

Career paths of women in speleology: A historical analysis on the example of the Earth scientists Elise Hofmann & Maria Mottl

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Abstract

This paper offers novel insights into the career paths of early female scientists engaged in the study of caves, their fields of action and networks involved. Based on archive research on the Austrian paleobotanist Elise Hofmann (1889–1955) and the Hungarian paleontologist Maria Mottl (1906–80), the article uses their biographies as analytical tools for understanding gender-specific forms of cooperation and discourses in speleological communities. Working as a school teacher, Hofmann completed her doctorate in botany in 1920, specialized in the analysis of fossil plant remains as well as cave flora and received an extraordinary professorship at the University of Vienna during the Third Reich. Holding a PhD in paleontology, Mottl, in turn, obtained the position of a section geologist at the Hungarian Geological Survey, became secretary of the Hungarian Speleology Society, and was able to continue her activities as curator at the Museum Joanneum in Graz after 1945. Both careers are closely linked to major archaeological and paleontological cave excavations conducted in Central Europe during the inter- and post-war period, the scientific-political circles and goals involved in them.

Résumé

Cet article offre un nouvel éclairage sur les parcours professionnels des premières femmes scientifiques engagées dans l'étude des grottes, leurs champs d'action et les réseaux impliqués. Basé sur des recherches d'archives sur la paléobotaniste autrichienne Elise Hofmann (1889–1955) et la paléontologue hongroise Maria Mottl (1906–80), l'article utilise leurs biographies comme outils analytiques pour comprendre les formes de coopération et les discours basés sur le genre dans les communautés spéléologiques. Travaillant comme institutrice, Hofmann a obtenu son doctorat en botanique en 1920, s'est spécialisée dans l'analyse des restes de plantes fossiles et de la flore des grottes et a reçu un poste de professeur extraordinaire à l'Université de Vienne pendant le Troisième Reich. Titulaire d'un doctorat en paléontologie, Mottl obtient à son tour un poste de géologue au Service Géologique Hongrois, devient secrétaire de la Société Hongroise de Spéléologie et peut poursuivre ses activités de conservateur au Musée Joanneum à Graz après 1945. Ces deux carrières sont étroitement liées aux grandes fouilles archéologiques et paléontologiques menées dans les grottes d'Europe centrale pendant l'entre-deux-guerres et l'après-guerre, ainsi qu'aux milieux et objectifs scientifiques et politiques qui y ont participé.

1. Introduction

For a long time, interest in the history of cave science stemmed mostly from speleologists themselves. Trevor Shaw, Karl Mais, or Arrigo Cigna, among others, have dealt with a broad range of historical topics related to caves, i.e. scientific concepts, exploration, and popular culture. Only recently, caves and the underground space in general became a field of interest for the social sciences and humanities. Topics increasingly address aspects of cooperation, boundary work, and exclusion due to political, social, or scientific practices. Likewise, contributions of women and questions of gender have become a focus of interest in the history of speleology. Notable works on this subject come from Trevor SHAW (2007), who studied the life of Poldi Fuhrich (1898–1926), a female cave explorer from Salzburg. An article by Stephan KEMPE *et al.* (2006) covers the first descriptions of caves by women at the end of the eighteenth century. Most recently, Bernard CHIROL (2021) contributed to the subject with his extensive work on "*Heroines of the caverns*". The history of women has thus developed from a

marginal topic to one of central interest, also of the UIS Congress. So far, the history of women in speleology has focused on individual female "pioneers" in cave exploration. Its focus rarely shifted towards general female fields of action, discourses, structural phenomena, historical change, or the diversity of women who have been active in speleology. On the one hand, it is necessary to analyze which roles women researchers took on in scientific discourse and in practice, which obstacles they confronted and which strategies for success they developed. On the other hand, it is a matter of question whether gender only played a role as an exclusion criterion. Furthermore, it can be asked why some biographies are highlighted in historiography while others remain invisible.

This article contributes to filling this gap on a micro-historical level by analyzing the career paths of two lesser known female Earth and cave scientists of the early twentieth century. These two women are the paleobotanist Elise Hoffmann, born in Vienna in 1889, and the paleontologist and

geologist Maria Mottl, born in Budapest in 1906. On the basis of the lives of these two women, we will analyze gender-

specific forms of cooperation and careers and point out patterns of narration in the reception of female scientific work.

2. Social and institutional conditions for the participation of women

Historians working on the role of women in Earth sciences have to deal with a lack of visibility of their achievements in historical sources. Women cave scientists rarely published, were not mentioned (by name) in reports or depicted on photos. Obituaries appeared only in a few cases, and changing surnames due to marriage customs add to the difficulty of identifying women. The social and institutional conditions of the fields, in which Hofmann and Mottl were equally engaged, were geared towards male striving for success. However, since the nineteenth century at the latest, women have been present in the field and even participated in demanding cave ventures.

Martina KÖLBL-EBERT (2007) analyzed the different settings in which women were active in geological research in nineteenth century German and British Empires. Women took the roles of assistants, secretaries, collectors, draughtswomen, participants in field research, or managers of their husbands' scientific legacy. In Germany, stricter gender roles prevailed, albeit without excluding women's participation entirely. In British paleontology, by contrast, wives, daughters, and unmarried sisters formed the invisible "*infrastructure of male research*" (KÖLBL-EBERT & TURNER, 2016).

However, there were considerable regional differences: In London, the Royal Society and the Geological Society were required by law to admit women in 1919, while the first female geologist was not employed by the British Geological Survey before 1969. This was the case despite an early admission for women to university and a significant number of graduates. In the Habsburg Empire, by contrast, scientific societies, founded since the 1850s, became inclusive areas for female scientific activity – decades before women were admitted as regular students to universities. Already in 1886,

over 15% of the membership of the Vienna Speleological Society consisted of women, including women's rights activist Marie Rosenthal (1854–1919) or industrialist Louise Poschacher (1857–1933). By 1910, five percent of the Geological Society's membership was female.

Regarding the employment of women as field geologists, the difference with the British Empire is even more striking. Individual postdoc women, among them Hilda Gerhart (1861–1963), were hired for geological mapping tasks even before 1914. Compliance with socio-political conditions, namely during the fascist regimes in Austria and Hungary, provided (non-Jewish) women further career opportunities. In 1930, Mottl was already employed as paleontologist at the Hungarian Geological Survey, and in 1942, Irmtraud Wiesböck (1915–99), the first female geologist, took up her post at the Vienna branch of the Reich's Geological Survey.

Nevertheless, writing a PhD thesis in geology does not appear to have been an attractive option for women at the University of Vienna. Between 1897 and 1937, there were 211 women obtaining a doctorate in botany, 106 women in zoology, yet only four women in geology and mineralogy. These four women, one of which being Gerhart, all followed the path of either working as school teachers or dedicating themselves to the scientific career of their husbands. Furthermore, there were no women holding a PhD in paleontology, a discipline under the influence of Othenio Abel (1875–1946), university professor and president of the Vienna Speleological Society, and his successor and son-in-law Kurt Ehrenberg (1896–1979). Still, Hofmann and Mottl both achieved a career in this field of research. In the following we will examine the specific career patterns of their biographies and the scientific-political networks involved.

3. Elise Hofmann

Born as the daughter of a school inspector, Hofmann worked as a teacher in a Vienna middle school her entire life (MATTES, 2019) (Fig. 1). After a doctorate in plant physiology in 1920, she became one of the leading paleobotanists in Austria. As she did not hold a university position, she had to build a private laboratory. Her career was closely tied to her academic teacher Richard von Wettstein (1863–1931), Vice-President of the Vienna Academy of Sciences, to the aforementioned paleontologist Abel, and to Fritz Knoll (1883–1981), professor of botany and later National Socialist rector of the Vienna University.

Although Wettstein's evaluation of Hofmann's PhD thesis was not overly positive, he advised her to turn to the study of cave flora and paleobotany. Wettstein, a strong promoter of speleology, thus paved the way for Hofmann's participation in the state-funded excavation of the Drachenhöhle cave (Styria). Abel and Georg Kyrle (1887–1937), later first professor of speleology, led this large-scale endeavor. Hofmann turned out to be the only woman among the 24 contributors to the two-volume Drachenhöhle monograph,



Figure 1 : Elise Hofmann at the *École Pratique des Hautes Études* in Paris, 1954. Source: Austrian Geological Survey.

which became the basis for the accreditation of speleology as an academic discipline. As Abel was dismissed as university rector due to his support of violence towards Jewish and catholic students in 1934, Hofmann turned towards Knoll, who supported her habilitation. After the annexation of Austria to the German Reich, Hofmann applied for membership of the National Socialist Party and was accepted in 1941. Thanks to Knoll's promotion, Hofmann finally obtained an extraordinary university professorship two years later, but had to continue to work part-time as a school teacher.

The study of cave flora, which Wettstein had proposed to Hofmann, turned out to be a convenient niche area for her since a chair of speleology was established at the University of Vienna in 1929. Meanwhile, the low level of professionalization in speleology enabled Hofmann to interact with "non-academic" speleologists such as Friedrich Morton (1890–1969) and Franz Mühlhofer (1881–1951) as equal partners. In addition, she was able to publish articles in (popular) scientific journals of the Vienna Geological, Zoological-Botanical and the Speleological Societies without having to fear rivalry or criticism.

Even if Hofmann never mentioned gender issues in relation to her career, it was indeed a matter of interest in reports

by her colleagues. KNOLL (1935) in his habilitation report, for instance, emphasized her role as a teacher: "*She is not married and devotes the time she has available besides her teaching profession at the middle school to her scientific work. Her personal appearance and her previous works show that she does not lag behind the average of male performance.*" This emphasis on female pedagogical work was in accordance with contemporary gender stereotypes. When trying to obtain Hofmann a regular salary for her extraordinary professorship KNOLL (1943) again referred to her teaching role: "*It is the role of the party member [Hofmann] to train this [scientific] offspring.*"

When Hofmann's career came to a premature end due to the political upheavals after WW II, she spoke for the first time of a disadvantage compared to her male colleagues. In petitions to the university and the Vienna school board, HOFMANN (1946) emphasized the "*notoriety of my Catholic attitude as a scientist*" and complained: "*I have repeatedly asked to be released from teaching. This request was described as unrealizable. On the other hand, a male colleague at my school, a convinced National Socialist, was immediately granted the requested release from teaching and was employed for party purposes in accordance with his wishes.*"

4. Maria Mottl

A different career path was chosen by Mottl (MATTES, 2019) (Fig. 2). Born to a German-speaking Budapest family, she accomplished her PhD thesis supervised by Tivadar Kormos (1881–1946) on the morphology of cave bear fossils from the Peștera Igrîța cave (Romania) in 1932.



Figure 2: Maria Mottl with prehistoric findings (around 1950). Source: Universalmuseum Joanneum (Graz).

At the beginning, Mottl's career similarly relied on personal relations. In her case, it was the chief geologist of the Hungarian Geological Survey Ottokár Kadić (1876–1957) who, due to his Croatian origin, was on probation during the ultranationalist regime of Miklós Horthy. Previously unsuccessful himself, Kadić assigned Mottl to get a hold of information about the Drachenhöhle excavation and its rich findings, stored in Abel's paleobiological institute. Mottl was successful on her mission to Vienna and returned with hints of prehistoric sites in Eastern European caves.

Paleolithic findings in Hungary during the Horthy regime served to justify national political claims. In this context, the knowledge Mottl gathered held significant potential and her career notably benefited from it. In consequence, she worked as a translator, an assistant and finally as a co-author of Kadić's publications. KADIĆ (1944) stated: "*Dr. Mottl was so kind to ... provide the results of her research for me. Only through this intimate cooperation was I able to give an overall picture of our research results in these caves.*" In 1932, human fossils were finally discovered in a small cavity called Suba-lyuk in Northeastern Hungary. The site thus was renamed Mussolini Cave and the findings were exploited in the nationalist press (MATTES, 2020) (Fig. 3).

Her role as a "*jack-of-all-trades*" (*Mädchen für alles*) – as MOTTL (1971) complained on behalf of her retirement – was, however, at odds with her claiming her own field of research and the exploitation of the finds in the public media. Mottl indeed developed her own agency in conducting excavations in caves in Hungary and Austria first in collaboration with Kadić, after 1945 with Ehrenberg, and later on her own (MODL et al., 2014). National-political claims were central components of all these research campaigns. Ehrenberg, who had been dismissed because of his National Socialist party membership, succeeded in obtaining a *venia legendi* in speleology in 1953. He was part of the networks established by Mottl before 1945, that helped her to get traction after her immigration to Austria in the aftermath of WW II. Obituaries by male colleagues provide further insights: EHRENBURG (1956), who had earlier tried to denounce Hofmann to the SS-Ahnenerbe organization, described her as an "*amiable and always helpful*" servant of science, but did not mention any personal initiatives in research. Another obituary on Hofmann by Othmar KÜHN (1956) stressed her "*special urge for teaching and for popular-scientific articles*" and

her diligence to take over “a large number of thankless tasks”. Mottl’s scientific skills were described similarly in the only obituary on her by Helmuth ZAPFE (1981), a former student of Ehrenberg: “[Field]work posed great demands on a

woman’s physical capabilities. ... I first met her at the International Quaternary Conference in Vienna in 1936, where an attractive young lady from Budapest, accompanied by her teacher, gave a lecture.”

5. Conclusion

Hofmann and Mottl both turned towards well-established scientists of their time in order to gain ground in the scholarly community. They proved to be flexible in their collaboration with various researchers in a time of political upheaval. Their adaptability to a changing radical political environment and their skillful networking formed a basis for both of their successful careers.



Figure 3: Maria Mottl with Ottokar Kadić (center) at an excavation in the Mussolini Cave. Source: BARÁZ (2008).

What is more, by engaging in cave excavations they both chose a research area that was on the verge of professionalization and institutionalization in Central Europe during the interwar period. Establishing oneself in a field dominated by so-called “lay researchers” was a convenient choice for women at that time. This circumstance made it easier for Hofmann and Mottl to attach themselves to prominent scientists such as Abel, Knoll, Kadić, or Ehrenberg. From the two biographies under study we can therefore derive career patterns which are situated at the interface between professional and popular science. In Hofmann’s and Mottl’s cases, contemporaries emphasized their teaching role and their diligent character rather than scholarly ambition or innovation when praising their abilities.

Distinctions between science and non-science and its boundaries are constantly re-evaluated. This re-evaluation process determines the historical actors and those who can speak in the name of science. It thus affects the development of gender-related scientific agency. Not only scientific practice, but also biographies and career paths are subject to negotiation. This is to be kept in mind with regard to obituaries of female scientists that are still mostly written by men.

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