

Earth Sciences

Essay

Deciphering the footprint of Emil Grosse from Germany to Brazil: a brief review

Siguiendo la huella de Emil Grosse entre Alemania y Brasil: una breve reseña

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Abstract

After the German geologist Emil Jakob Grosse concluded his work as head of the General Geological Commission of Colombia in April 1931, he lived and worked between Germany and Brazil, where his record has been largely unknown to the present date. In this contribution, we document some historical aspects of his life and briefly review Emil Grosse's trajectory from Germany to Brazil. The oldest record of Emil Grosse in Brazil dates from August 20, 1936, when he worked at the "Fábrica mine" until 1939. The Fábrica mine contains an iron deposit located southeast of the São Francisco Craton in what is now known as Quadrilátero Ferrífero, within the municipality of Ouro Preto. Grosse worked in a hematite ore site located in a banded iron formation (BIF), but there is no record of him having worked in the coal deposits. Years after, in 1946, the Fábrica mine changed owners and name to Ferteco, a subsidiary of the German corporation Industriegewerkschaft Bergbau, with headquarters in Bochum, Germany, where Grosse possibly worked to validate the deposit. In the 1940s, Grosse lived between the steelworks town of Peine, Germany, and Belo Horizonte, Brazil. There is a record of his trip in the middle of the Second World War on October 26, 1942. In 1946, his work on the Fábrica mine was finally published in Volume XI (No. 62) of the Brazilian journal *Mineração e Metalurgia*. Later, on August 18, 1949, Grosse obtained his permanent visa through the mediation of the Brazilian Military Mission and the German control council. Finally, he settled in Würzburg, Germany, where in 1971, he died at the age of 91.

Keywords: Geological heritage; Emil Grosse; Mining history; Brazil; Germany.

Resumen

Después de finalizar su trabajo como jefe de la Comisión Geológica General de Colombia en abril de 1931, el geólogo alemán Emil Jakob Grosse vivió y trabajó entre Alemania y Brasil, donde el registro de su presencia se había perdido hasta la actualidad. En este estudio documentamos algunos aspectos históricos de su vida y elaboramos una breve reseña de sus viajes entre Alemania y Brasil. El registro más antiguo de Emil Grosse en Brasil data del 20 de agosto de 1936, en la mina Fábrica donde trabajó hasta 1939. La mina Fábrica contiene un depósito de hierro situado al sureste del Cratón São Francisco, en lo que ahora se conoce como Quadrilátero Ferrífero, dentro del municipio de Ouro Preto. Grosse trabajó en un depósito de hematita localizado en una formación de hierro bandeado (BIF), pero no se tiene registro de que haya trabajado en los depósitos de carbón de la zona. Después de 1946 la mina Fábrica cambió de propietario y de nombre, a Ferteco (abreviación portuguesa de hierro y carbón), que era una subsidiaria de la corporación alemana Industriegewerkschaft Bergbau, con sede en Bochum, Alemania Occidental, donde Grosse probablemente trabajaba para validar el depósito. En la década de 1940, Grosse vivió entre la ciudad de Peine, en Alemania, conocida por su industria siderúrgica, y Belo Horizonte, Brasil, donde hay un registro de su viaje en plena Segunda Guerra Mundial, el 26 de octubre de 1942. En 1946 el estudio que realizaba en la mina Fábrica

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finalmente se publicó en el volumen XI (N° 62) de la revista brasileña *Mineração e Metalurgia*. Posteriormente, el 18 de agosto de 1949, Grosse obtuvo su visa permanente por intermediación de la misión militar brasileña y el consejo de control alemán. En la posguerra se estableció en Wurzburg, Alemania, donde en 1971 falleció a la edad de 91 años.

Palabras clave: Patrimonio geológico; Emil Grosse; Historia de la minería; Brasil; Alemania.

Introduction

Emil Jakob Grosse was a German geologist who worked in Colombia during the early 1920s. His seminal work in the country was the *Estudio geológico del Terciario Carbonífero de Antioquia en la parte occidental de la cordillera Central de Colombia, entre el río Arma y Sacaoyal* (Grosse, 1926). The study (hereinafter referred to as TCA) is one of Colombia's most important mapping works at the beginning of the 20th century, and it was considered at that time a wide-ranging, rigorous, and systematic geologic work (Velásquez Ruiz *et al.*, 2021). Later, Emil Grosse was appointed as head of the Colombian General Geological Commission until 1931 (Espinosa Baquero, 2016; Zuluaga, 2005), when he left the country with no known records of return. After Emil Grosse's stay in Colombia, the track of his activities was almost lost, with some news of a possible visit to Brazil, which for the date, and due to the situation during World War II (1939 – 1945), was obviously difficult to establish for sure. Nevertheless, relatively little is known of Grosse's life outside Colombia. Here we present recent research on Emil Grosse's life and work in Brazil after leaving our country.

Grosse's family background and life in Germany before 1920

At an early age, Emil Grosse's childhood and youth in Germany were closely linked to iron and coal mining, but before we embark on his early life, it is relevant to inquire into his family origins. Both Emil Grosse's paternal and maternal grandparents were from what today is the Neunkirchen region, located in Saarland, southwestern Germany, near the border with France. This is an iron and coal mining region where these strategic minerals started to be intensively produced after the industrial revolution (Deutsche Welle - DW, 2007). The paternal grandparents were Christian Grosse (born 1813) and Katharina Margarethe Ahlemann (born 1818) (Figure 1); they were married in Völklingen, Saarland,

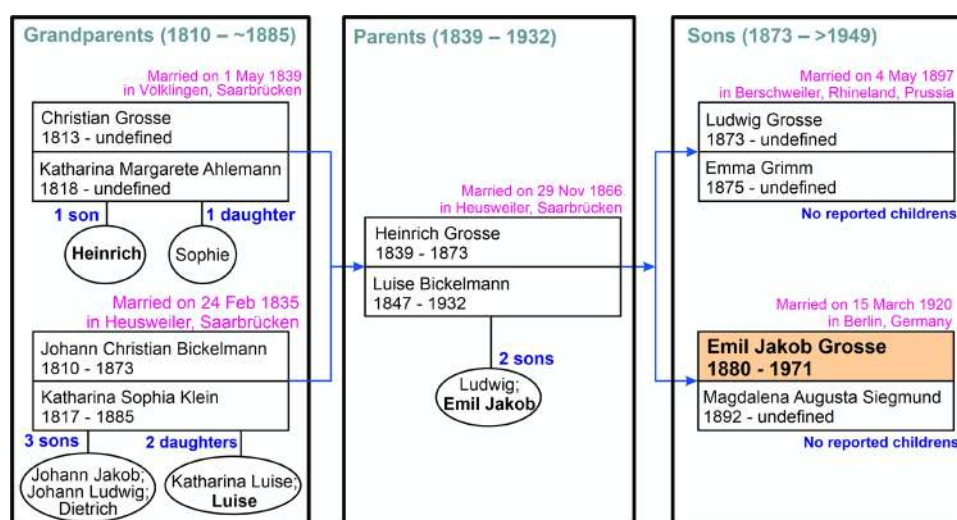


Figure 1. Grosse family tree. Three generations of Grosses are presented along with the age of birth and, in some cases, of death as well. The date and location of the marriage are also recorded (Family Search, 2023).

on May 1, 1839, and had two children, Heinrich (Emil Grosse's father) and Sophie Grosse (**Figure 1**). Grosse's maternal grandparents were Johann Christian Bickelmann (1810 - 1873) and Katharina Sophia Klein (1817 - 1885), who married on February 24, 1835, in Heusweiler, Saarland and had three sons (Johann Jakob, Johann Ludwig, and Dietrich), and two daughters (Katharina Luise and Luise, Emil Jakob's mother). Emil Grosse's middle name, Jakob, may be a reference to the older maternal uncle, Johann Jakob Bickelmann.

Emil Grosse's parents, Heinrich Grosse and Luise Bickelmann, married in Heusweiler on November 29, 1866 (**Figure 1**); later, they moved to the Saar region, where their two children, Ludwig and Emil Jakob Grosse, were born. Emil was born on December 6, 1880, in Heiligenwald, Rheinprovinz (today Saarland), where his father Heinrich worked as a mining foreman (**Grosse, 1908**), possibly in the local coal mines. Very likely, here, Emil Grosse became familiar from a very young age with iron mining and geology. He worked as a miner for half a year before starting his academic studies (**Grosse, 1908**). However, the mining heritage probably came from his grandparents, who settled in extractive areas where coal was mined.

After his school years at the Königliche Oberrealschule zu Saarbrücken (Royal Secondary School of Saarbrücken), Emil Grosse studied mining engineering at the Königlichen Bergakademie zu Berlin (Royal Mining Academy of Berlin) where he graduated in 1905 (**Grosse, 1908**). He did his military service for one year at the Garde-Pionier-Bataillon, and then he obtained his postgraduate degree and doctorate on June 5, 1908 (**Figure 2**) at Friedrich Wilhelm's Universität zu Berlin. Grosse's Ph.D. dissertation is titled "*Petrographische Untersuchungen jüngerer Ergussgesteine Mittelitaliens*" (Petrographic study of younger effusive rocks in central Italy) (**Figure 2a**). This may be evidence that despite his experience in mining, Grosse had a strong investigative sense for

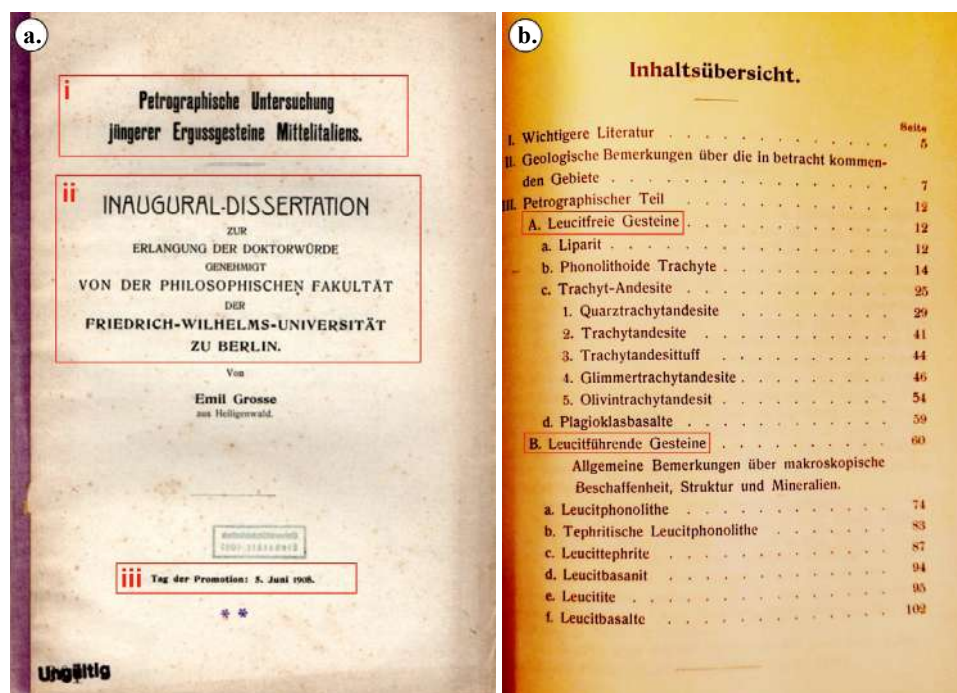


Figure 2. (a) Front page of Emil Grosse's doctoral dissertation thesis. Translation of key points: i-) Title "Petrographic study of younger volcanic extrusive rocks in Central Italy". ii-) Inaugural dissertation for obtaining the doctorate approved by the Philosophical Faculty of the Friedrich Wilhelm Universität zu Berlin. iii-) Day of his graduation: June 5, 1908. **(b)** Table of contents where the analyzed rocks in the doctorate thesis are mentioned subdivided into (A) rocks free of leucite and (B) rocks with leucite.

geology. The petrographic analysis of volcanic rocks in Grosse's doctoral thesis refers to rocks with and without leucite (**Figure 2b**). Leucite is a mineral phase of the feldspathoid group; due to its rarity, it is a petrogenetic indicator in potassic and ultrapotassic volcanic rocks (Velásquez Ruiz *et al.*, 2022) that outcrop in Italy as kamafugite lavas. The volcanic rocks he studied are perhaps what we know today as the central Apennine chain, where there is a variety of leucite-bearing kamafugite lavas from the San Venanzo volcanic complex, such as venanzites, mafurites, and melilitolite (Lustrino *et al.*, 2020).

After his doctorate degree, Grosse gained geological mapping experience in Africa, which he published in a report: *Grundlinien der Geologie und Petrographie des östlichen Katanga* (Baselines for the geology and petrography of eastern Katanga) resulting from a geological and mining expedition in 1911 and 1912 in what today is the Democratic Republic of the Congo.

Probably during his stay in Berlin, Emil Grosse met Magdalena Augusta Siegmund, a telephone operator, born in 1892 in Kreuzburg, Upper Silesia (today Poland); they married in Berlin on March 15, 1920 (**Figure 3**), just five months before arriving in Medellín, on

Figure 3. Marriage certificate of Emil Grosse and Magdalena Augusta Siegmund. Key points from the English transcription state: **(a)** Date of the wedding: March 15, 1920. **(b)** Personal details of Emil Grosse: Geologist, protestant, born on December 5, 1880, in Heiligenwald, Ottweiler District, son of a retired mining foreman, Heinrich Grosse, and his wife Luise Bickelmann, both living in Göttelborn, Saarbrücken District. **(c)** Personal details of Magdalena Auguste Siegmund: telephone operator, protestant, born on March 10, 1892, in Kreuzburg, daughter of postman Karl Siegmund and his wife, Marie Köhler, both living in Oppeln. **(d)** The husband passed away on March 25, 1971, in Würzburg (Family Search, 2023).

August 23, 1920 (**Zuluaga**, 2005). Grosse's stay in Colombia between 1920 and 1931 is not part of the scope of this article, so it will not be examined in depth. However, it is necessary to mention that Professor Dr. Robert Scheibe, who was one of his lecturers at the *Königlichen Bergakademie zu Berlin*, recommended Emil Grosse to the Honorable Departmental Assembly of Antioquia to carry out geological studies in Antioquia as stated in the Ordinance No. 16 of April 6, 1918 (**Velásquez Ruiz et al.**, 2021). Thus, between 1920 and 1923, Emil Grosse carried out the field work for his classic study on Colombian geology, which was published in 1926 (**Grosse**, 1926). Then he was appointed as the head of the General Geological Commission of Colombia until 1931 (**Espinosa Baquero**, 2016; **Zuluaga**, 2005).

Grosse's life in Brazil between 1936 and 1939

The first record of the arrival of Emil Grosse in Brazil is documented in the maritime registry sealed by the State of Rio de Janeiro (**Figure 1S**, <https://www.raccefyn.co/index.php/raccefyn/article/view/1908/3404>). The registry, issued by the Rio de Janeiro Foreigners Registration Service, is dated October 26, 1942, and states that: "the German passport No. 291R/293/36 is issued in Berlin on July 16, 1936, given the visa No. 1067 in the consulate of the United States of Brazil in Berlin on July 20, 1936, and arrives in Rio de Janeiro on August 20, 1936, translated under decree CE 3232 of the Ministry of Justice and Internal Affairs, issued on October 5, 1939, in photostatic copy" (referring to Grosse's passport and visa). The document also states that: "He has an identity card mode 19, issued under the terms of article 24 c/c 150 §1° of decree 3010/38, n° 868/206.314, by the authorities of Belo Horizonte, where he resided, in Anginhas do Campo" (**Figure 1S**, <https://www.raccefyn.co/index.php/raccefyn/article/view/1908/3404>). Finally, it says: "On the respective Minas Gerais ID card the following annotation was made: it was presented the decree No. CE/3232, issued on October 5, 1939, by the Ministry of Justice, which bestows upon the bearer a permanent permission".

This information gives us a clearer picture of Emil Grosse's track between Germany and Brazil in the 1930s: He arrived for the first time on August 20, 1936, in Rio de Janeiro with permission to stay legally in Brazil until October 5, 1939. Once there, he is transferred to the State of Minas Gerais, where he worked between 1937 and 1939 at Fábrica Mine, an iron mine located in the jurisdiction of Ouro Preto Municipality. There is evidence of his stay there in volume XIV, No. 79 (May to July 1949) of the Brazilian journal *Mineração e Metalurgia* (**Figure 4**), where figure 6 on page 6 mentions that "this material was discovered between 1937 and 1939 by the German geologist Emil Grosse, in charge of the research studies of these iron ores". On the other hand, **Barbosa** (1949) also points out that "on the occasion, the Second Panamerican Congress of Geology and Mining Engineering was being held. During this event, the results of Grosse's studies were presented as mentioned in the *Mineração e Metalurgia* journal (No. 62, Vol. XI, August 1946) (**Figure 4**).

Grosse had a temporary visa with legal permission to be in Brazil until October 5, 1939, so he returned to Germany that year. The fact that his wife Magdalena Augusta Siegmund obtained her German passport on January 25, 1938, in Berlin and, later, on March 29, 1939, a temporary visa to Brazil at this country's consulate in Berlin is also documented (**Figure 2S**, <https://www.raccefyn.co/index.php/raccefyn/article/view/1908/3404>). Magdalena probably arrived in Brazil for the first time with Grosse (Grosse's second visit) after March 29, 1939. It is not clear if they were there before or during the beginning of World War II. Emil Grosse had at least one son (information from the "Obituaries, Main-Post Number 72, Sunday 27th of March 1971, Stadtarchiv Würzburg, Germany), although Magdalena did not report any in the Brazilian visa where she states having no children under the age of 18 (Magdalena being 46 years old).



Figure 4. Volume XIV, No. 79 of the *Mineração e Metalurgia* journal (Barbosa, 1949) describes the geology of the Congonhas do Campo Region. In one of the footnotes, we can read that “this material was discovered between 1937 and 1939 by the German geologist E. Grosse, who was in charge of the research studies of these iron ores”.

Background of the Fábrica/Ferteco Mine work

The results of Emil Grosse’s work between 1937 and 1939 at the Fábrica Mine were published in volume XI, No. 62 of the *Mineração e Metalurgia* journal (Mello & Grosse, 1946) under the title “Iron ore of the Fábrica Property of the Ferro e Carvão company S/A, District of São Julião, Municipality of Ouro Preto, State of Minas Gerais” (Figure 5). The Fábrica mine changed ownership after 1946, and the company also changed its name to *Ferteco* (Portuguese abbreviation for iron and coal). Ferteco was a subsidiary of the German *Industriegewerkschaft Bergbau*, a trade union established after de Second World War and headquartered in Bochum; Grosse probably worked there to validate the Ferteco deposit in Minas Gerais as a “Qualified Person” (QP). The issue also recorded that Grosse specifically worked the iron mineralization and, despite the fact that there was also coal, there is no record of additional work on this strategic material.

The Fábrica/Ferteco Mine is inserted in the Congonhas do Campo region, which has an area of 20 x 30 km, and is located southeast of the São Francisco craton (Cavalcanti *et al.*, 2023), in what is now known as the Quadrilátero Ferrífero (Iron Quadrilateral), a high-grade iron ore province (>64% Fe) with 600 million metric tons (Mt) reserves and inferred resources of 2100 Mt (Rosière *et al.*, 2008). The São Francisco Craton corresponds to an Archean-Proterozoic portion of a larger proto-craton called Paramirim (Almeida *et al.*, 1981). This piece of crust has stabilized since the beginning of the Phanerozoic (Heilbron *et al.*, 2017). Stratigraphically, the Quadrilátero Ferrífero groups the Minas Supergroup and includes three main subgroups: Piracicaba, Itabira, and Caraça, which are interpreted as a volcano-sedimentary sequence from a rift that changed to a passive margin basin (Dopico *et al.*, 2017). Emil Grosse studied the Itabira Group between 1937 and 1939. In Grosse’s time, the iron ore was called *itabirito*, which is a specific Brazilian designation for a banded iron formation (bif). According to Barbosa (1949), the name *itabirito* was used by V. Eschwege due to its proximity to the town of Itabira.

After Grosse’s publication in 1946 about the metallogenesis of iron ore from the Fábrica deposit, there are only a few records of papers citing Grosse’s work in Brazil (Barbosa, 1949; Dorr & Miranda, 1963; Guild, 1957). This Brazilian work was accomplished to



Figure 5. Volume XI, No. 62 of the *Mineração e Metalurgia* journal (Mello & Grosse, 1946) including the article entitled “Iron ore of the Fábrica Property of the Ferro e Carvão company S/A, District of São Julião, Municipality of Ouro Preto, State of Minas Gerais “. In the journal, Grosse’s name was mistyped as Graosse, which made it difficult to track him through Brazil.



calculate the amounts of iron mineralization, mainly hematite, hosted by a BIF of the Itabira Group. The calculated iron amount reaches a digit of 63.5 Mt of ore. Moreover, Grosse and his coauthor conclude that “of these reserves, according to numerous and systematic sieving tests carried out during the course of the survey, around 36.5 million tons correspond to ore in fragments larger than 5 mm, and 27.5 million tons to fine ore, less than 5 mm, which requires agglomeration.” (Mello & Grosse, 1946).

Hypothesis about Grosse’s experience in Germany and Brazil in the 1940s

The records show that Emil Grosse made at least two overseas trips during World War II (1939 – 1945). The first trip was from Brazil to Germany in the second semester of 1939 when his Brazilian visa ended (**Figure 1S**, <https://www.raccefyn.co/index.php/raccefyn/article/view/1908/3404>). His wife traveled to Brazil on March 29, 1939, with a temporary visa (**Figure 2S**, <https://www.raccefyn.co/index.php/raccefyn/article/view/1908/3404>). The second trip, on October 26, 1942, took Grosse from Germany to Brazil (**Figure 1S**, <https://www.raccefyn.co/index.php/raccefyn/article/view/1908/3404>). Subsequently, in 1949, in the postwar period, he was granted a permanent visa. As shown in the documents in **figure 6**, the Allied authorities occupying Germany in the post-war did not find a reason to retain Emil Grosse in Germany. In the 1940s, Grosse’s address in Peine was Am Sackpfeifenberg 18, a miners’ housing development. Peine is known for its steel industry and nearby iron ore mines, and it is likely that Grosse worked in this industry. Lastly, the permanent visa in Brazil was granted in Berlin by the Brazilian Military Mission and the German Control Council on August 18, 1949, which means he traveled to Brazil after August 1949. Sometime after 1949, Grosse moved to Würzburg, Germany, where he died in 1971 at the age of 91. His wife survived him, as evidenced in the Obituaries section of the Main Post, Number 72, from Sunday, March 27, 1971 (Stadtarchiv Würzburg, Germany).

Thus, we have generated a map tracking Emil Grosse’s life (**Figure 7**), from his birth in Heiligenwald, Germany, on December 6, 1880, and his transfer to Berlin, where he finished his undergraduate studies on the volcanic rocks of Central Italy from 1904 to 1908, and gained mapping experience between 1911 and 1912. Later, he married Magdalena Siegmund on March 15, 1920, and made several trips to Colombia between 1920 and 1931, initially to work on the TCA and later at the Colombian Geological Commission.

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NOTAÇÃO: BR.AN.RIO.OL.0.FCN,TMP. 180. 15. 1/190

REPÚBLICA DOS ESTADOS UNIDOS DO BRASIL
FICHA CONSULAR DE QUALIFICAÇÃO

Esta ficha, expedida em duas vias, será entregue à Polícia Marítima e à Imigração no porto de destino

Nome por extenso Emil Jakob GROSSE "extº 9"

Admitido em território nacional em caráter permanente (temporário ou permanente)

em virtude de recomendação nominal do Ministério das Relações Exteriores.

Lugar e data de nascimento 6-12-80 Heiligenwald/Saar

Nacionalidade alemã Estado civil casado

Filiação (nome do Pai e da Mãe) Heinrich Grosse e Louise

nete Bickelmann Profissão geólogo

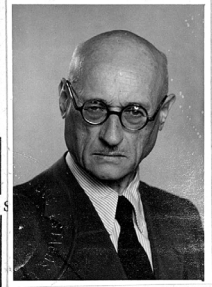
Residência no país de origem Am Sackpfeifenberg 18, Feine

NOME	IDADE	SEXO
FILHOS MENORES DE 16 ANOS		

Temporary Travel Document n. 0038919 expedido pelas autoridades aliadas de ocupação da Alemanha na data de 28-6-49, Exit Permit n. N-65469

ASSINATURA DO PORTADOR

Dr. Emil Grosse



SÉLO

Missão Militar Brasileira junto ao Conselho de Controle da Alemanha

Berlim, em 18-8 de 19. 49

Coronel A. de S. Tavares
Chefe da Missão

NOTA - Esta ficha deve ser preenchida à máquina pela autoridade consular sendo as duas vias em original

Figure 6. Consular record of the maritime entry of Emil Grosse to Brazil. It was sealed by the Brazilian military mission and the German control council in Berlin on August 18, 1949. The temporary Travel Document No. 0038919 was issued by the Allied authorities occupying Germany on June 28, 1949. The German passport (No. N-65469) was no longer used at that time; instead, an exit permit issued by the Allies was required.

Finally, from 1936 to 1971 he made at least three trips to Brazil, in 1939, in 1942, in the midst of World War II, and the last one in 1949, when he obtained a permanent resident visa. He later returned to Germany where he died in 1971 (**Figure 7**).

Conclusions

Emil Grosse's stay in Colombia had great scientific importance for his contribution to the study of "The Carboniferous Tertiary of Antioquia" while his work in Brazil was more oriented to industry. Historical records show that Grosse arrived in Rio de Janeiro on August 20, 1936, and made at least two trips in the midst of World War II, between 1939 and 1942. A likely hypothesis is that having worked at the iron deposits of Minas Gerais, where iron ore proved to be a strategic raw material for pre- and postwar times,

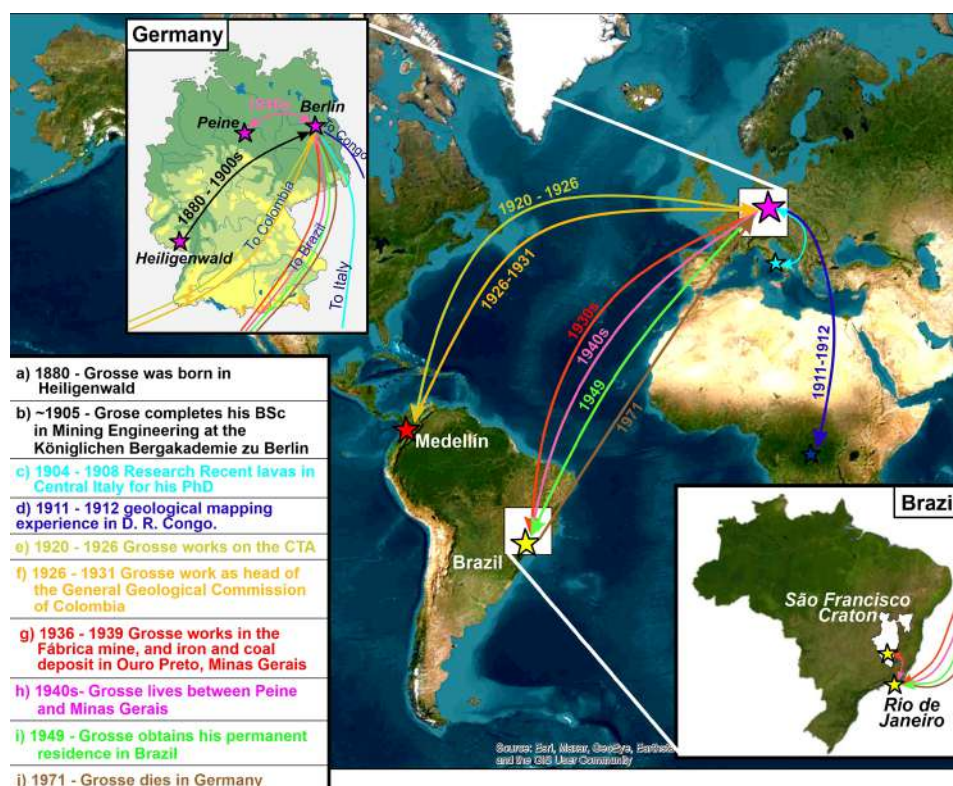


Figure 7. A summary of Emil Grosse's track of routes between Germany, Italy, Congo, Colombia, and Brazil.

Emil Grosse was one of the few Germans that had the opportunity to travel in business missions. The fact that Grosse got a permanent visa on August 18, 1949 and that his post-war document was issued by the Allied Authorities occupying Germany means they had no reason to deny Grosse's departure from Germany. It can be inferred, therefore, that there were no investigations for war crimes pending on him. Emil Grosse spent his final years in southern Germany, where he died in 1971.

Supplementary Information

See the supplementary information in <https://www.raccefyn.co/index.php/raccefyn/article/view/1908/3404>

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Conflicts of interest

The authors declare that they have no financial or personal interest that may have influenced this work.

Authors' contributions

FVR, MES, and FCJ declare that they contributed equally to the bibliographic compilation and the drafting of the manuscript.

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