Czech Academy of Sciences. He was also a member of many important international societies.

His scientific activities were focused on research into seismic phenomena induced by mining activities, their monitoring and the processing of seismic data, on research into the mechanism of seismic centres, the statistical processing of time series of seismic data, extrapolation of non-stationary seismic processes, prediction of seismic shocks, assessment of seismic hazards, laboratory tests of brittle rock deformations and stability criteria of rocks under compressive load. He was one of the founders of the seismic research into rockbursts in the Kladno shock area, and he himself initiated and elaborated seismic research in the Příbram ore and uranium mines, Ostrava-Karviná mines and in pillar shocks in the Pluto mine in the North Bohemian brown coal district.

Vladimír Rudajev is the author of methodology for processing seismic data for the objective assessment of shock activities and is credited for the use of multi-channel statistical extrapolations of time series for shock prognosis. He has also devised a system for comprehensive research into shocks with real outputs for the suitable use of shock precautions. In the area of brittle rock deformation research, he is a co-author of the criteria for rock susceptibility to sudden failure and also the co-author of a new physical concept of the rockburst centre mechanism. He has presented the results of his work in more than 170 scientific publications, papers and expertise reports.

He was awarded the ČSAV Prize five times for his scientific activities in 1975–1987. His paper, entitled *Causes of Occurrence, Laws of the Occurrence and Prediction of Geodynamic Effects of a Rock Mass*[3], earned him the Prize of the ČSAV Presidium and of the Polish Academy of Sciences for the development of cooperation in the seismic research of rockbursts. In 2009 he was awarded the František Pošepný Honourable Disciplinary Medal for Merit for Geological Sciences.

1 Czech: Seismicita kladenských otřesových oblastí.
2 Czech: Seismicita důlních otřesů.
3 Czech: Příčiny vzniku, zákonitosti výskytu a predikce geodynamických projevů horninového masivu.

The Institute of Rock Structure and Mechanics is a co-organiser of Czech-Polish workshops. The 4th workshop, held in Lubawka in 2002, included an excursion to the geodynamic laboratory under the Ksiaz chateau in Poland where the rock mass tilt is permanently monitored using a tube in the laboratory's long corridors.
IRSM, Vladimír Schenk's personal archives.

tion, Caustobiolith Chemistry section, and the section of Textural and Chemical Analysis, which in fact went beyond the framework of the sections as it acted as a certain service provider for all the other departments; all of this occurred in the mid-1990s.

Intense efforts were made in the 1990s to re-establish or expand international contacts especially with the West. This is how cooperation with the University of Wales began, as well as with the University of Patras, Greece; the University in Nijmegen, Holland; the Ruhr-Universität in Bochum, Germany and the University of Innsbruck, Austria. The boundaries of Europe were eventually crossed, and cooperation was aimed at the USA, Canada, Japan and South Korea. Cooperation successfully continued with Russia, Poland, Belarus and Slovakia.

The scientific staff of the IRSM were pro-actively involved in important international scientific organisations and their committees, such as the International Committee for Coal and Organic Petrology (ICCP), International Society of Rock Mechanics (ISRM), International Society for Soil Mechanics and Foundation Engineering (ISSMFE), International Association for Engineering Geology (IAEG), International Association for Computer Methods and Advances in Geomechanics (IACMAG), International Geographical Union (IGU), Seismological Society of America (SSA), The Society for Organic Petrology (TSOP), International Association of Seismology and Physics of the Earth's Interior (IASPEI), European Association for

Jiří Medek at the Carbon conference in Granada, Spain.
IRSM, Zuzana Weishauptová's personal archives.

Earthquake Engineering (EAEE), Mineralogical Society of America (MSA), International Mineralogical Association (IMA) and others.[350]

Another important aspect of building up the Institute's international renown was its participation in the projects supported by the European Committee, known as *Copernicus* and *Inco-Copernicus*, and in UNESCO programmes.

The staff of the IRSM spent a great deal of time educating further generations of scholars. Many of them worked in teaching, lecturing and supervising student's papers at all levels of university studies both at home and abroad, for instance, in cooperation with the Karlsruhe Institute of Technology, Czech Technical University in Prague, University of Chemistry and Technology in Prague, faculties of medicine of Charles University, Faculty of Natural Sciences of Charles University, Technical University in Liberec, Masaryk University in Brno and the Mining University – Czech Technical University in Ostrava.

350 A AV ČR Archives, Basic ČSAV Institute Documents collection, uncatalogued, Výroční zprávy o činnosti a hospodaření za roky 1993–2017 [Annual Reports and Economic Reports for 1993–2017].

Restructuring in 2006 and 2012[351]

In 2001 Vladimír Rudajev was replaced as the director of the Institute of Rock Structure and Mechanics by Karel Balík, who was the director until 31 May 2012 and carried out two major restructuring plans.

As of 1 January 2006 there was a major change in the organisation of the IRSM when the entire section of Geomechanics[352] was transferred to the CAS Institute of Geology. The reason for this was that its subject of research was closely linked to the issues which were the focus of the activities of the Institute of Geology. The comprehensive research into rock deformation properties was thus concentrated into one institute. For the Institute of Geology, research into rock properties under pressure in the Earth's crust at depths of up to 20 km, research of rheological processes in rocks under long-term stress and research into changes in rock parameters depending on their chemical composition were of particularly high importance.

As the section of Geomechanics had been the only section sited outside the premises at V Holešovičkách, namely at Puškinovo Sq. 9 in Praha-Dejvice, in a building also administered by the IRSM, the ownership title to the building, land and equipment was transferred at the same time. The Institute of Geology thereby also acquired the tenant in the transferred building, the CAS Institute of Musical Sciences[353], which had been there under a free lease since 1997. As regards staff, 12 out of the total of 16 changed their academic employer while 4 remained with the IRSM.

The separation of the Geomechanics section launched a more extensive restructuring process at the IRSM, motivated by the recommendations of the evaluation committee and the subsequent decision of the Academic Council. As a consequence, the management of the Institute and its scientific board arrived at a series of measures which they expected to improve scientific performance and efficiency.

The original divisions (Geotechnics, Chemistry and Materials) were abolished and the three-level management scheme was superseded by a simpler two-level scheme, with the director and the scientific departments.

From 2006 the IRSM had six scientific departments. The most important changes included the establishment of a brand new department of Geodynamics, led by Vladimír Schenk, which stemmed from a group of employees of the Earth Geodynamics Research Centre, a part of the previous department of Geofactors. The remaining part of that department was merged with the department of Engineering Geology, which is how the department of Engineering Geology and Geofactors was established. Shortly afterwards, however, it was renamed back to the department of Engineering Geology.

351 See A AV ČR Archives, Institute Files collection, Institute of Rock Structure and Mechanics.

352 Referred to as the Geotechnics section from the end of the 1990s, formed by merging the Physical Modelling section with the Scientific Team for Mathematical Modelling.

353 Czech: Ústav pro hudební vědu AV ČR.

Karel Balík

IRSM, collection of photographs.

Karel Balík was born on 24 August 1943 in Prague. In 1958–1962 he studied the Technical branch at the Secondary Industrial School of Ceramics in Bechyně. After that, he studied at the University of Chemistry and Technology in Prague (VŠCHT) in 1963–1968, from where he graduated with a thesis entitled *The Influence of Phase and Chemical Composition on the Electric Properties of Porcelain*[1]. After graduating, he worked briefly as a technological engineer in Keramprojekt, and from 1969 in the development department of Tesla Vršovice, Prague.

In 1987, as an external intern, he defended his dissertation on *Pyrolytic Graphite* at the VŠCHT and the following year joined the scientific staff at the ČSAV Institute of Geology and Geotechnics where he established himself in the Department of Industrial Carbon, to become its head in 1990 when it changed its name to the Department of Carbon. He now works in the Department of Composites and Carbon Materials. In 1994 he became the deputy director of the ČSAV Institute of Rock Structure and Mechanics and in 2001 he was elected the director of the Institute. He remained in this position until 2012.

During his career in Tesla Vršovice, he initially worked on the development of ceramic-to-metal vacuum bonds for transmitter tube systems and the surface treatment of vacuum envelopes. In 1975 he became focused on Chemical Vapour Deposition methods with pyrolytic carbon, especially the coating kinetics of metallic and carbon substrates. He built a complete worksite for the preparation of self-supporting grids from pyrolytic carbon for transmitter tubes and was declared the company's best inventor in 1985.

After joining the ČSAV Institute of Geology and Geotechnics, he began to work researching so-called modern carbon materials, such as flexible graphite, glassy carbon, carbon fibres, pyrolytic carbon and composite materials. At the incentive of the Department of Composites and Carbon Materials at the Institute of Rock Structure and Mechanics, the Czech Society for Carbon Materials was established in 1996 and Karel Balík was elected its chairman. On the grounds of this position, he became a member of the German workgroup for carbon at Deutsche Keramische Gesellschaft.

He currently focuses primarily on research into composite materials as biomaterials and works on the compatibility of mechanical properties and biochemical compatibility with human tissues, blood and bones. His other interests include research into nanocomposites as biomaterials.

1 Czech: Vliv fázového a chemického složení na elektrické vlastnosti porcelánu.

The original department of Geodynamics was renamed to Seismology, and four employees from the separated department of Geomechanics who had not been transferred to the CAS Institute of Geology were allocated there.

The Central Chemical Laboratory was also newly established from the merger of the department of Geofactors chemical laboratory and the technical and elementary analysis laboratory from the department of Textural and Chemical Analysis. Its purpose was to cover all the requirements of all the scientific departments as regards chemical analyses.

A major organisational change which affected the entire Academy of Sciences was the legal transformation of research institutes to public research institutions[354]

354 Czech: veřejná výzkumná instituce (v. v. i.), a legal form.

as of 1 January 2007. The new legal regulation stipulated that the director was the statutory body of an institution and was authorised to adopt decisions in all of the institution's affairs, except those expressly declared as being the competence of the Institute Council, consisting of elected representatives of employees; the Board of Supervisors, representing the interests of the founder, i.e. the Academy of Sciences; or the founder itself. The IRSM organisational chart therefore saw another major change in the second decade of the new millennium, too; mostly in an effort to adapt it to the character of a modern and high-quality scientific institution. The department of Geodynamics was abolished as of 1 January 2012 following a decision by the Council, and its activities were gradually acquired by the department of Engineering Geology. The same year a new department of Material Structure and Properties was established from the merger of the department of Geopolymer Chemistry and the Inorganic Materials Laboratory[355], previously a joint research centre of the CAS Institute of Inorganic Chemistry and the University of Chemistry and Technology.

The Present Day

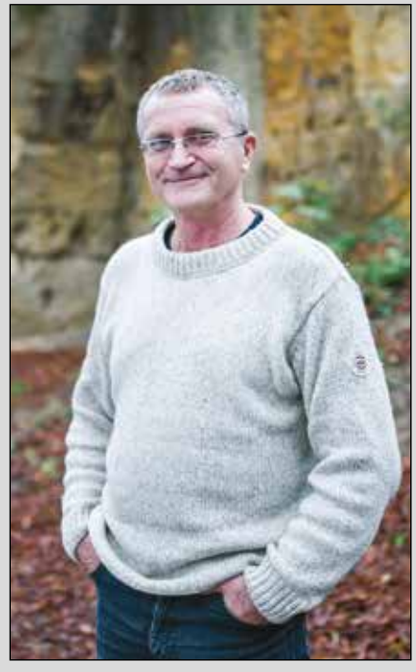
While throughout most of its post-November existence the Institute was constantly facing the high average age of its staff, which was mainly due to graduates' lack of interest in the low-paid work in the Academy of Sciences, there has been a major change in this respect in recent years. In 1995 the average age of an IRSM employee was 48, and ten years later it was even 56.7, with more than one half of the staff older than 60. However, the year 2006 was a turning point; in 2009 the average age was 49.5 and in 2014 just 38.2, with more than one half of the staff younger than 45.

As regards the history of the total head count, there have been no major changes thereto since 1995, remaining at 110–120, with 113 in 2017. The staff stabilisation coupled with the younger team resulted, besides others, in a major boost in the Institute's publishing activities, and the results of its work are published in prestigious professional magazines.

The Institute of Rock Structure and Mechanics, directed by Josef Stemberk since 2012, now has six scientific departments: Geochemistry, Engineering Geology, Composites and Carbon Materials, Material Structure and Properties, Seismotectonics, and the newest department of Neotectonics and Thermochronology.

355 Czech: Laboratoř anorganických materiálů (LAM).

Josef Stemberk



CAS Shared Activities Centre. Photo by Pavlína Jáchimová.

Josef Stemberk was born on 28 March 1963 in Příbram. After graduating from the Vincenc Makovský grammar school in Nové Město na Moravě in 1981 he studied at the Faculty of Natural Sciences of Charles University in Prague, the Department of Hydrogeology, Engineering Geology and Applied Geophysics until 1986. His thesis on *Stability of Sandstone Rock Walls in the Central Part of the Labe Valley between Děčín and Hřensko*[1] was supervised by Jiří Zvelebil.

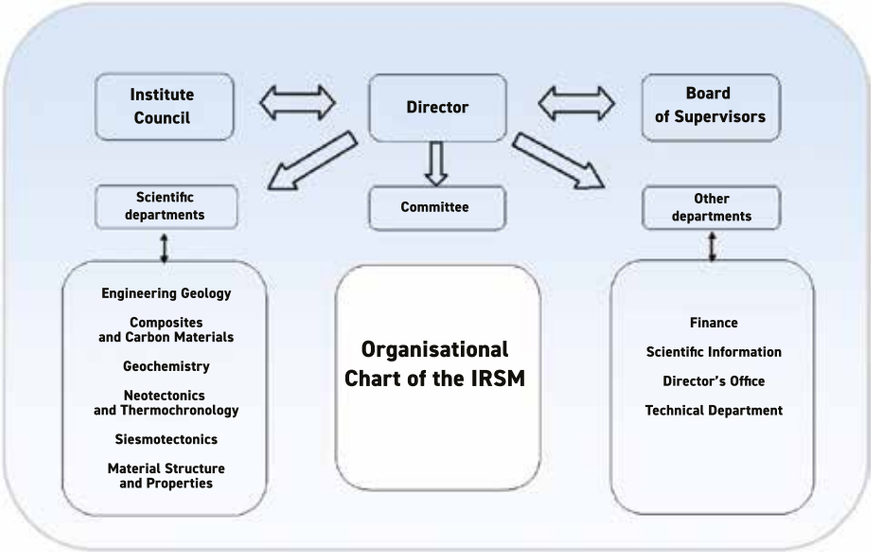
He came to work at the ČSAV Institute of Geology and Geotechnics in September 1986 but soon had to suspend that due to military service. After defending his dissertation entitled *Analysis of Dangerous Geodynamic Phenomena in the Central River Ohře Region*[2], supervised by Jan Kalvoda, in 1994, he joined the ČSAV Institute of Rock Structure and Mechanics as a scientist. In 2001–2014 he was the head of the Department of Engineering Geology, where he continues to work. Since 2012 he has been the director of the Institute.

His professional focus is on hazardous slope deformations, especially their very slow forms, and their long-term monitoring in a rock mass, especially along major faults. In 2001 he initiated the establishment of the Tecnet network, which provides long-term monitoring of movement along faults. Since then he has been working on keeping the network operational, its further development and the assessment of information received via the network in Europe, North and South America, Africa, Central Asia or the Arctic. Josef Stemberk is the author of more than a hundred reviewed publications in prestigious Czech and foreign periodicals and publishing houses. He is the chief editor of the scientific magazine *Acta Geodynamica et Geomaterialia*.

He also works as a lecturer at the Faculty of Science of Charles University, where he teaches Dynamic Engineering Geology. He is also a lecturer for bachelor, magisterial and doctoral theses and a member of final state examination committees. Since 2015 he has also taught a course in Dynamic Engineering Geology at the Arba Minch University in Ethiopia.

He is a member of numerous international organisations, such as the International Consortium on Landslides where he is also a member of the managerial committee, and the International Association for Engineering Geology and the Environment. In 2014–2017 he was the chairman of one of the Centres of Excellence for Landslide Risk Reduction at the International Consortium on Landslides.

1 Czech: Stabilita pískovcových stěn ve střední části údolí Labe mezi Děčínem a Hřenskem.
2 Czech: Analýza nebezpečných geodynamických jevů ve středním Poohří.



The IRSM's current organisational chart.
IRSM.

Department of Engineering Geology

The changes in society following the events in the former Czechoslovakia at the end of 1989 had a fundamental impact on research in engineering geology. The extraction of minerals gradually began to phase down, and this was accompanied by a gradual waning of the formerly strong ties between the Institute and the topics of underground and opencast mining. And while in the 1980s the engineering geologists from the institute were focused mostly on the issues of stability of big open-pit mines along the foot of the Krušné Hory Mts. and its fault slope, from the beginning of the 1990s attention gradually switched to research into hazardous geodynamic phenomena in other regions, too, especially landslides and other slope deformations, including earth falls or creep. There was increasing interest in the development of methods to monitor these processes and predict their development in space and time.

The other direction newly taken by the Department of Engineering Geology was the area of active tectonic processes and their effects on the development of earth's surface. This was especially the task of Jan Kalvoda and Vít Vilímek. They both moved to the Faculty of Natural Sciences at Charles University in the 1990s, where they became professors in physical geography at the Department of Physical Geography and Geoecology, and still collaborate with the IRSM. Research in this area was also prompted by the request for a new risk assessment of nuclear power plants in Czechoslovakia following the Chernobyl disaster and also to look for new suitable locations for the construction of nuclear power facilities.

Deep slide affecting the overburden benches at the ČSA giant coal opencast; Krušné Mts. fault slope at the rear. Photo by unknown author.
IRSM.

The leading experts and tutors of the next scientific generation in this uneasy period were especially Jan Rybář, the department head in the 1990s and a world-renowned expert in slope deformations; Blahoslav Košťák, a renowned geotechnician and the designer of the unique TM-71 3-D deformation measurement instrument, still in use today; and Josef Stemberk, the successor of the two, the inventor of *TecNet* – a global geodynamics network and the department head in 2001–2015.

Research in Landslides

Extreme precipitation affected the eastern part of the Czech Republic in July 1997,[356] exceeding 400–500% of the long-term monthly average value in some locations. As a result, massive floods killed 48 people, and were moreover accompanied by numerous landslides caused by extreme rains especially in areas susceptible to landslides. The worst effects were undoubtedly seen in districts where the rock substrata are Carpathian flysch units. The staff of the Engineering Geology department surveyed the emergency situation from the very beginning in close collaboration with the staff of the former Czech Geological Institute (today the Czech

356 RYBÁŘ, Jan: Rozbor příčin zvýšeného výskytu svahových deformací v České republice v červenci 1997 [Analysis of Increased Incidence of Slope Deformations in the Czech Republic in July 1997]. *Geotechnika*, 1999, Vol. 2, No. 2, pp. 7–14.

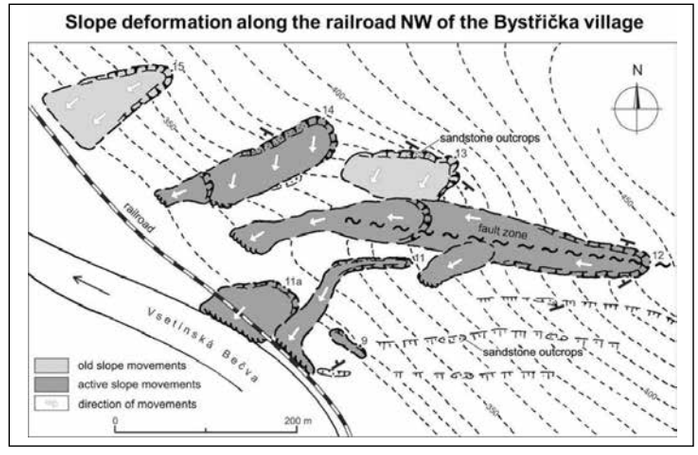
Jan Rybář (right) leading an excursion at the Vaňov site near Ústí nad Labem as part of the 1st European Conference on Landslides in 2002. Photo by unknown author.
IRSM.

Blahoslav Košťák and Olga Hamplová, undated. Photo by unknown author.
IRSM.

Geological Survey)[357] in the most severely affected parts of the Vsetín district, East Moravia, and documented over 120 slope deformations including the Bystřička site, where the international railway line was seriously damaged. For this model area, a sample purpose-made engineering geology slope stability map was prepared at

357 Czech: Česká geologická služba.

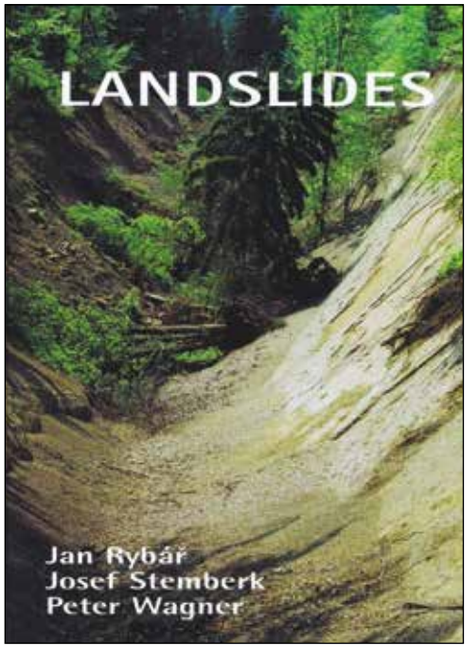
Map of landslides and slope movements northwest of Bystřička where the dual railway track was endangered and then partially destroyed in the July 1997 floods.
IRSM.



Division wall of a 450 m long slope movement near Bystřička, undated. Photo by unknown author.
IRSM.

a scale of 1:10000, from which the landslide risk prediction map was derived and which became the basis for the new landslide survey methodology. The opportunity to test the accuracy of these prediction maps came in May 2010, when excessive precipitation reactivated landslide movements in the West Carpathian flysch units. The newly identified deformations confirmed the reliability of the prediction maps that were based on high quality survey documentation of all old and newer slope movements.[358]

358 RYBÁŘ, Jan, KLIMEŠ, Jan, NOVOSAD, Stanislav: Mapy náchylnosti k sesouvání ve flyšových horninách Západních Karpat a verifikace jejich spolehlivosti po mimořádných dešťových srážkách v květnu 2010 [Maps of Landslide Risks in Western Carpathian Flysch Rocks and Their Verification after the Extraordinary Rainfall in May 2010]. *Geotechnika*, 2011, No. 4, pp. 17–28.



Conference proceedings book: RYBÁŘ, Jan, STEMBERK, Josef, WAGNER, Peter (eds.): ***Landslides, Proceedings of the 1st European Conference on Landslides, Prague, Czech Republic, June 24–26, 2002.*** **Lisse: Swets & Zeitlinger, 2002.** *IRSM.*

In 1998–2010, in response to the disasters, almost 200 map sheets at a scale of 1:10000 were prepared for the West Carpathian flysch areas following the IRSM's methodology.

The international achievements of the Department of Engineering Geology in the research and exchange of knowledge on slope processes include the organisation of the 1st European Conference on Landslides which was held in 2002. It was attended by the world's leading specialists in the study of landslides and other hazardous slope movements. The conference proceedings were published by Elsevier in a collection containing papers by 234 specialists from Europe, America, Africa and Australia.

Research in Active Tectonics

The IRSM was given important momentum for the further development of research in the effects of plate tectonics by the European project entitled *COST-625: 3-D monitoring of active tectonic structures,* carried out in 2000–2007, in which the Department of Engineering Geology was the main applicant. The project focused on launching the long-term monitoring of current fault movements in various parts of Europe and was conducted by Blahoslav Košťák and Josef Stemberk. Besides the Czech Republic, research teams from Denmark, Belgium, Germany, Spain, Italy, Greece, Slovenia, Bulgaria, Romania, Hungary, Slovakia and Poland were also involved, and representatives of Austria, Norway and the USA participated at

Website of the European Plate Observatory System – EPOS.
https://www.epos-ip.org/about/who-makes-epos/community, retrieved on 11 January 2018

regular meetings as observers. As a result, the *TecNet*[359] network was created which became part of the entire Czech/Geo – EPOS (European Plate Observatory System) scientific infrastructure in 2010, giving a clear promise of funding for its operation and the future continuation of research linked with the network.

TecNet is now a global network and is unique both in terms of its scope and the method used to measure movement (3-D measurement with greater than 1/100 mm accuracy). The fundamental instrument used in the monitoring is the TM-71 space dilatometer designed by Blahoslav Košťák. Together with the measurement of slide on faults, selected sites are also monitored for carbon dioxide emanations, groundwater level, electromagnetic radiation, seismicity and basic atmospheric factors, such as precipitation, temperature, pressure and humidity.

Tectonic micro-movement is monitored in collaboration with foreign research institutions, such as in California in the San Andreas Fault zone, Peru, the Canary Islands (El Hierro island), in Svalbard near the Polish polar station in Hornsund, in Ethiopia on the peripheral fault of the East African rift and in Kyrgyzstan in the mine tunnels in the Tian-Shan Mountains. Cooperation is also underway with European universities and other research institutions in Germany on the peripheral faults of the Rhine graben, in the Grimsel test tunnel in Switzerland and in many caves and

359 www.tecnet.cz.

Josef Stemberk, Filip Hartvich and Jan Blahůt installing a GNSS point to measure geodynamic movements at Hornsund fjord, undated. Photo by M. Hladká.
IRSM.

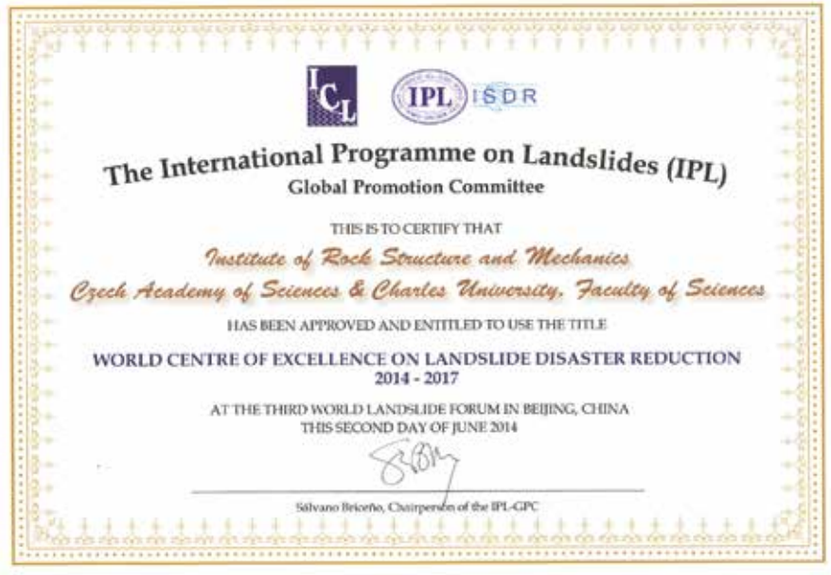
mine tunnels in Belgium, Austria, Slovenia, Italy, Greece, Bulgaria, Slovakia, Poland and in the Czech Republic.[360]

The Present Day

The Department of Engineering Geology, headed by Jan Blahůt since 2015, is now a top quality institution in the area of research in slope deformations in the Czech Republic and in monitoring very slow movements relating to slope deformations or tectonic movements. It develops close cooperation with the leading institutions in the discipline especially in the USA, Switzerland, Germany, Italy, Poland and Japan, and carries out its own research on almost every continent.

The core of the research team in the Department consists of several recent doctoral graduates who joined the Institute after 2000. The most important of these are Jan Klimeš, who is an expert mainly in slope deformations in the Czech Republic and Peru; Petra Štěpančíková, now the head of the new Department of

360 Cf. for instance Český rozhlas Sever radio station, Planetárium, Jak se měří chvění Země [How to Measure Earth Tremors], broadcast on 29 April 2007. (http://www.rozhlas.cz/planetarium/paleontologie/_zprava/343423); STEMBERK, Josef: Polární výprava badatelů z AV ČR [The Polar Expedition of CAS Researchers]. Veda.cz, 11 June 2012, [online]. http://www.veda.cz/article.do?articleId=71014, accessed on 24 May 2017.



Certificate of the World Centre of Excellence on Landslide Disaster Reduction for 2014–2017.
IRSM.

Neotectonics and Thermochronology and an expert focusing on neotectonics and palaeoseismology; Filip Hartvich, the geomorphologist and geoinformatician with a very wide range of specialisations, from geotectonics through geodynamic monitoring to dynamic geomorphology, all of them doctoral graduates from the Faculty of Natural Sciences at Charles University; and Miloš Briestenský, a graduate in engineering geology from Bratislava university who is intensely engaged especially in active tectonics in karst areas. In 2010 the team was joined by another two important members, namely Jan Blahůt, a graduate of the University of Milano-Bicocca, and Matt Rowberry, who brought valuable experience from England and South Africa.

In 2015 the Department was awarded the World Centre of Excellence on Landslide Disaster Reduction status under the auspices of UNESCO and the ICL (International Consortium on Landslides with its headquarters at Kyoto University, Japan) as a joint research centre with the department of Physical Geography and Geoecology at the Faculty of Natural Sciences at Charles University. In 2017 the centre of excellence was awarded for the next three-year period until 2020.

The expanding knowledge gained through the trenching technique and geophysical research in active tectonics led to a group being set up to study palaeoseismicity. Following its separation from the Department of Engineering Geology at the beginning of 2015, a new scientific department of Neotectonics and Thermochronology (see below) was created at the IRSM.

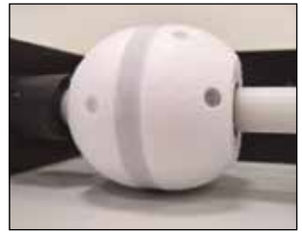
Department of Composites and Carbon Materials

From the late 1980s the Institute of Geology and Geotechnics began to focus, amongst other topics, on the research of carbon materials for technical use, reflecting its rich experience in coal processing research. The newly established department for Carbon Materials, headed by František Špaček, was assigned a task that was strategic from the viewpoint of the Czechoslovak economy, i.e. to carry out research with the prospect of introducing the production of graphite electrodes for electric steelworks furnaces, until then imported from the West at huge expense. The intention was also supported by the abundant availability of high-quality Czech black coal tar pitch. Therefore, after massive investments, the Institute implemented the production of model graphite castings and built a laboratory to test its principal properties. In 1987 a graphitising furnace, then a unique piece of equipment, was purchased from Ruhstrat for 3.5 million crowns. It used a protective argon atmosphere and could reach a temperature of up to 3100 °C. At the beginning of the 1990s, however, the development of carbon electrodes was terminated, both in connection with the opening up of the markets and better availability of western goods as well as with the considerable decline in the production of non-corroding steels in Czechoslovakia.

Under the new head of department, Karel Balík, appointed in 1990, the department began to focus on the research and development of modern structural carbon materials at the beginning of the 1990s. This primarily involved the development of so-called C-C composites, i.e. carbon-fibre materials in a carbon matrix, the development of expanded graphite for use especially as a sealant to replace asbestos products, and the development of glassy carbon, i.e. amorphous sp^2 carbon for use primarily in chemical technologies and in analytical chemistry. In the latter half of the 1990s the research was extended to include chemical vapour deposition methods (CVD) to create carbon coating. However, the greatest attention was paid to the development of C-C composites. The advantages of these were their low density, relatively good mechanical properties and primarily high thermal stability in an inert atmosphere, which predetermined the materials for applications especially in astronautics.

At the beginning there were two expert groups in the department, one of which used black coal tar pitch as the matrix precursor, while the other used phenol formaldehyde resin (phenoplast). The production of composites based on black coal tar pitch soon turned out to be too demanding in technical terms and yielded poor results, and this direction was therefore abandoned after some time. Much more promising, despite their lower material yield, were composites made from phenol formaldehyde resin.

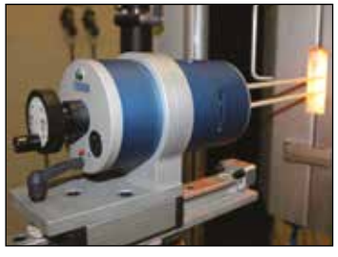
Even though the research into C-C composites was initially conceived as a purely academic activity involving the development of a structural material, with no clear vision about its practical use, its two possible applications were soon defined: 1) C-C composites for use in medicine and 2) C-C composites for structural and technological use under elevated temperatures. Although the current department has been developing other composite materials for several years, the primary focus on these two application areas has remained.



This 4SPIN device by Contipro a.s. is used for electrospinning polymer solutions, especially with polymers of natural origin such as collagen, or for coating implants; the image shows sockets for a hip prosthesis. *Photos by Vlasta Mádlová and Tomáš Suchý.*

Composite Materials for Use in Medicine

As already mentioned, the first materials developed for application in medicine were C-C composites. Their preparation was designed so that they could be used as bone implants, reconstruction plates or intervertebral cages for spinal stabilisation. Their mechanical properties were designed to prevent any undesired transfer of load onto the treated bone (so-called stress shielding). Carbon fabric saturated with phenol formaldehyde resin as a matrix precursor was pressed and then further processed. An important part of its preparation was slow carbonisation, in which the

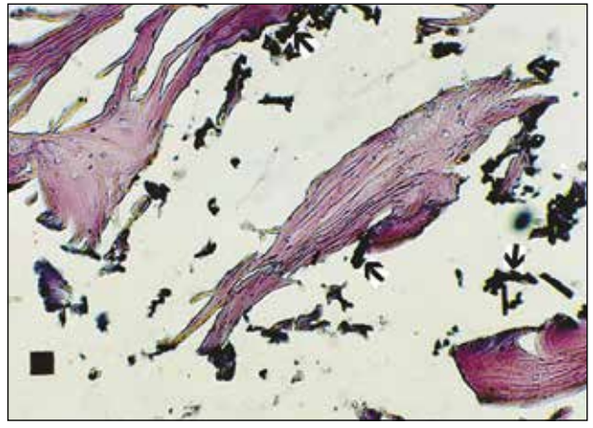


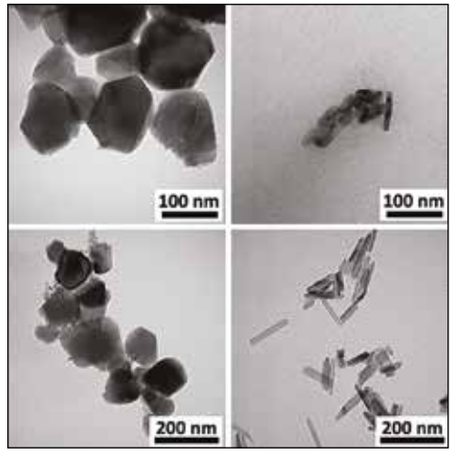
The Inspekt 100 device (Hegewald & Peschke) allows mechanical material tests at high temperatures, 2018. Photos by Vlasta Mádlová.

resin was converted into a biocompatible carbon. To achieve satisfactory mechanical properties, bending strength and the Young's modulus of elasticity, however, more production stages were required, such as coating with pyrolytic carbon. In an effort to reduce the possible release of carbon wear particles from the composite, the samples were further impregnated with special hydrogels and collagen. Nevertheless, the preparation of C-C composites was costly and time-consuming, which affected the price of the resulting materials. Their application in medicine was eventually brought to a definite halt due to the potential release of carbon particles into tissues, an issue which has never been fully resolved.

The second generation of materials developed for medical applications were composites composed of a biocompatible inert siloxane matrix and reinforcements made of glass (E-glass, R-glass) fibres or polyamide fibres. Their advantage was that they were simple and relatively cheap to prepare and also had mechanical properties comparable with the character of bone tissues. Therefore hybrid composites were developed with a siloxane matrix modified with various amounts of bioactive calcium phosphate microparticles and nanoparticles, especially hydroxyapatite and calcium biphosphate. The department's staff prepared a fibre-based as well as particle-based composite, and the effects of adding two types of calcium phosphate powders could be verified, both from the viewpoint of their chemical composition as well as their particle size, on the mechanical properties of the composite and on

This microphotograph of pig tissue after implanting carbon-carbon composite demonstrates the release of carbon wear particles (see arrows).
BALÍK, Karel – SUCHÝ, Tomáš. Biokompozitní náhrady kostní tkáně [Biocomposite Bone Tissue Implants]. Edice Věda kolem nás. Výzvy a otázky, no. 21. Academia, Praha: 2015.



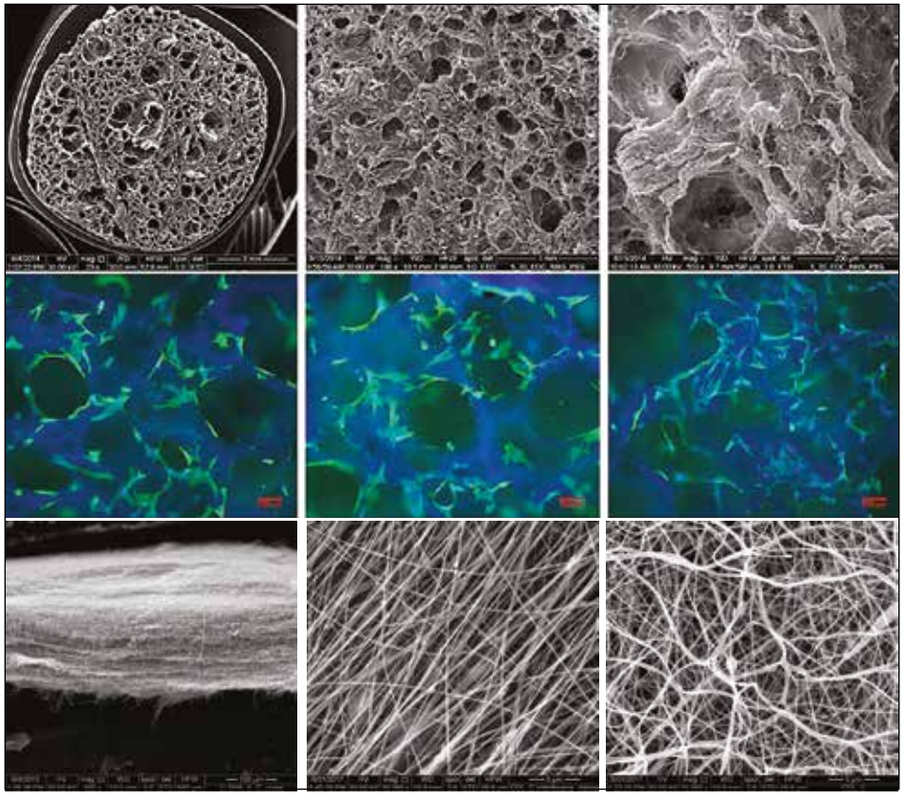


Transmission electron microscopy images of various types of calcium phosphate nanoparticles which are prepared at the Department of Composites and Carbon Materials.
BALÍK, Karel – SUCHÝ, Tomáš. Biokompozitní náhrady kostní tkáně [Biocomposite Bone Tissue Implants]. Edice Věda kolem nás. Výzvy a otázky, no. 21. Academia, Praha: 2015.

the ingrowth of cells. Particulate reinforced composites were developed as possible replacements for intervertebral cages, as they could replace the fillers routinely prepared from a bone graft from the patient's body.

However, demands for biomaterials have considerably changed since the first research into C-C composites started 20 years ago. It is no longer enough merely to satisfy the requirements for biocompatibility, but with bone implants the materials must be bioactive, i.e. support the growth of the surrounding bone cells from undamaged tissue into the implant, and also biodegradability, i.e. the ability to degrade as the new cells grow in and are produced, and to be subsequently resorbed by the organism.

Nowadays the major research priorities for the department primarily include the development and testing of clinically utilisable biocompatible and biodegradable composite materials based on natural or synthetic polymers and mineral fillers, such as collagen, polyactic acid or calcium phosphates, their characterisation and



Scanning electron microscopy images of the composite carriers of cells prepared from a collagen matrix, polyactide nanofibres and calcium phosphate nanoparticles (upper row). Fluorescence microscopy images of composite carriers with stem cells (middle row). SEM images of collagen nanofibrous drug carriers which can be prepared with single-direction or multidirectional fibres.

evaluation of their physicochemical properties. An important research direction is the isolation of collagen and bone apatite from animal tissues of various types and their processing. Considerable attention has been paid to the optimisation of the process of preparing collagen nanofibres with a preserved natural structure at the macromolecular level. Two main directions in which the developed materials can be applied are high-porosity scaffolds for bone tissue engineering and composite nanofibrous layers as drug carriers for surface layers of metallic implants.

Composite Materials for Use under Elevated Temperature

An expert group headed by Petr Glogar, which dealt with composites for high-temperature applications, worked in the department from 1993. Initially, as already mentioned above, the development was focused on C-C composites. At that time, they were used in various parts of the world in some special applications, such

as rocket jets, space shuttle wall panel linings, heat shields for landing modules, aircraft brake pads, hot chutes for glassworks, etc. As regards the type of reinforcement, it was mostly used in woven fabrics and special knitwear.

In line with the existing state of knowledge, it was assumed that the best mechanical properties of the final composites could be achieved with the use of high-module carbon fibre, which is structurally most similar to graphite crystals. However, their use was considerably limited by the price, then exceeding 15 thousand crowns per kilogram. The IRSM therefore developed a composite material from high-tenacity carbon fibre, which is more affordable, using the pyrolysed composite graphitizing method at 2800 °C. The new composite also showed high resistance to high-speed impact measured by the Hopkinson technique, which was verified in collaboration with the Technical University in Liberec.

In the late 1990s the high-temperature oxidation resistance of C-C composites started to be frequently discussed as a limiting factor for ordinary technical applications under elevated temperatures. The department of Carbon therefore tried to resolve this issue through the impregnation of carbonised composites with polysiloxane resins and subsequent pyrolysis, while siloxane resins produced by Lučební závody in Kolín turned out to be highly suitable for this purpose.

Based on this, the idea emerged of developing a composite material with a pyrolysed polysiloxane matrix reinforced with ceramic fibre. As polysiloxane resin undergoing pyrolysis at 1000 °C transforms into the Si-O-C ceramics state, it becomes a material classified as ceramic matrix composite (CMC). The ceramic fibres Nicalon NL202, Nextel 720 with a corundum-mullite nanocrystalline structure and Nextel 610 with pure corundum nanocrystalline structure were gradually used for the production of the first composites of this type. However, neither of these proved too successful in this regard and, moreover, some foreign institutes began to publish studies on principally different technologies for the production of composite materials with a ceramic fibre and ceramic matrix, which had significantly higher strength.

It was therefore decided that further work would now be focused on the development of all-ceramic sandwich liners with outer CMC carrier layers from pyrolysed composite and with an Si-O-C foam ceramic core. The method of particle dispersion from a set epoxide resin and starch particles in a polysiloxane precursor appeared promising for preparing the Si-O-C ceramic foams. Foams prepared with dispersed epoxide particles have a high strength, but given their low foaming level they provide the sandwich liner with a lower release rate. With dispersed starch particles, a high foaming level can be achieved while maintaining relatively good mechanical properties of the foam, and there is the advantage that little starch is consumed and, last but not least, also that this technological alternative is more environmentally friendly.

Along with CMC composites, the department also worked on the development of partially pyrolysed composites reinforced with basalt fibre with a pyrolysed polysiloxane matrix. This topic was the subject of a project implemented by the GAČR with MDI Technologies and later also the Institute of Physics of Materials and the

CAS Institute of Macromolecular Chemistry.[361] Experiments were conducted which showed that the partially pyrolysed composites reinforced with basalt fibre processed at only 650 °C have extraordinary mechanical properties with a high fracture toughness. The technology currently in use allows the production of 1D composites with a mechanical strength of up to 900 MPa. Another advantage of this material is the very low price of the basalt fibre and the matrix precursor, but unfortunately it cannot be used in long-term exposure to high temperature. Compared with the standard composites with a polymer matrix, however, it has excellent fire resistance thanks to a completely fireproof matrix which releases no gaseous by-products.

Other Expert Activities of the Staff of the Department of Composites and Carbon Materials

The department of Composites and Carbon Materials develops, in a broader context of its research, collaboration with many domestic and foreign research institution, universities and development facilities of private entities. Since the 1990s it has contributed to the development of the C-C composites at the Sardar Patel University in Vallabh Vidyanagar, India, and the development of bio-composite materials based on various reinforcements and matrices with the Institute of Macromolecular Compounds in St. Petersburg, Russia, which is still continuing. Long-term cooperation has also been launched with the University of Mining and Metallurgy of Krakow, Poland in the area of composite material research for medical purposes.

As part of the KONTAKT programme run by the Ministry of Education, the department has cooperated on several international grant projects, namely with the National Institute of Advanced Industrial Science and Technology of Tsukuba, Japan on a grant entitled *Preparation of porous carbon with separation ability*, and with the University of Vienna, Austria, where it was *Microstructure and mechanical properties of ceramic matrix composites for elevated temperatures and oxidising environment* and *Microstructure and mechanical properties of heat-resistant and chemically stable composites reinforced with basalt fibres*.

Research was carried out in collaboration with the National University of Singapore concerning the biological evaluation of collagen-polyactide bone implants, and currently the latest international project has been research of composite cell carriers with the Politecnico di Milano, Italy. As regards the collaborating facilities of commercial companies which are interested in joint development and research in medical devices and implants, a few can be named, such as ProSpon, Contipro, Medin, Medin Orthopaedics, Lasak, Elmarco and others.

The department, which changed its old name from the department of Carbon to 'Carbon and Composite Carbon Materials'[362] in 2005, has had its current name since

361 Czech: Ústav fyziky materiálů AV ČR; Ústav makromolekulární chemie AV ČR.
362 Czech: Oddělení uhlíku a kompozitních uhlíkových materiálů.

Participants at the 10th specialised seminar on Biomaterials and Their Surfaces, 2017. Photo by unknown author.

2012. In the same year Karel Balík was replaced as the department's head by Tomáš Suchý, who has also been the chairman of the Society for Composite and Carbon Materials[363] since 2016, an entity with the legal form of a civic association. It was established in 1996 as the Czech Society for Composite and Carbon Materials[364] at the initiative of Karel Balík, who was its chairman for a full twenty years. The Society has as members, and supports, experts who work in the development and processing of carbon and composite materials, has held regular events for specialists in biomaterials and tissue engineering, and since 2008 has contributed every year to the organising of the traditional specialised seminar on *Biomaterials and Their Surfaces*.[365]

Department of Geochemistry

The department of Geochemistry followed up on the many years of activities and cooperation of several groups within the Institute, namely in the departments of Research of Coal and Carbonaceous Materials, Coal Chemistry and Physical Methods, which dealt with coal petrology, surface chemistry and chemical analysis. In 1992 they were merged with the department of Analytics, headed by Alena Vodičková, creating the department of Textural and Chemical Analyses headed by Ivana Sýkorová.

The research activities of the new department were focused on the multi-disciplinary research of coal, humins, carbonaceous materials and products of chemical coal processing. The core of the research comprised methods, namely in the chemical

363 Czech: Společnost pro kompozitní a uhlíkové materiály, z. s.
364 Czech: Česká společnost pro kompozitní a uhlíkové materiály.
365 Czech: *Biomateriály a jejich povrchy.*

Ivana Sýkorová.
Photo by Vlasta Mádlová.

analysis of fuels, surface chemistry physico-chemical methods, optical and electron microscopy, that had already been developed in the Institute for several decades. The Institute was a leading institution in the country as well as in the former Eastern Bloc as regards the mastering and application of these methods. Over time, the scope of the research was extended, thanks to Viktor Dobal, Jaroslav Černý, Ivo Lang, Vladimír Machovič, Helena Pavlíková, Pavel Šebesta, Eva Šebestová and Petr Vavrečka, to include studies into the structure of coal and its derivatives using modern instrumental methods, especially infrared spectroscopy and nuclear magnetic resonance. Given its experimental character, the department of Textural and Chemical Analysis also worked as the service centre for other departments in the Institute and as a facility shared by the University of Chemistry and Technology in Prague, the Faculty of Natural Sciences in Prague and the Mining University – Technical University in Ostrava.

As part of the complete restructuring of the Institute in 2006, the department was renamed to Geochemistry, after its laboratories for technical and elementary analysis were separated, and together with the chemical laboratory from the department of Geofactors formed the basis for the newly established Central Chemical Laboratories. However, they did not exist for long, and the laboratories returned to the department of Geochemistry after 2010.

Until 2008 only two main and closely cooperating expert groups worked in the department. One of them carried out research into coal and organic petrology, while the other studied the surface properties of carbon and carbonaceous materials.

Alexandr Šulc preparing polished sections for the study of microscopic parameters.
Photo by Vlasta Mádlová.

Alena Jandečková working with mercury porosimeters.
Photo by Vlasta Mádlová.

Coal and Organic Petrology

Research in the field of coal and organic petrology in the Institute has always been founded on the internationally accepted scientific methodology of vitrinite reflectance measurement and determination of maceral composition, introduced by Vlastimil Holubář, who had worked on this topic from as early as the 1960s. Before the independent Czech Republic was established, these methods were used, for instance, to classify bituminous coal on the grounds of geological research in the Upper Silesian basin and to characterise coke charges and the quality of foundry cokes in the Ostrava-Karviná district by determining the degree of coalification, maceral composition, degree of reduction and reactivity of inertinite. At the same time, international classification systems for bituminous coal, anthracite and lignite were outlined for technological purposes as part of the cooperation between the Comecon countries, that were in line with the principles laid out by the International Organisation for Standardisation (ISO), together with the classification structure for the textures of

coal, tar and oil cokes using microscopic methods. In cooperation with the North Bohemian and Sokolov Coal District mines and especially the Palivový kombinát in Vřesová, the Institute assisted in the monitoring of briquetting capacity and the susceptibility of coal and briquettes to spontaneous combustion, by analysing their petrographic composition, coalification, degree of gelification, microhardness, ash content, sulphur content and other physical and chemical parameters.

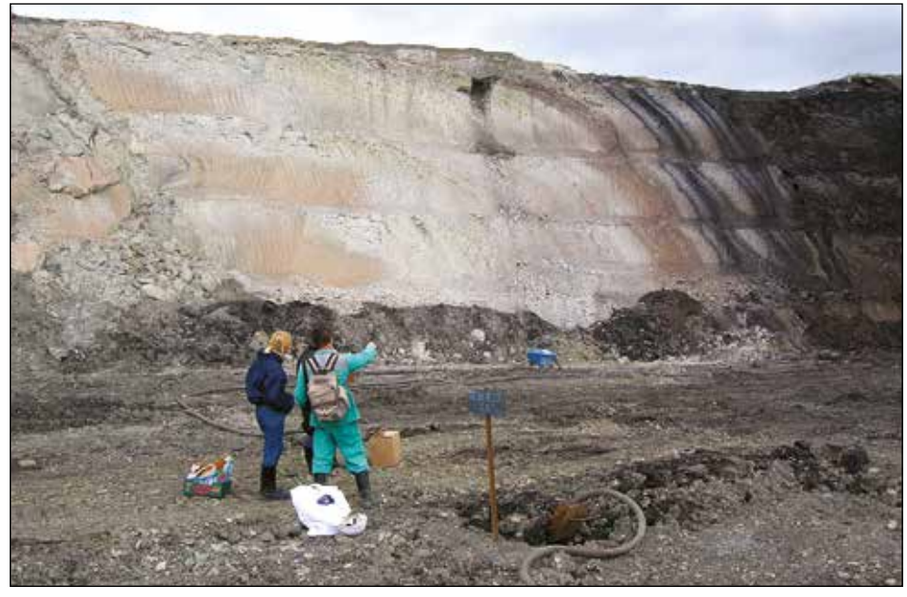
The microscopic parameters were also incorporated into the multidisciplinary research into humins and weathering processes relating to changes in the morphological, mechanical, physical and chemical properties of lignite, bituminous coal and anthracite in seams and on heaps, and of by-products from the processing of brown coal with oil fractions.

The reduction in the geological research of coal deposits, phasing down of the mining and processing of coal and increased interest in environmental protection at the end of the 20th century gave Ivan Rozkošný and Ivana Sýkorová the idea of expanding the department's research activities and establishing cooperation as part of the International Committee for Coal and Organic Petrology (ICCOP). After the departure of Ivan Rozkošný, besides classic coal petrology, studies were made into the optical properties and morphology of organic matter particles dispersed in rocks while using the results from other analytical methods in organic as well as inorganic chemistry and infrared and Raman spectroscopy in combination with optical microscopy.

Since then, the department has focused primarily on the topics of general and applied petrology. In the general foundations of petrology, the microscopic laboratory has long been intensely involved in the activities of the ICCOP and assists in the revision and preparation of new definitions and classification of petrologic organic components in coal, such as huminite, vitrinite, inertinite, alginite, bituminite and others, and organic particles, such as altered matter, cokes, chars, tars and bitumens, in solid products from combustion or other processes, through the modernisation and testing of existing methods and the introduction of new instrument techniques. The result of Ivana Sýkorová's collaboration with the world's leading organic petrologists, which has gained worldwide recognition, is a new international classification with definitions and characteristics of huminite macerals for low-rank coal and peat, which complements the international system of vitrinite, liptinite and inertinite macerals. It is also part of the ISO 7404-3 standard entitled *Methods for the petrographic analysis of coals – Part 3: Method of determining maceral group composition. 2009.*

Studies into the reflectance and properties of carbon particles, including zooclasts, graphite and bitumens, dispersed in sediments of various ages, have helped to clarify the thermal history of the relevant basins and the conditions for the formation processes of carbonaceous matter in the ore deposits in the Czech Republic, namely Central and Southern Bohemia, and around the world, for instance in the Swiss Alps, the shales of South China and in West Africa.

Knowledge of the petrographic characteristics of organic matter has been very useful in collaboration with top experts from the geological institutions of Czech



Martina Havelcová with Petr Rojík of the Sokolovská uhelná company taking samples in the Antonín coal seam, Sokolov coal basin, undated. Photo by unknown author.
IRSM

universities, academic institutions and mining companies in the reconstruction of the paleoenvironment, original vegetation, climatic and tectonic conditions of Tertiary and Carboniferous sediments including coal basins in the Czech Republic and also abroad, for instance in Russia, South Wales, Spain, Egypt or Kazakhstan.

In line with the international environmental protection trends, the department pays a great deal of attention to the identification and study of the properties, composition and morphology of organic particles produced during incomplete combustion, whether in connection with human activities, i.e. in the power industry, household heating systems or transport, or with the natural consequences of weathering, wildfires, spontaneous combustion and the burning of organic matter in seams and on heaps. This way the department has assisted in resolving environmental issues involving the release of toxic elements and carbon compounds.

One new direction being taken in the field of coal and organic petrology, applied in ecology, is the identification of dust particles of biological origin, particles produced by means of transport and production facilities, the concentration and composition of these particles in the atmosphere and in their fallout on the surface of structures and soils in urban, industrial and agricultural areas.

Given its staffing and instruments, equipment for the preparation of microscopic samples and its broad scope of topics relating to coal and organic petrology, the department's microscope laboratory has been used for laboratory practice by students from the Faculty of Natural Sciences of Charles University. Using experimental

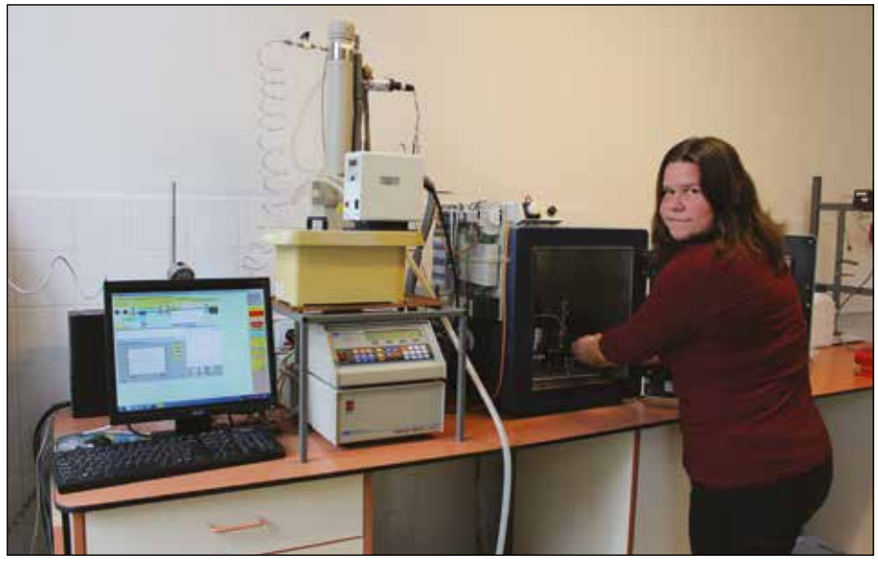
Zuzana Weishauptová, Jiří Medek and Karel Balík at the Carbon 96 conference in Newcastle Upon Tyne, Great Britain. Photo by unknown author.
IRSM, Zuzana Weishauptová's personal archives

measurements and studies of organic matter, the students most often try to reconstruct the paleoenvironment of coal seams and resolve environmental issues in coal processing for their bachelor's and magisterial theses and dissertations.

Surface Properties of Carbonaceous and Carbon Materials

Until the beginning of the 1990s research into the surface properties of carbonaceous and carbon materials, developed and led by Jiří Medek and Zuzana Weishauptová, focused primarily on the studies of mesophase on the basis of bituminous coal tar pitch produced in the preparation of needle coke, a raw material for the production of graphite electrodes. However, after the development of graphite electrodes was halted due to changes in the state's economic priorities, attention turned to the microporous structure of carbonaceous substances and its sorption ability for selected gases.

The practical importance of microporosity was proved during studies of the physical principles of the gas-bearing and gas-yielding capacity of coal, where it acts as the main component of the coalbed methane collector. The knowledge gained was applied in cooperation with the OKD mining company in the real coal/methane system, which is of considerable importance in terms of energy, safety and the environment. The key result of the studies focusing on the storage of methane in the coal substance was the definition and mathematical expression of four forms of bonds of gases in a polydisperse system of coal and rocks which may be released from coal, and determination of the summary potential gas-bearing capacity on the grounds of low-pressure measurements. Two parallel sorption processes were newly distinguished, namely adsorption and absorption. At the same time the mechanism for gas release in spontaneous as well as induced degassing was also clarified.



Daniela Řimnáčová working with a high-pressure sorption device. Photo by Vlasta Mádlová.

In connection with the global trend of monitoring gaseous pollutants in the air and ways of removing them, the department's activities also began to include the storage of carbon dioxide as the most widespread greenhouse gas in coal through high-pressure sorption carried out using the original sorption device designed by Oldřich Přibyl of the IRSM. The research also explored the influence of coal properties, its sorption capacity and sorption kinetics, which was followed by research of the gas-bearing and gas-yielding capacity of shales as a potential source of fossil energy.

In the long term, the department has also focused on spontaneous combustion, especially with regard to determining the susceptibility of coal to spontaneous combustion. A new theory was created for the initiation of the spontaneous combustion of coal, based on the principle of its spontaneous disintegration as a result of potential latent energy creating microfissures, the initiation and propagation of which is related to the formation of reactive radicals.

Studies of Organic Compounds in Geological Materials

A new specialist group was established at the department in 2008 that has focused on studying organic compounds in geological materials. Their work uses especially gas chromatography in combination with a mass detector, and they have also applied their research potential in preparing their own methodology for treating samples and performing chromatographic analyses. In fact it is the only institution

Jiří Medek

IRSM, collection of photographs.

Jiří Medek was born on 20 May 1922 in Hradec Králové but his family soon moved to Prague, where he grew up. He graduated from grammar school in 1941 and the following year was assigned to forced labour in the German Reich where he worked in a medicaments wholesaler's in Halberstadt, now Saxony-Anhalt. After the war he briefly worked in the pharmacy at Thomayer Hospital in Prague. In April 1946 he began his employment at the Institute for Scientific Coal Research and the rest of his career was linked to this Institute.[1] At first he worked there as a technician. In the 1950s he was part of the group for basic research into solid fuels and was one of those who joined the ČSAV Mining Institute in the major reorganisation of the Institute for Scientific Coal Research.[2] In the 1960s he worked in research of the colloidal and surface properties of solid fuels, especially surface chemistry. He was also involved in spectral analysis, reaction kinetics and the study of electric conductivity. He was seen as a well disciplined, diligent and conscientious worker who had a very good rapport with his colleagues. Thanks to his professional skills, he became a member of the closer realisation committee and a reporter from the successful conference entitled Coal Science, held in Prague in 1968.[3]

As World War Two prevented Jiří Medek from studying at university, he initially worked as an ordinary technician and only slowly gained the education necessary for a researcher. In the 1950s he began long-distance studies at what is now the Faculty of Natural Sciences of Charles University, which he completed in 1962. After that he continued at the University of Chemistry and Technology where he completed his doctoral thesis in 1968 and dissertation in 1973.[4] In the 1970s he enjoyed great scientific success when his quantitative description of the microporous structure of solid phase gained international renown. The key factor was his frequently quoted paper *Possibility of micropore analysis of coal and coke from the carbon dioxide isotherm*, published in the prestigious Fuel magazine in 1977.[5] In his works he conceived a comprehensive idea of the microporous structure of solid substances and derived equations to compute the basic quantitative parameters of the microporous structure. The notion "Medek's equation" or "Medek's theory" is still commonly used today.

Besides this, he was the author of original papers on coke reactivity, oxidation kinetics and pyrolysis, a new theory of the spontaneous combustion of coal, the mechanical and electrical properties of coal and coke, and the preparation of needle coke. His theoretical work served as the foundation for resolving numerous tasks in the area of technical practice, for instance for expert studies on the extraction of coal methane as an alterative energy source. Jiří Medek himself assisted in many contemporary tasks, and drew on his knowledge, for instance, as a member of the expert group entrusted to determine the causes and course of the Pluto mine disaster, the explosion in the premises of the former State Planning Committee in Prague and in the assessment of the gas-bearing capacity of Prague's central waste dump.

In the 1980s he received several awards, including the Merited Scientist of the ČSAV diploma in 1983 and the ČSAV Commendation for the development of instruments of high scientific quality in 1989.[6] At that time he worked in the Coal Research Department, later in the Department of Chemistry of Coal and Carbon Substances. Besides scientific research, he also lectured interns. Despite his advanced age, he still continued his research work, published scientific texts until after his 80th birthday and worked as a consultant in the Institute's Department of Textural and Chemical Analysis.[7] He was also an active member of the Czech Chemical Society, including his membership of the committee of its Expert Group for Surface and Colloidal Chemistry.[8] At the end of his life he received an important award, the Hanuš Medal from the Czech Chemical Society, in 2007.[9] Jiří Medek died on 24 July 2008 and remained active in science until the very last days of his life.[10]

1 A AV ČR Archives, ČSAV Mining Institute collection, box 4, inv. no. 28, Zařazení pracovníků do vědeckých kvalifikačních stupňů [Classification of Staff in Scientific Qualification Degrees] – Jiří Medek.
2 A AV ČR Archives, ČSAV Mining Institute collection, box 4, inv. no. 27, Seznam zaměstnanců, kteří přecházejí z ÚVVP do HOÚ ČSAV [List of Employees Transferring from the Institute for Scientific Coal Research to the ČSAV Mining Institute].
3 KLOUBEK, Jan: Jiří Medek osmdesátníkem [Jiří Medek Turning 80]. *Chemické listy* 2002, Vol. 96, p. 843.
4 A AV ČR Archives, ČSAV Mining Institute collection, box 4, inv. no. 28, Zařazení pracovníků do vědeckých kvalifikačních stupňů [Classification of Staff in Scientific Qualification Degrees] – Jiří Medek.
5 MEDEK, Jiří: Possibility of micropore analysis of coal and coke from the carbon dioxide isotherm. *Fuel* 1977, Vol. 56, No. 2, pp. 131–133.
6 KLOUBEK, Jan: Jiří Medek osmdesátníkem [Jiří Medek Turning 80]. *Chemické listy* 2002, Vol. 96, pp. 827–852; Bulletin, p. 843.
7 Institute of Rock Structure and Mechanics of the Academy of Sciences of the Czech Republic. Praha, 2004, pp. 30, 36, 37.
8 KLOUBEK, Jan: K rozloučení s RNDr. Jiřím Medkem, CSc [Farewell to Jiří Medek]. *Chemické listy* 2008, Vol. 102, pp. 939–940.
9 http://www.csch.cz/Hanusova-medaile
10 KLOUBEK, Jan: K rozloučení s RNDr. Jiřím Medkem, CSc [Farewell to Jiří Medek]. *Chemické listy* 2008, Vol. 102, pp. 939–940.

Alexandra Špaldoňová at the gas chromatography laboratory, 2018. Photo by Vlasta Mádlová.

in the country which focuses on, processes and documents samples of coal and coal materials using organic analyses. The samples here are studied not only from the viewpoint of their composition, but also with respect to their use, for instance, as geosorbents for the sorption of metals, utilisable in cleaning wastewater. The scope of materials processed, however, goes beyond coal geochemistry as it includes samples of sediments, soils, dust, carbonaceous particles, industrial materials, plant and animal lipids and resins.

Textural Analysis Centre

With support from the *Prague Competitiveness* operational programme financed by the European Regional Development Fund, the Textural Analysis Centre was built in 2015 and is part of the department of Geochemistry. The reconstruction of obsolete laboratories and the purchase of new technologies for optical microscopy and sorption analyses have significantly improved the research into the structure, composition and properties of materials applicable to studies of the properties and course of natural, anthropogenous and technical processes.

The key line of research of the current department of Geochemistry is based on studying coal structure, the characterisation of organic matter in sediments, soils, peats and rocks with organic matter, determination of porosimetry factors and research of sorption properties. The basic scope of interest can be divided up into four categories: 1) Application of coal and organic petrology and geochemistry in geology and ecology, 2) Application of geochemical methods from the environment to

Gravimetric sorption analyser operated by Maryna Vorokhta, 2018. Photo by Vlasta Mádlová.

medicine, 3) Sorption and textural properties of materials and their importance for natural and anthropogenous processes, 4) Geochemistry and petrology of granites.

Domestic and Foreign Cooperation

Since 2010, the textural properties of sedimentary rocks used in the construction of historical buildings, and their changes caused by weathering, have been studied at the Laboratory of Sorption and Porosimetric Analysis[366], a joint research centre of the IRSM and the Faculty of Natural Sciences of Charles University. Crucial achievements in this area especially include the assessment of authentic and alternative sedimentary rocks carried out during the last repair of Prague's historical Charles' Bridge and the precise specification of the role of hierarchical porous structure in the bentonite sealing of nuclear waste storage sites, which are part of the engineering barriers in these underground storage facilities.

For more than twenty years now cooperation has been underway with UJP Praha a.s. (the Nuclear Research Institute[367] in Prague – Zbraslav) in the research of the corrosion layers of zirconium alloys used as cladding of the fuel cells of nuclear reactors. The new knowledge gained through this research includes the fact that the corrosion layer has properties corresponding to those of the reversible xerogel.

366 12th Session of the CAS Academic Council, 12 January 2010.
367 Czech: Ústav jaderného výzkumu.

An original method for the hydriding of zirconium alloys was developed to study the effects of the presence of zirconium hydrides in the alloy that could initiate hazardous cracks and fissures.

Also thanks to the first international seminar on coal petrology, held in 1992 at the Institute of Geotechnics, the predecessor of the IRSM, under the auspices of the International Committee for Coal and Organic Petrology (ICCOP), the department's foreign cooperation has expanded considerably, especially in the area of the ICCOP's research activities, and still continues today. Another example of fruitful international cooperation was a joint project with the Leibniz University of Hannover focusing on the geochemical studies of topaz granites and the geochemical and mineralogical research of Moldanubic batholith granites with the University of Salzburg.

Department of Material Structure and Properties

The current arrangement of the department is the result of several different stages in which the scope of its activities and head count gradually expanded. The original department of Caustobiolith Chemistry was first transformed to the department of Geopolymer Chemistry, and that was later changed to the department of Material Structure and Properties.

Department of Caustobiolith Chemistry

The current department of Material Structure and Properties was established in 1999 by merging the department of Preparation with the department of Caustobiolith Chemistry. The newly established department, headed by Pavel Straka, followed up on the Institute's previous research activities in the treatment and processing of minerals and focused on new methods for producing materials with a high utility value. The department's basic research was aimed at the structure and use of caustobioliths, while the applied research dealt with the effects of process conditions on the quality of products from the thermal processing of organic waste with coal. At the same time the traditional methods of treating minerals were developed, especially magnetic separation and filtration, mainly owing to the work of the Institute's long-standing employee Pavel Mucha.

With the arrival of the new millennium, coal mining and coke production began to be gradually phased down, and so did the relevant research. The department's staff worked on intense collaboration with the Mining College – Technical University in Ostrava[368] on topics which were rapidly increasing in importance, such as the thermal processing of organic waste materials with coal in so-called co-processing, issues involving the environmentally-acceptable use of the country's sources of coal,

368 Czech: Vysoká škola báňská – Technická univerzita Ostrava (VŠB – TUO).

Pavel Mucha, undated. Photo by unknown author. *IRSM, collection of photographs.*

Olga Bičáková preparing a device for the thermal processing of organic waste materials. Furnace with a stationary bed and second stage, 2018. Photo by Vlasta Mádlová.

especially for the power industry, and local sources of heat. Other important projects of the Institute that the Mining College participated in included research into the use of mixtures of black coals with auxiliary substances to produce pyrolytic carbon for the foundry industry. Besides process parameters, also the structural forms of the produced carbon were analysed to ensure the high strength and surface smoothness of the castings, and attention was also paid to comparing the conversion efficiency of the coal substance in various processes and reducing pollutant emissions.

Nikoleta Čimová working with gas chromatographs for analysing power gases and processing measurement data, 2018. Photo by Vlasta Mádlová.

After the year 2000, new methods were also successfully applied for the pyrolysis and gasification of solid organic waste, such as waste tyres and rubber, with coal to produce smokeless fuels, heating oils and power gas. Under pressure from the growing volumes of various types of waste materials, especially waste that is hard to recycle, the department began to work on other possibilities for processing them using advanced methods. This trend was considerably boosted with the arrival of the scientist Olga Bičáková in 2009, who had dealt with the topic in her thesis as well as her dissertation.

Key subjects of research included the catalysed thermal conversion of biomass to liquid products which can be used as clean heating oils or as sources of chemicals. Catalysts for the conversion were determined and verified and the possibilities for their use were defined. There was also considerable interest in determining the process conditions for the thermal processing of plastic waste mixtures to pure liquid fuels on a large scale. Based on the results of laboratory experiments and computations, a polyolefin waste mixture was then processed while producing sulphur-free heating oil with high calorific value and favourable technical parameters, i.e. a pure fuel suitable for storage. As part of research into clean fuels, methods of producing hydrogen from renewable sources were also described, an important factor as regards the role of hydrogen as a clean fuel as well as for environmental protection.

Department of Geopolymer Chemistry

In 2003 the Institute's Scientific Council discussed and approved a change to the department's name to the department of Geopolymers. The main reason for that was the expansion of its activities after 2000, related to the arrival of many new colleagues, namely Václav Žežulka, Tomáš Hanzlíček, Michaela Steinerová-Vondráčková and Ivana Perná, when the development of physical methods for the preparation of raw materials took on a new dimension and, at the same time, research

developed in new disciplines, namely the chemistry and technology of geopolymers and structural chemistry of solid substances.

The studies into the preparation of newly developed geopolymer materials had widespread practical effects. The hydrolytic dissociation of natural aluminium silicates and their subsequent polymerization using the sol-gel process in an alkaline environment at laboratory temperature and atmospheric pressure resulted in solid substances that can be used in restoring historical monuments and in the construction industry. Another way in which they can be applied is to fix toxic and radioactive waste in a geopolymer structure, which isolates and disposes of it. Other research activities were focused on the use of bioashes and biowaste to enrich soils with mineral components, on the use of ash from the fluidised-bed combustion of coal and woodchips for material solidification and also the assessment of historical mortars and facades for restoration purposes.

Research work by Václav Žežulka, Pavel Mucha and Pavel Straka relating to the treatment of raw materials with magnetic separation, which involved creating and using strong magnetic fields with permanent magnet sets from precious soils without any electricity required, led to technologies for designing large magnetic blocks from neodymium magnets and setting them up in final industrial facilities. Various types of magnetic filters and separators were designed and implemented for cleaning ceramic suspensions and substances, as well as a suspended magnetic separator of undesired components from raw material mixtures. The magnetic devices developed were installed in the technological lines in many industrial plants all over the country and several Czech patents and a US patent have been issued for these magnetic devices.

Department of Material Structure and Properties

The department of Material Structure and Properties was established in 2012 as a merger of two organisational units, both of which focused on technologies and materials: the IRSM Geopolymer Chemistry department and the Inorganic Materials Laboratory, a joint research centre of the University of Chemistry and Technology and the Czech Academy of Sciences.

Inorganic Materials Laboratory

The Inorganic Materials Laboratory was established on the grounds of a government decree in 1962 as the VŠCHT and ČSAV Joint Laboratory for Silicate Chemistry and Technology. Its establishment was necessary to satisfy the needs of the emerging institutes of the then ČSAV, universities and the developing silicate industry. For the scientific institutes this was an opportunity to share laboratories and their equipment, get involved in the education of students and join forces in working on bigger projects, and for the industry this was an opportunity to gain valuable knowledge that could be used in the development and application of new technologies. Two excellent Czech scientists, Vladimír Šatava and Jan Hlaváč, both also pedagogues at the University of Chemistry and Technology, were the founders of the laboratory and the former later became the head of the new Laboratory. The key topics on which the Laboratory focused from the beginning was research in the process of setting inorganic binders on a plaster model, basic glass melting processes, the mechanisms of glass corrosion caused by aqueous solutions and glass treatment processes involving cutting and polishing. The development of special cements was gradually added, together with the use of waste materials, and eventually also research into geopolymer materials. In the area of glass technology, research was launched into the reactions of gases with glass melt, which shed further light on the industrial glass refining process and later, in connection with other institutions, the development of mathematical models for the industrial glass melting process. At the same time, research was developed in electrochemical processes that occur when molten glass comes into contact with metal, through to the industrial application and theoretical clarification of the corrosion processes of heat-resistant materials on contact with molten glass. The results of the Laboratory's work included many experimental methods, analysis methods for

Operating magnetic filter on the technological line for the preparation of ceramic casting material, undated. Photo by unknown author. *IRSM.*

Magnetic separator of impurities over the raw materials mixture conveyor belt, undated. Photo by unknown author. *IRSM.*

Laboratory ovens for the high-temperature monitoring of processes in molten glass, 2018.
Photo by Vlasta Mádlová.

the dissolution of ceramic materials in molten glass under forced convection, analysis of gases in molten glass, observing and monitoring processes in molten glass, and methods and monitoring of the corrosion of metallic electrodes in molten glass under high current load. From the very beginning the Laboratory also developed optical and electron microscopy methods. An industrial application was found for the patent for reducing the corrosion of molybdenum electrodes in electric glass melting with a lower frequency current, and the results of the high-temperature monitoring of processes in various types of molten glass also found their technological use.

After the founder Vladimír Šatava, who had been withdrawn for political reasons in 1974, the directors were Jaroslav Staněk (until 1980), Jiří Götz (until 1993) and Lubomír Němec (until 2010). The Laboratory also changed its name several times, following the changes in its organisational context over time. In 1986 it was converted to the Institute of Chemistry of Glass and Ceramic Materials affiliated with the ČSAV[369], focused on the research and preparation of glass optical fibres for telecommunication purposes, which brought an end to the previous link with the VŠCHT, although one part of the original institution remained at its premises. The other parts of the new institute were scattered around several places in Prague, and a pilot plant for the production of optical fibres was later built in Praha-Suchdol, which still operates under the CAS Institute of Electronic and Photonics[370].

369 Czech: Ústav chemie skelných a keramických materiálů při ČSAV.
370 Czech: Ústav elektroniky a fotoniky AV ČR.

Jana Náhunková working with the SETARAM Setsys Evolution 18 thermogravimetric analyser with a mass detector used to characterise and determine the kinetic parameters of decomposition reactions in inorganic and organic matters, 2018.
Photo by Vlasta Mádlová.

The Spectro IQ X-ray fluorescence analyser for analysing main and trace elements in solid, pulverised and liquid materials, 2018.
Photo by Vlasta Mádlová.

However, the Institute of Chemistry of Glass and Ceramic Materials was closed down in extensive cutbacks to the Czech Academy of Sciences in 1993 and converted back into the joint research centre of the CAS and VŠCHT, called the Laboratory of Glass and Ceramic Materials, later to be renamed to the Inorganic Materials Laboratory. Its academic partner was initially the ČSAV Institute of Inorganic Chemistry[371] and, since 2012, the Institute of Rock Structure and Mechanics.

At present, the department headed by Jaroslav Kloužek has maintained a broad range of research activities: Technological issues in the production of glass, the preparation of special glasses, the processing of inorganic and organic waste materials, the preparation and cleaning of raw material mixtures and, last but not least, analyses of materials, material mixtures, intermediate products and products of chemical processes.

371 Czech: Ústav anorganické chemie AV ČR.

The department's activities are performed in two laboratories: the Inorganic Materials Laboratory, headed by Jaroslav Kloužek, and the Environmental Technologies Laboratory, headed by Olga Bičáková. The Inorganic Materials Laboratory deals with melting processes in order to seek new process principles and their mathematical modelling, and research into new glasses characterised by their high infrared translucency, which is for the most part the domain of Petr Kostka. The Laboratory naturally combines research with education at the VŠCHT, and in doing so it fulfils the intended mission of the joint centres. The Environmental Technologies Laboratory is involved in the development of technologies for processing inorganic and organic waste mixtures while creating products of high utility value and valorising the input raw materials by eliminating undesired pollutants.

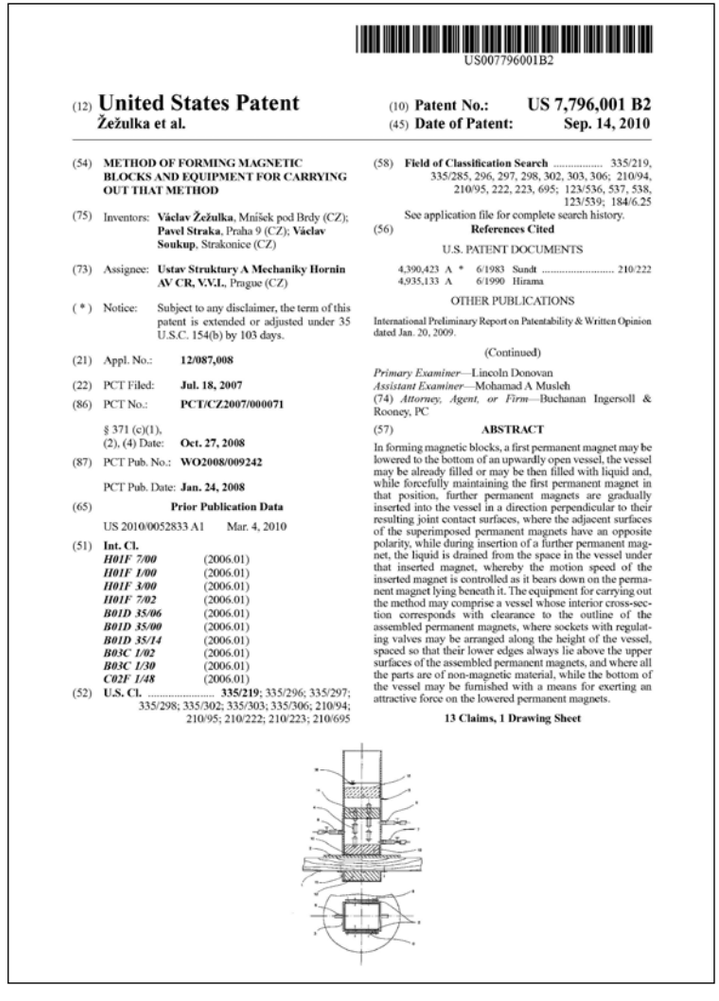
Important projects handled by the department particularly include the *Research and development of new materials and technologies for the treatment of radioactive and hazardous wastes,* where the development of new materials based on cements, geopolymers and synthetic polymers, and the creation of detailed procedures to immobilise radioactive and hazardous waste from nuclear power plants, served as the basis for the preparation of methods for the solidification and fixation of waste; *A study on reactions of coal chemical structures with model polymers mixtures leading to hydrogen formation,* as part of which process conditions were determined for the maximum production of hydrogen from waste polymers; and *The use of ashes from biomass combustion and its conversion to easily applicable fertiliser – a complex study of advantages and risks*, assessing the benefits and risks related to the use of ash from biomass combustion to prepare easy-to-apply and environmentally-friendly fertilisers and determining factors which influence the quality of these ashes, together with methods of processing these ashes into environmentally-friendly fertilisers.

Another important project on the design and application of advanced melting technologies and melting spaces for various types of glass with a high specific output and low thermal losses was prepared under the name *Advanced glass production technologies*. The causes of changes in the structure of glasses which lead to vacancies, new components and phases were researched as part of the project entitled *Physical properties of glasses designed for applications in the infrared region of the spectrum and memory devices*.

Since 2015 the department of Material Structure and Properties has been working along with other CAS research institutes on the topic of *Fuels for efficient and clean combustion* as part of the *Efficient transformation and storage of energy* research programme.

The outstanding staff of the department, not only in 1993–2017, besides its long-standing head Pavel Straka and the current head Jaroslav Kloužek, also include Jaroslav Buchtele and Václav Káš, who has been in the Institute since 1954, i.e. for more than 60 years. Jaroslav Kloužek has been working on research of glassmaking technologies, while Pavel Straka is focused on environmental technologies and organic chemistry and Václav Káš conducts research into the development of methods of thermal decomposition of materials. Jaroslav Buchtele was a leading coal technology specialist.

Device for setting up magnets into blocks with high magnetic field values, patented in the USA, undated. Photo by unknown author.
IRSM.



US007796001B2

(12) **United States Patent**
Žežulka et al.

(10) **Patent No.: US 7,796,001 B2**
(45) **Date of Patent: Sep. 14, 2010**

(54) **METHOD OF FORMING MAGNETIC BLOCKS AND EQUIPMENT FOR CARRYING OUT THAT METHOD**

(75) Inventors: **Václav Žežulka**, Mníšek pod Brdy (CZ); **Pavel Straka**, Praha 9 (CZ); **Václav Soukup**, Strakonice (CZ)

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(58) **Field of Classification Search** 335/219, 335/285, 296, 297, 298, 302, 303, 306; 210/94, 210/95, 222, 223, 695; 123/536, 537, 538, 123/539; 184/6.25

See application file for complete search history.

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(57) **ABSTRACT**

In forming magnetic blocks, a first permanent magnet may be lowered to the bottom of an upwardly open vessel, the vessel may be already filled or may be then filled with liquid and, while forcefully maintaining the first permanent magnet in that position, further permanent magnets are gradually inserted into the vessel in a direction perpendicular to their resulting joint contact surfaces, where the adjacent surfaces of the superimposed permanent magnets have an opposite polarity, while during insertion of a further permanent magnet, the liquid is drained from the space in the vessel under that inserted magnet, whereby the motion speed of the inserted magnet is controlled as it bears down on the permanent magnet lying beneath it. The equipment for carrying out the method may comprise a vessel whose interior cross-section corresponds with clearance to the outline of the assembled permanent magnets, where sockets with regulating valves may be arranged along the height of the vessel, spaced so that their lower edges always lie above the upper surfaces of the assembled permanent magnets, and where all the parts are of non-magnetic material, while the bottom of the vessel may be furnished with a means for exerting an attractive force on the lowered permanent magnets.

13 Claims, 1 Drawing Sheet

Department of Seismotectonics

The department of Seismotectonics has had this name since 2013; however, its scientific activities directly follow up on the research carried out by the previous department of Seismology, established in 2006 on the foundations of the Geodynamics department. In the 1970s and 1980s it was focused on the theoretical research of earthquake hypocentres and the propagation of seismic waves, and on geophysical measurements in mines, emphasizing the use of seismic and seismo-acoustic methods. The main topics were rockbursts, which posed a risk for the mining activities in the coal mines in North Bohemia, around Ostrava and Kladno, and the ore mines

Gathering geoelectric data around the Temelín nuclear power plant, undated. Photo by unknown author. *IRSM.*

Seismic monitoring in Třeboň, undated. Photo by unknown author. *IRSM.*

Construction works on the Ostaš seismic station in 2003. From left, Jaroslav Štrunc, Petr Kolínský, Lukáš Čermák, Petra Štěpančíková and Vladimír Stejskal. Photo by unknown author *IRSM.*

Seismic station in southwest Iceland, part of the REYKJANET network operated by the Institute of Geophysics and the Department of Seismotectonics of the IRSM, undated. Photo by unknown author. *IRSM.*

in Příbram, and later also seismic risks for nuclear power plants, checks on adherence to disarmament treaties using seismic monitoring and research into seismic swarms in West Bohemia. At the same time the department was already developing its own seismic instruments which enabled extensive field measurements especially in mining areas.

Many outstanding scientific personalities contributed to the work of the department before 1989. Besides those who remained with the department for a long time, including the head Vladimír Roček, the later director of the IRSM Vladimír Rudajev, Ludvík Mužík, Jiří Buben and Milan Brož, these also included the current head of the Seismic department at the CAS Geophysical Institute Jan Šílený; the leading theoretical seismologists Luděk Klimeš, who now works at the Faculty of Mathematics

Leo Eisner in the Savuka mines, South Africa at a depth of 3.7 km. The Savuka mines are among the deepest in the world. Undated. Photo by unknown author.
IRSM.

and Physics of Charles University; Bohuslav Růžek, a leading scientist at the CAS Geophysical Institute; Jan Vilhelm, the director of the Institute of Hydrogeology, Engineering Geology and Applied Geophysics of the Faculty of Natural Sciences of Charles University; and his colleague Tomáš Fischer.

In the 1990s there was a certain phasing-down when, as a result of the markets and borders opening, and also due to the low salaries in the former Academy of Sciences, many promising scientists left to work in the private sector or went abroad. However, a turning point came at the beginning of the new millennium. Staff numbers increased thanks to newly hired young scientists and the return of renowned researchers. In 1997, for instance, Jiří Málek came back to the Institute from the private sector and in 2003 became the head of department, after which the Modelling Laboratory led by Jiřina Trčková became part of the departement.

The department has also participated in deeper domestic and international collaboration focused on research into the structure of the earth's crust using passive as well as active seismic experiments. In cooperation with the CAS Institute of Geophysics, the Webnet seismic network was built to study seismic swarms in Western Bohemia. A seismic network was put in operation in the surroundings of an underground gas reservoir in the Příbram area and in the seismically active area in Eastern Bohemia, which was followed by the installation of similar facilities in Slovakia, Bulgaria, Iceland, Indonesia and Ethiopia. A programme was successfully launched for the development of the Institute's own seismic stations, including a unique instrument for rotational seismology, the so-called Rotaphon.

The department's staff also now began to include renowned foreign seismologists or those active in foreign countries, thanks to the improved financial situation and opportunities of the Institute. After 15 years of successful work in the USA and Great Britain, Leo Eisner returned to the Czech Republic. He was behind the new topics, developing methods of induced seismicity on crude oil and natural gas extraction, and a laboratory dedicated to this research was established. In 2014, the Italian seismologist Giancarlo Dal Moro became the department head, and is now accompanied by two other foreign scientists from Poland and Slovakia. The staffing ratio has a positive trend, as women under 40 make up 50% of the department's employees with a PhD degree.

Since April 2017 the department has again been headed by Jiří Málek. The main scope of activities is both in theory, namely seismic source, propagation of seismic waves, especially surface waves, and their attenuation, seismic swarms, the rotational components of seismic waves and the induced earthquakes theory, and in practical solutions, such as computation of the seismic hazards of Czech nuclear power plants, seismic safety in the production of geothermal energy and in the extraction of crude oil and natural gas.

The department of seismotectonics is well equipped with instruments that have been mostly developed internally. This allows the department to be involved, on a broad scale, in seismic measurements at home and abroad. Regular engagements are assigned, for instance, from ČEZ, the key energy producer, which orders expert statements on the seismic safety of nuclear power plants. A considerable amount of work, also in the future, is involved in participation in the RINGEN research infrastructure focused on the use of geothermal energy, and participation in the CzechGeo system for monitoring geophysical fields.

An extensive reconstruction of the premises of the IRSM, launched in 2018, should provide the department with suitable conditions for the development of its promising activities.

Department of Neotectonics and Thermochronology

As of 1 January 2015 a new department of Neotectonics and Thermochronology, which was based on the Palaeoseismology and Tectonic Geomorphology group (Petra Štěpančíková, Petr Tábořík, Jakub Stemberk, Jana Šreinová and Věra Primasová) that separated from the department of Engineering Geology, was established.

The new head Petra Štěpančíková was a specialist at the department of Engineering Geology in the then still unused discipline in Central Europe, palaeoseismology, which studies tectonic activities and prehistoric earthquakes from the geological record on morphologically distinct tectonic faults. Research carried out in Spain, Mexico, California, Israel, the Carpathian Foredeep and the Bohemian Massif finds its implication in the currently ongoing re-evaluation of seismic hazards related to the safety of nuclear power plants. At the same time, previously unknown larger earthquakes were identified in the geological past of the Bohemian Massif.

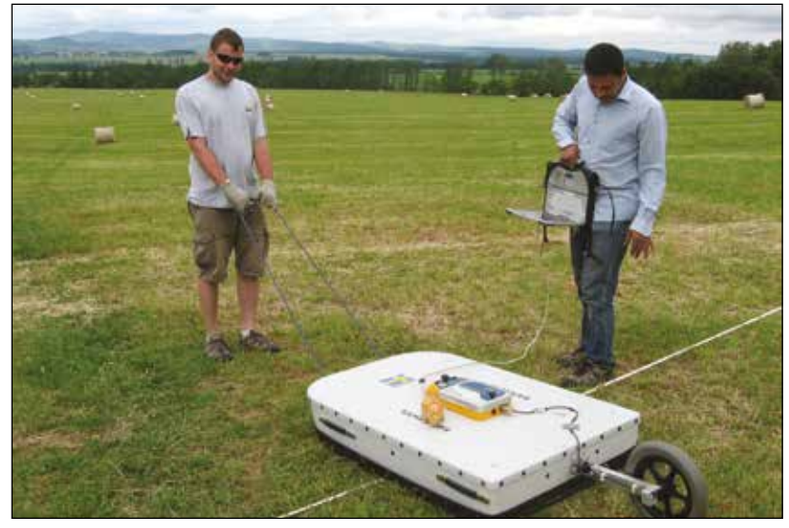
The core of activities of the new department has been geomorphologic and structural-geological research into neotectonic processes, for which a broad range of geophysical methods has also been used. They are used especially to detect subsurface structures without the need for invasive intervention in the landscape. In cooperation with the Institute of Hydrology, Engineering Geology and Applied Geophysics at the Faculty of Natural Sciences of Charles University, various methodologies are

Deformation of Quaternary sediments at the Mariánské Lázně fault, exposed in a palaeoseismic test trench at the Kopanina site near Cheb. Undated.
Photo by Petra Štěpančíková.
IRSM.

tested, in which the department is represented by Petr Tábořík. Jointly with the department of Engineering Geology, research into slope deformations has continued, taking into account the structural and tectonic conditions for their formation and the long-term monitoring of selected slope deformations.

The department's activities also include research into the Cenozoic tectonic evolution, i.e. the Tertiary and Quaternary, in the studied regions and their long-term geomorphologic evolution, for which tectonic geomorphology methods are used, mainly by Petra Štěpančíková, Jakub Stemberk and Jan Flašar. Current seismic activity in fault zones is monitored using TM-71 dilatometers both underground and on the surface at sites in the Czech Republic and in California. The arrival of Miroslav Coubal in the department helped to develop research into actual fault structures and reconstruct palaeostress, especially in the northern and western part of the Bohemian Massif.

Since 2017 Hamid Sana has been an employee of the IRSM thanks to a prestigious post-doctoral internship provided by the Academy of Sciences. His focus on studies of active tectonics and seismicity in areas with active thrust and folding in the Western Himalayas expands the scope of interest of the department of Neotectonics and Thermochronology. He has made contributions in the field of seismic



Geophysical measurement with a geo radar at the Kopanina site, Eger Basin to display subsurface structures around the Mariánské Lázně fault. Undated. Photo by Petra Štěpančíková.
IRSM.

Check upon the TM-71 dilatometer that automatically registers displacement on the Superstition Hills fault at the Imler monitoring station in South California. Undated. Photo by Petra Štěpančíková.
IRSM.

hazards, using stochastic simulation methods, numeric modelling, InSAR interferometry, etc.

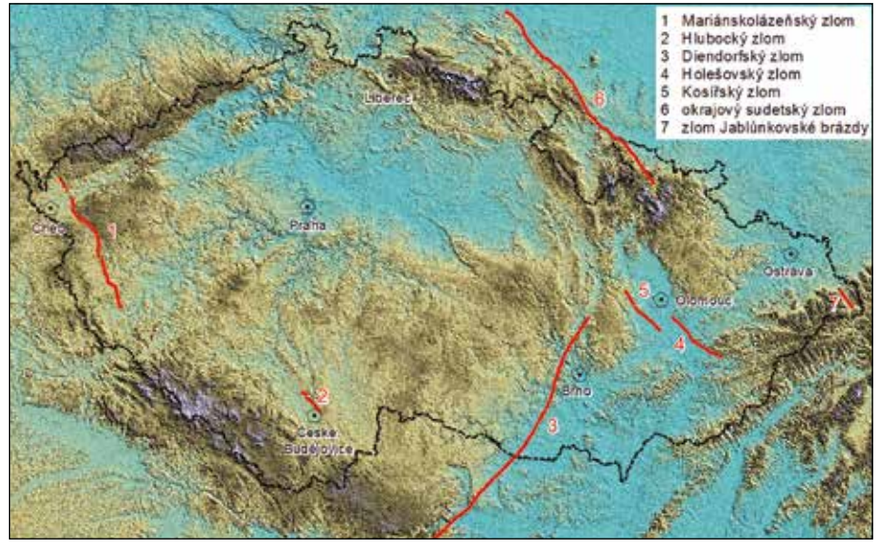
The studies of neotectonics are also complemented with the U-Th/He Thermochronological Laboratory, built in 2015. It was opened in the spring 2016 and has since been used for the thermochronological dating of more recent low-temperature

The AlphachronTM mass spectrometer designed for helium thermochronology, which uses automated extraction of radiogenic helium and can measure its contents in samples of minerals. Undated.
Photo by Petra Štěpančíková.
IRSM.

geological processes which help us to reconstruct and model geological processes related, for instance, to natural hazards, such as Cenozoic tectonic movements and volcanism. Annika Szameitat, an expert in thermochronological dating, was hired as the laboratory head, having received – like Hamid Sana – a prestigious post-doctoral internship of the Czech Academy of Sciences.

During its short history, the department has resolved many projects, often in broad cooperation, such as *Late Quaternary seismogenic faulting and evolution of fault-controlled sedimentary basins in the eastern Bohemian Massif*, which deals with tectonic movements in the area of the Upper Moravian shallow valley and the adjacent parts of the Sudetes, and reveals middle and late Pleistocene activities on the researched faults; *Multidisciplinary Geophysical Research in studies of landforms,* focused on slope geomorphology, fluvial geomorphology and tectonic geomorphology in the area of the Bohemian Massif and the outer Western Carpathians; and the *Late Cenozoic to present-day tectonic activity in the western Eger Rift,* which resulted in publications that present, for the first time in our country, verified major earthquakes in the geological past of the Eger Basin.

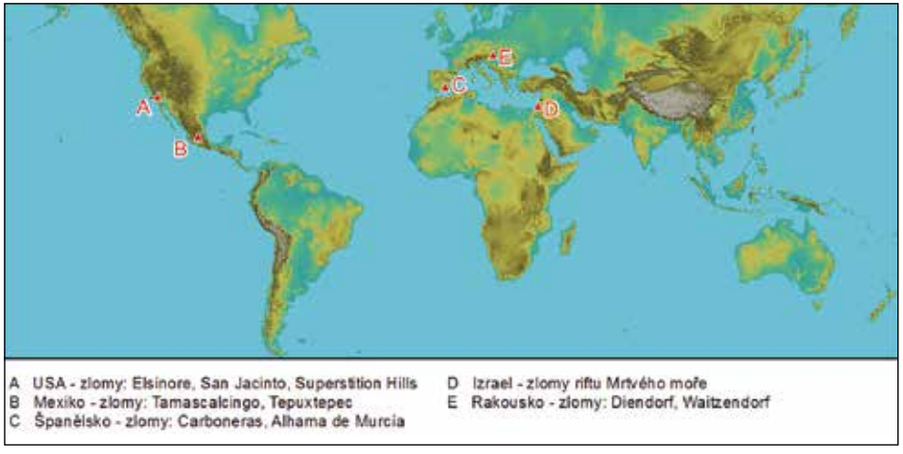
In collaboration with the department of Engineering Geology, the project entitled *EPOS/CzechGeo – A Distributed system of observatory and field measurements and monitoring of geophysical fields in the Czech Republic* is underway (for more, see the chapter on the department of Engineering Geology) and the *Geophysical, hydroclimatic and geodynamic monitoring of* Čeřeniště *active slope deformation – stage II: Proposal for automated TL-ERT monitoring for measurement at one-day intervals*. As part of this, the electrical resistivity tomography method was tested as a tool for long-term geophysical monitoring, experimental measurements were carried out and a methodical solution was proposed to implement an automated system at the site.



Faults in the Czech Republic where the Department of Neotectonics and Thermochronology has carried out or carries out palaeoseismic, geomorphologic or geophysical research.
IRSM.

A project entitled *Palaeoseismological research and identification of the seismic response of bizarre rock formations (precariously balanced rocks, mushroom rocks and rock towers) in the Czech Republic* has been under way since 2015 in a joint effort with the department of Seismotectonics as part of the Natural Hazards – AV21 Strategy programme. It is focused on research of selected potentially unstable rock formations, the computation of their stability and determination of the maximum earthquake magnitude that could have occurred during the existence of these formations.

An important example of international cooperation is the *Assessment of tectonic movement on active faults*, supported by the KONTAKT II programme run by the Ministry of Education, Youth and Sport. Thomas Rockwell from San Diego State University was the foreign partner in this project. The key outcome from the project is knowledge of accelerated displacements on a peripheral Sudeten fault during the last glaciation period in connection with the deformation of the earth's crust as a result of the loading and lightening effects of the glacier. This joint project also initiated the dynamics of cooperation with other scientific institutions in the USA, such as the Colorado University (Roger Bilham) and University of Southern California (Yehuda Ben-Zion).



Sites where the Department of Neotectonics and Thermochronology has carried out palaeoseismic, geomorphologic or geophysical research in collaboration with its foreign partners: USA, Mexico, Spain, Israel, Austria.
IRSM.

Looking back at the development of the department and the team which today makes up the department established in 2015, so far the most valuable success can be seen as being the introduction and development of the relatively young discipline of palaeoseismology in the Czech Republic. Its use has led to the discovery of previously unknown large prehistoric earthquakes in the Bohemian Massif, and the identification of the effects of the load on the earth's crust by the continental glacier which, during the Last Glacial Maximum, resulted in stress changes and accelerated displacements on faults in our country. All this knowledge was used to assess the seismic risk in the Czech Republic, not only as part of the risk assessment of nuclear power plants. The department, which also draws on rich foreign experience in areas with more active tectonics, is a leading institution of its kind and deals with comprehensive models of neotectonic landscape development, where it collates knowledge from tectonic geomorphology, structural geology, geophysics, thermochronology and other geosciences.

In the area of geophysical methods, the department has made a significant contribution to the long-term development of the monitoring of active slope deformations, i.e. not only displacement, but also other geotechnical and physical parameters that provide valuable information on changes in the environment. Besides regular monitoring, experimental measurements have also been made in order to test various measurement configurations. An important result was the design of an optimum configuration for these measurements, according to which the company GF Instruments Brno produced a TL-ERT automated geoelectric monitoring system, which is now able to operate on a continuous basis.

Last but not least, the big success of the department is the establishment of its helium thermochronology laboratory, the only of its kind in Europe east of Germany.

After two years of implementation, testing and resolving operational issues which are common with very sensitive instruments such as mass spectrometers, and which also included the software for a unique instrument known as the Alphachron and the instrument itself, the laboratory is now stable and reliable. It has therefore begun to produce thermochronological data from samples collected in the Czech Republic and many other countries. Owing to its outstanding design and the careful application of the latest laboratory design procedures, Alphachron has excellent blank and sensitivity values. The laboratory has launched international collaboration with more than five countries in the field of thermochronology.[372]

In the future, too, the department of Neotectonics and Thermochronology will make it a priority to expand on the topics with which it has several years of experience and which are among its strengths, and on which it has been collaborating with numerous foreign colleagues and is able to stand up to international comparison. This rich cooperation with leading institutions at home and abroad that specialise in various methods for understanding the neotectonic development of the landscape and geodynamic processes, for instance through the research and monitoring of landslides, research into seismic risks, etc., will continue to strengthen. In cooperation with other CAS institutes, these topics will also be worked on as part of the AV21 Strategy programme towards the professional community as well as the public, especially as regards topics relating to natural hazards.

372 Cf. for instance ŠTĚPANČÍKOVÁ, Petra: Laboratoř pro heliovou termochronologii [Helium Thermochronology Laboratory]. *Vesmír*, 2016, Vol. 95, No. 6 (http://casopis.vesmir.cz/clanek/laborator-pro-heliovou-termochronologii).

VI. JOURNALS

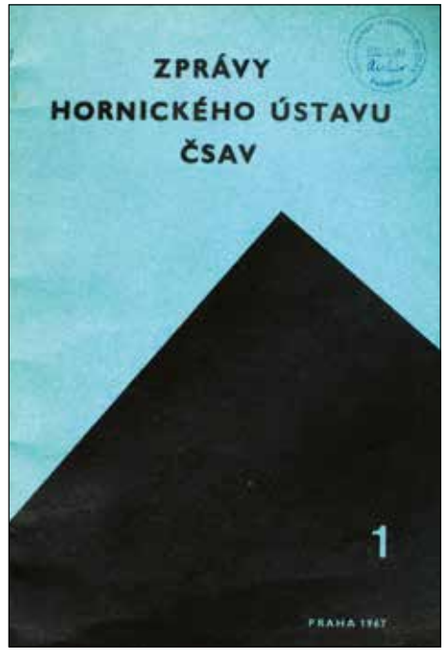
After the establishment of the Mining Institute within the ČSAV, and as its research activities developed, the need arose to launch its own periodical. At first *Proceedings of the Mining Institute*[373] was published in 1959–1961, but it was discontinued for financial reasons. In the 1960s the Institute therefore needed to overcome these difficulties and in collaboration with the Mining Institute[374] in Slovakia *Mining Research Results*[375] (1962–1967) was published by the Slovak Academy of Sciences in Bratislava. In 1967 the Institute renewed its own journal, at first entitled *News from the ČSAV Mining Institute*[376], renamed to *Acta Montana* in 1970. Eventually *Acta Montana* became a certain showcase for the activities of the Institute and remained its regular periodical for several decades to come.

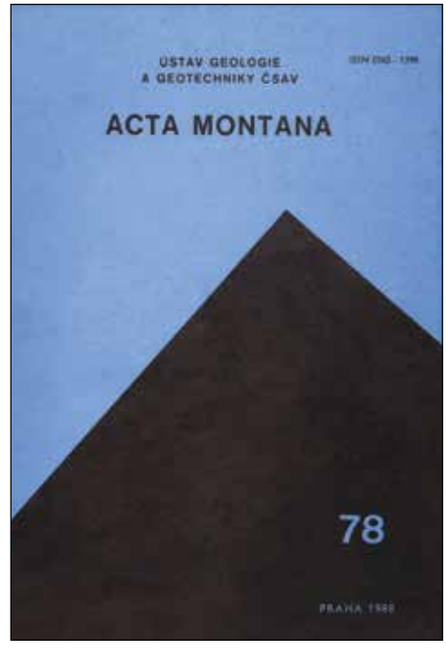
At the beginning of the 1970s *Acta Montana* opened up to the foreign scientific community engaged in the topic of mining, and authors especially from Poland and also the former East Germany and Soviet Union began to publish there, in line with the then political course.

In the early 1990s the journal underwent a major change. The articles began to be published only in English (then with an extended Czech abstract) and the review procedure was always based on two peers, only one of which was allowed from the ČSAV Institute of Geotechnics while the other was preferably from abroad. The scope of the journal was expanded to cover local as well as regional geoscience topics and the development of new carbon materials. Two series of the journal began to be published to reflect upon the professional scope of the papers, namely Series A – Geodynamics (ISSN 1211-1910) and Series B – Fuel, Carbon, Mineral Processing (ISSN 1211-1929). In addition to these, Series AB (ISSN 0365-1398) was published once a year and combined the two different scopes. It included the results of grant projects carried out in the Institute and extended abstracts for theses, dissertations and doctoral theses which were successfully defended by the IRSM staff.

As there was a major decline in mining volumes in the Czech Republic in the 1990s, the topics of the articles were not necessarily always linked with the topic of mining. The original name, *Acta Montana*, therefore slowly ceased to represent the main scope of the journal, and was therefore renamed to *Acta geodynamica et geomaterialia* (ISSN 1214-9705) in 2004. The broader title allowed it to combine both

373 Czech: *Sborník prací Hornického ústavu.*
374 Slovak: Ústav baníctva.
375 Czech: *Výsledky báňského výzkumu.*
376 Czech: *Zprávy Hornického ústavu ČSAV.*





Journals published by the ČSAV Mining Institute and later by the CAS Institute of Rock Structure and Mechanics.
IRSM, library.

the former series and the journal began to be published regularly in four volumes per year.

Currently the *Acta geodynamica et geomaterialia* is an international multi-disciplinary scientific journal for geophysics, geodynamics, geomechanics, geology, geodesy, material engineering, preparation and dressing, research and processing of minerals. Special, but not exclusive, attention is paid to the Central European region. The journal only accepts original articles in English and continues to apply the rule of no less than two anonymous reviewers, at least one of whom must be from abroad. The editorial board has 23 members, 13 of whom are leading representatives of foreign professional readers. The interest of foreign experts in publishing in the *Acta* is proven by the fact that their texts make up a relatively high percentage of the published articles, namely 83%. The authors are mostly from Europe, but the journal is becoming increasingly popular in China, Iran, Iraq and the United Arab Emirates. The full texts of the articles, beginning with Vol. 4 of the year 2007/4, are available in PDF format on the Institute's website and since 2017 also in the Digital Library of the Czech Academy of Sciences, where digital copies of the articles from 1967 onward are also available. The Research, Development and Innovation Council classified *Acta geodynamica et geomaterialia* as an important foreign language journal published in the Czech Republic. In 2007 the *Acta* was indexed in the Science Citation Index Expanded and the Journal Citation Reports/Science Edition, and in 2009 it gained an impact factor. Since 2010 the journal has been available in SCOPUS and has been registered with DOI since 2013.

Since 2012 the IRSM, in collaboration with the University of Chemistry and Technology, has also published an impacted journal entitled *Ceramics-Silikáty*. It was established in 1957 and focuses on the chemistry and physics of silicates and glass, the theoretical principles of their processing including computational methods and advanced technologies in the production of so-called starting materials, and materials based on glass, silicates and cements. The articles are also reviewed by at least two peers and foreign nationals make up two-thirds of the editorial board.

VII. PROSPECTS FOR THE FUTURE

The CAS Institute of Rock Structure and Mechanics has been using this name since 1994; however, its history began back in 1927 with the establishment of the Institute for Scientific Coal Research. Thirty years later a part of the abolished institution formed the basis of the newly established ČSAV Mining Institute, which merged with the Geological Institute in 1979 to form the ČSAV Institute of Geology and Geotechnics. They were split in 1990 to create the renewed Geological Institute and the independent Institute of Geotechnics, which was renamed as the Institute of Rock Structure and Mechanics as of 1 January 1994.

Not even in its recent history has the Institute avoided many changes resulting, as with its predecessors, from political, economic and purely scientific circumstances of various significance. However, it is now a fully professionally established institution with a stabilised staff, boasting many theoretical scientific results as well as their practical applications, acclaimed not only in the Czech Republic but also abroad. The Institute's prospects are therefore linked with a number of grand plans.

The department of **Engineering Geology** will continue working on its two main research topics, i.e. slope deformations and the monitoring of tectonic movement. Accurate and reliable slope deformation monitoring methods will be further developed based on their activities in the České střehodoří area, the Czech Paradise, Western Carpathians, and also in Peru, the Canary Islands and Spitsbergen. The monitoring network in the Czech Republic will receive more of the latest instruments which, when connected to the network, could yield their first results in 3–5 years. The thermal influences on the stability and development of rock block displacements and weathering processes in rocks will also be monitored.

As part of the monitoring of tectonic movement, the development and automation of the faultproof and reliable TM-71 instrument for fault displacement measurements will continue in order to gather data, enhanced with other monitored variables such as temperature, pressure, relative humidity, gas concentration, etc., at an increased measurement frequency and accuracy, and to provide the subsequent automated processing of the gathered data. Using automated monitoring, the TecNet monitoring network will be updated and improved, now comprising sites in North and South America, namely the USA and Peru, Asia (Kyrgyzstan) and Africa (Ethiopia and the Canary Islands). The planned increased frequency of data collection will enable quantitative assessment of the geodynamics of selected researched areas.

The department's involvement in the AV21 Strategy – 'Top Research in the Public Interest' programme lies in resolving practically oriented specialist matters concerning, for the most part, rock stability, slope deformation and the subsequent remediation measures.

The nearest future of the **Department of Composites and Carbon Materials**

will be linked with the research and development of composite materials for applications in medicine, namely in tissue engineering and various forms of drug carriers. Special emphasis will be still placed on basic research in the area of isolating collagen and calcium phosphates in their natural form. The primary objective is to create biological or close-to-biological materials with properties corresponding to the native tissue.

The development of resorbable nanostructured multicomponent layers is focused on expanding knowledge of the possibilities of preparing these materials and methods of applying them to metallic alloy surfaces, and on the direct use of this knowledge in developing a new type of interface for contact between bone joint implants and the bone surface. Implants with biomimetic surfaces containing drugs, e.g. antibiotics, could in the future become a first-choice medical device in orthopaedics and traumatology, especially in the treatment of patients who may justifiably be expected to have an inflammatory response, which is the cause of failure of the current treatment methods.

As regards the research and development of composite materials for high-temperature use, the department will focus on fibre composites with elevated heat and fire resistance. The objective is primarily to find the most suitable fibre reinforcements in silicate fibres; however, attention will also be paid to basalt fibres which, for the time being, appear to be most prospective for the given purposes.

In composite matrices, efforts will be made to find the best matrix precursor, possessing high material yield, i.e. low loss on pyrolysis, and also good adhesive properties to the silicate fibre used in order to achieve high strength and toughness. In accordance with the global environmental protection trends, solvent-free polysiloxane matrix precursors will also be included in the research. Last but not least, the department's staff will work in an effort to find a more universal production technology for Si-O-C ceramic foams for use under high temperature, which could be applicable to a larger group of polymer precursors than now.

The department of **Geochemistry**, whose activities spread across several areas of research, will continue to strive to maintain its research diversity. Besides traditional topics, namely studies of coal and organic matter in sediments, the characterisation of their source organisms, conditions and phenomena in the palaeoenvironment, matters related to weathering and thermal processes in sedimentary rocks and the importance and use of humins, the department will continue to prioritise research into the earth's surface events which are affected by the results of human activities and which subsequently influence ecosystems and human health. This includes, for instance, the characterisation and properties of carbon particles in ashes and fallouts, studies into the composition and structure of coal waste from various dumps and determining its influence on the environment, research into the alteration and destruction of construction materials in the environment or studies of selected materials for their sorption of chemical compounds and elements.

The current topics in the area of environmental quality include the presence of carbon dioxide in the air and the use of new fossil energy sources. The subject of research will therefore also include studies into the potential gas-yielding capacity of methane in shale formations as well as reduction of carbon dioxide through its entrapment and long-term storage in suitable reservoirs, especially coal measures and shale deposits.

In the organisation of international cooperation, the department's priority will be to support pro-active collaboration within the International Committee for Coal and Organic Petrology, for instance through organising some of the approaching annual member reunions.

The department of **Material Structure and Properties** will perform research into chemical processes for new glass materials and advanced methods of their preparation, and research into the processing of waste materials. A special task will be the study of magnetic materials for applications with no electricity source. The research will be carried out by the Inorganic Materials Laboratory and Environmental Technologies Laboratory.

The *Inorganic Materials Laboratory* will focus on technologies used to prepare glass and research into special glass types. The principles of creating glass from precursors will be formulated and their effective preparation predicted, especially in vitrification and industrial processes that are similar in nature but differ in the final product. While the vitrification process fixates substances that have no momentary use and could be harmful, the industrial process provides objects of practical use. What they have in common are multi-action processes, research of which will provide a description of the complex of actions that provides the conditions for the realisation and effective organisation of the process, and in the preparation of large-sized glass also the need for new structures. Understanding some actions will have a major influence on the process as a whole, such as with glass foaming, an understanding of which will favourably transform the vitrification process, and with the flow of glass melt in the melting space, an understanding of which may change the size and character of industrial spaces. The knowledge will also be transferable to glass prepared on a small scale, such as flawless glass of high chemical purity and special optical properties, or highly homogenous coloured glass.

The *Environmental Technologies Laboratory* will focus on methods of preparing waste materials and proposals for technological processes, and on the study and use of magnetic materials. Organic waste materials will be converted thermally while optimising the process conditions with the aim of producing substances of high utility value, such as clean fuels, power gases, sorbents, fertilisers and mixtures for the preparation of chemicals. The processes will be described with reaction kinetics parameters, the balances and chemical as well as structural characteristics of the products. Inorganic waste materials will be solidified and inhibited in a geopolymer matrix under various setting conditions. After the optimisation of the geopolymer matrix composition, the mechanical properties and structure will be defined for the newly produced materials, and the waste inhibition rate will be tested through leaching. Other samples will be used to test resistance to acids, alkalis and high temperatures. With magnetic materials, the possibility of using sets of permanent

magnets will be researched. The primary approach will be to design these sets with a strong magnetic field potential.

The department of **Seismotectonics** now has extensive observation material from seismic measurements, on which it will base its theoretical and application research in the very near future. The basic intention is to maintain and further develop all observatories that are now operated, to be complemented with a new local seismic network in the vicinity of Litoměřice in 2018 for the purposes of geothermal power as part of the RINGEN project. Theoretical research will continue in the department's traditional fields, namely the propagation of surface waves, rotational seismology, research into seismic centres, palaeostress and induced seismicity. From the application point of view, it appears to be highly promising for the department to file two of its own patents, namely the development of a new rotational seismograph ("Rotaphon") and induced seismicity detection. Studies of the seismic hazards of Czech nuclear power plants, both existing and planned, have an impact on the whole of society. They will be carried out in cooperation with ČEZ and also as part of the Sigma 2 international project. What also appears promising in this context is the research of unstable rock formations in the Czech Republic as indicators of seismic hazards.

Foreign cooperation will be developed especially with Slovakia, Iceland, Italy and the USA, and will be complemented with the Czech engagement in development aid in the field of seismology, especially in Ethiopia and Bosnia and Herzegovina. Most recently, joint projects in Chile, Indonesia and Georgia are being considered or discussed.

The plans of the department of **Neotectonics and Thermochronology** are, and will continue to be, linked to tectonic movement from the Tertiary to the present. The sites to be studied especially include Western Bohemia near the Mariánské Lázně fault and the Eger Basin, and the Krušné Mts. fault zone with the Ooher rift. Collaboration with foreign countries has been underway for several years, such as in California, Spain, Mexico, Israel and Germany. As part of the department's research activities, approaches of a palaeoseismic nature will continue to be developed, together with geophysical survey methods and thermochronology, while using modern instrumentation for field and laboratory work.

In cooperation with other institutions, the department's staff will continue compiling the database of active faults, to be used, amongst others, to assess and compute seismic hazards. Attention will also be paid to the development (and application) of modern methods of seismic risk assessment in selected, seismically highly active regions, such as Cashmere in the Western Himalayas, and their susceptibility to secondary earthquake effects, such as liquefaction.

Selected areas will then be subject to geodynamic development research, emphasizing their structural and tectonic predisposition. Using thermochronological dating, reconstructions in time and space and modelling of low-temperature geological processes will be carried out.

As can be seen, in their work all the departments draw on the rich experience and excellent results of their activities, not only in refining traditional disciplines whose potential is by far not fully used, but also in response to global developments and society's latest needs and in order to develop and strengthen the position of new disciplines, for which considerably more staff are required for the research teams. A concept-based generational exchange, stemming from the cooperation of the experienced senior staff and promising young doctoral and post-doctoral graduates, is proving fruitful. The building up and expansion of the necessary experimental background in the premises of the former Vydra Consumables Factory only serves as proof of the modern character of the institution and its readiness to successfully face the topical challenges of the present and the future.

RESOURCES AND BIBLIOGRAPHY

Archival Collections

Original Czech descriptors given in brackets

A AV ČR Archives: Archives of the Czech Academy of Sciences, Prague (Archiv Akademie věd České republiky)

A AV ČR Archives, 5th Section of the ČSAV – Technical Section collection (fond V. sekce ČSAV – technická)

A AV ČR Archives, Basic ČSAV Institute Documents collection (fond Sbírka základních dokumentů ČSAV)

A AV ČR Archives, Central Committee for the Remedy of Injustice collection (fond Ústřední komise pro nápravu křivd)

A AV ČR Archives, ČAVU collection (fond ČAVU)

A AV ČR Archives, ČSAV and CAS Reportages collection (fond Reportáže ČSAV a AV ČR)

A AV ČR Archives, ČSAV Institute for Geology and Geotechnics collection (fond Ústav geologie a geotechniky ČSAV)

A AV ČR Archives, ČSAV Mining Institute collection (fond Hornický ústav ČSAV)

A AV ČR Archives, ČSAV Presidium collection (fond Prezídium ČSAV)

A AV ČR Archives, ČSAV Presidium Board collection (fond Výbor Prezídia ČSAV)

A AV ČR Archives, ČSAV Science Planning Institute collection (fond Ústav plánování vědy ČSAV)

A AV ČR Archives, Government Committee for Building Up of the ČSAV collection (fond Vládní komise pro vybudování ČSAV)

A AV ČR Archives, Institute Files collection (sbírka Karty pracovišť)

A AV ČR Archives, Masaryk Academy of Labour collection (fond Masarykova akademie práce)

A AV ČR Archives, Personal Files of ČSAV Members collection (fond Osobní spisy členů ČSAV)

A AV ČR Archives, Photographs collection (fond Fotosbírka Archivu AV ČR)

A AV ČR Archives, Scientific Advisory Board for the Power Industry collection (fond Vědecké kolegium energetiky)

A AV ČR Archives, Stanislav Landa collection (fond Stanislav Landa)

ABS Archives: Security Services Archive, Prague (Archiv bezpečnostních složek)

ABS Archives, Investigation Files – Headquarters collection (fond Správa vyšetřování StB – vyšetřovací spisy: Centrála)

ABS Archives, Registry of Persons of Interest (Evidence zajmovych osob)

ČVUT Archives: Czech Technical University Archives, Prague (Archiv ČVUT)

ČVUT Archives, Czech Technical University collection (fond Česká vysoká škola technická)

ČVUT Archives, College of Chemical Engineering and Technology collection (fond Vysoká škola chemickotechnologického inženýrství)

IRSM: CAS Institute of Rock Structure and Mechanics, Prague (Ústav struktury a mechaniky hornin AV ČR, v. v. i.)

IRSM, Photographs collection (sbírka fotografií)

NA Archives: National Archives, Prague (Národní archiv)

NA Archives, Czechoslovak Mines, national enterprise, General Directorate collection (fond Československé doly, n. p., generální ředitelství, Praha 1945–1950)

NA Archives, Mine Owners' Association collection (fond Svaz majitelů dolů)

NA Archives, Ministry for Fuels and the Power Industry collection (fond Ministerstvo paliv a energetiky)

NA Archives, Ministry of Public Works collection (fond Ministerstvo veřejných prací)

NA Archives, Police Headquarters II collection (fond Policejní ředitelství II)

NA Archives, Presidium of the Government of the Czech Socialist Republic / Czechoslovak Socialist Republic collection (fond Úřad předsednictva vlády ČSR/ČSSR)

NTM Archives: National Technical Museum Archives, Prague (Archiv Národního technického muzea)

NTM Archives, František Špetl collection (fond František Špetl)

NTM Archives, Vydra Consumables Factory collection (fond Vydrova továrna pozivatin)

SOkA Zlín Archives: District Archives, Zlín (Státní okresní archiv Zlín)

SOkA Zlín Archives, Zlín Photographs collection (sbírka fotografií Zlín)

Archives of the Municipal Transport Company of the City of Prague (Archiv Dopravního podniku města Prahy)

LANGHANS PRAHA FOUNDATION Archives, Prague (Archiv Nadace Langhans Praha)

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RESÜMEE

Die vorliegende Publikation ist eine zusammenfassende Verarbeitung der neunzigjährigen Geschichte des Instituts für Struktur und Mechanik der Gesteine der Tschechische Akademie der Wissenschaften (öffentliche Forschungsinstitution) a seiner Vorgänger (Institut für Kohlenforschung, Institut für wissenschaftliche Forschung von Kohle und Minerale, Institut für Forschung und Nutzung der Treibstoffe, Bergmannsinstutit der Tschechoslawakischen Akademie der Wissenschaften, Institut für Geologie und Geotechnik der Tschechoslowakischen Akademie der Wissenschaften, Institut für Geotechnik der Tschechoslowakischen Akademie der Wissenschaften, Institut für Geotechnik der Tschechischen Akademie der Wissenschaften) im Kontext grundsätzlicher historischer Ereignisse, die sowohl die wissenschaftliche Forschungstätigkeit, als auch den normalen Betrieb der folgenden Institutionen wesentlich beeinflussten. Die Bearbeitung der Publikation forderte eine Forschung der umfassenden (schriftlichen und bildlichen) Archivquellen, dessen Zeugnis mit den Zeitzeugenaussagen ergänzt wurde. Die Kapitel, die den Zeitraum der letzten cirka zwanzig Jahren beschreibt, verfassten die gegenwärtigen Institutsmitarbeiter, die die detailierte Beschreibung der aktuellen Situation ihrer Abteilungen um Perspektive der einzelnen Fachrichtungen im Rahmen des Instituts ergänzten.

Den roten Pfaden der historischen Institutionsentwicklung stellt zweifellos die bäuliche und architektonische Entwicklung des Sitzes des Instituts für Struktur und Mechanik der Gesteine dar, der die organisatorische Forschungs – und Perosnalkontinuität der hier wirkenden Institute zusammenbildet. Auf der Stelle des heutigen weiträumigen und zum Teil unter dem Denkmalschutz stehenden Komplexes stand seit 1930er Jahren – in Wirtschaftsräumen zugehörten zum Gehöft Rokoska – eine Zuckerfabrik. Die wurde im Jahren 1910 – 1912 in gegenwärtige Form umgebaut, der Umbau erfolgte dank dem Fabrikbesitzer und Erforscher František Vydra (1869 – 1921), der auf dieser Stelle seine Lebensmittelfabrik ausbaute. In der zweiten Hälfte des 20. Jahrhunderts (nach Vydras Tod) kaufte den ganzen Komplex das neu enstandene Institut für wissenschaftliche Forschung von Kohle, also eine Institution, die man als den ersten direkten Vorgänger des heutigen Instituts für Struktur und Mechanik der Gesteine bezeichnen kann.

Der Gebäudekomplex in der Straße V Holešovičkách 41, das von der Heydrich-Kurve gerahmt wurde, ist seit 1920er Jahren das Zentrum der wissenschaftlichen Forschungen geworden, die mit der Kohlenförderung, Bearbeitung und dessen Nutzung verbunden sind. Es wurde vor allem nach dem Jahr 1989 allmählich um neu entstandene Fachrichtungen erweitert, die sich mit Gesteinen beschäftigen. Einige von denen beschäftigen sich weiter mit den Forschungen und Nutzung von Koh-

lenstoff, also dem Grundelement der Kohle, nur aus einer anderen Sichtweise und auf einem anderen Niveau. Weitere mit der Entwicklung der Oberfläche oder den Tiefen der Erdrinde verbundene Fachgebiete befassen sich u. A. mit Erdbebenforschungen oder mit Entwicklung von Georelief in seinen gefährlichen Formen, wie z. B. mit Hangbewegungen, mit extremen Polarbedingungen und Hochgebirgsgebieten. Weitere Aktivitäten befassen sich mit der Nutzung von Geothermalenergie. Gesteine sind zugleich Rohstoffe, deswegen werden ihre Eigenschaften, Bearbeitung, Verarbeitungstechnik als auch die resultirenden Materialien intensiv geforscht. Neulich wurden unter die Forschungsaktivitäten noch enviromentale Technologien eingeschlossen.

Science below Rokoska Hill

History of the Institute of Rock Structure and Mechanics, v. v. i., and Its Predecessors

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