http://dx.doi.org/10.1590/2236-3459/48962

TRANSFERENCE AND APPROPRIATIONS OF KNOWLEDGE: FRIEDRICH BIERI AND MATHMATICS FOR PRIMARY EDUCATION[1]

Circe Mary Silva da Silva

Federal University of Espírito Santo, Brazil.

Abstract

Starting from the analyses of Friedrich Bieri (1844-1924) work, a Swiss who immigrated to Brazil in the 19th century, we identified knowledge appropriation produced in German speaking countries in the Brazilian teaching. This study brings up Bieri's profile as well as reports the knowledge transference process occurred and its role in the country of Rio Grande do Sul. Bieri's work analyses allowed concluding that the author, besides being one of the precursors of didactics books for Teutonic schools production, also adopted a German pedagogical proposal adapted to the local context and influenced by Grube's method and its reformulation by Egger.

Key-words: Friedrich Bieri, didactic book, arithmetic, Jakob Egger.

TRANSFERÊNCIAS E APROPRIAÇÕES DE SABERES: FRIEDRICH BIERI E A MATEMÁTICA PARA O ENSINO PRIMÁRIO

Resumo

A partir da análise da obra de Friedrich Bieri (1844-1924), um suíço que emigrou para o Brasil no século 19, identificamos apropriações de saberes produzidos em países de língua alemã no ensino brasileiro. A investigação traz um perfil deste personagem, assim como relata o processo de transferência de conhecimentos ocorrido e seu papel no contexto da província do Rio Grande do Sul. A análise da obra de Bieri permitiu concluir que o autor, além de ter sido um dos pioneiros na produção de livros didáticos para escolas teuto-brasileiras, adotou uma proposta pedagógica germânica adaptada ao contexto local e influenciada pelo método de Grube e da reformulação deste por Egger.

Palavras-chave: Friedrich Bieri, livro didático, Egger, Grube, Rechenbuch.

[1] The research counted with the support of Capes.

http://dx.doi.org/10.1590/2236-3459/48962

TRANSFERENCIAS Y APROPIACIÓN DEL CONOCIMIENTO: FRIEDRICH BIERI Y LAS MATEMÁTICAS EN LA EDUCACIÓN PRIMARIA

Resumen
A partir del análisis de la obra de Friedrich Bieri (1844-1924), un suizo emigrado a Brasil en el siglo 19, nos ha sido posible identificar algunas apropiaciones de saberes producidos en países germanófonos y posteriormente introducidos en la educación brasileña. El presente trabajo expone el perfil del personaje central y muestra la evolución del proceso de tranferencia de conocimientos que tuvo lugar en su época y el papel que a éste le cupo en el contexto de la província de *Rio Grande do Sul*. El análisis de la obra de Bieri permite concluir que el autor, además de haber sido un precursor en matéria de producción de libros didácticos para las escuelas germano-brasileñas, propone una visión pedagógica germánica adaptada al contexto local e influída por el método Gube y su posterior reformulación propuesta por Egger.
Palabras-clave: Friedrich Bieri, libro didáctico, Egger, Gube, Rechenbuch.

TRANSFERTS ET APPROPRIATION DES SAVOIRS: FRIEDRICH BIERI ET DES MATHEMATIQUES POUR L'ENSEIGNEMENT PRIMAIRE

Résumé
A partir de l'analyse de l'oeuvre de Friedrich Bieri (1844-1924), un suisse émigré au Brésil au 19e siècle, on a pu identifier quelques appropriations des savoirs produits au sein des pays germanophones et puis introduits dans l'éducation brésilienne. Cette recherche expose le profil du personnage, ainsi qu'un récit du processus de transférence de connaissances qui ont eu lieu et de leur rôle dans le contexte de la province de *Rio Grande do Sul*. L'analyse de l'oeuvre de Bieri a permit de conclure que l'auteur, autre qu'avoir été un des pioniers de la production de livres didatiques pour les écoles germano-brésiliennes, proposé une vision pédagogique germanique adaptée au contexte local et influenciée par la méthode de Grube et sa réformulation postérieure faite par Egger.
Mots-clé: Friedrich Bieri, livre didactique, Egger, Grube, Rechenbuch.

http://dx.doi.org/10.1590/2236-3459/48962

Introduction

The immigrant Friedrich Bieri (1844-1924), swiss professor who landed on Brazilian soil in 1871, was one of the first to write textbooks for the teaching of mathematics for primary school education, in the German language, aiming at the public German-Brazilian schools. He started these publications in 1873 with the book *Rechnenbuch für die deutsche schulen in Brazilien*[2]. The ninth edition of this work occurred in 1900. This work aims at an analysis of Friedrich Bieri´s work to identify comparatively the influence of knowledge produced in German-speaking countries in the Brazilian primary education.

Breaking a territorial barrier, a European agent introduces mathematical knowledge produced in one place, with a greater tradition in teaching and teacher training, to a new place - southern Brazil, in the 19th century - with a significant number of poorly educated German immigrants. We will especially look to the history in the area of primary education, giving prominence to the teaching of mathematics in schools of German immigrants. Who was this agent and how did he act? That is, how did he convey this new knowledge from his country of origin to the country to which he emigrated?

The character is Friedrich Bieri, a Swiss raised in orphanages, who attended good schools, from which he graduated to teaching as well as to evangelical pastor who emigrated to Brazil and became a school teacher and the author of textbooks. If one compares the attention that historians have devoted to public figures, with that which was dedicated to other professionals such as educators, for example, we will find out a significant quantitative difference in the treatment, which caused large gaps in knowledge about the past of professionals of teaching. Braudel (2009) warns that history should be the study of the social, of the whole social, and, therefore, the issue of education could not always have been relegated to a second place. The characters that helped to shape this past, highlighting the activities of educating generations, should deserve a deeper look.

We found only one biography of Friedrich Bieri which was released by Leandro Telles (1976). Attention is called to this man who was, in his view, one of the most interesting figures of German colonization in Rio Grande do Sul. Thereafter, we dedicated ourselves to seek more data on this character, both in Brazilian archives as well in Swiss archives.

[2] Textbook on Arithmetic for German schools in Brazil.

http://dx.doi.org/10.1590/2236-3459/48962

Figure 1 -
Friedrich Bieri.

http://dx.doi.org/10.1590/2236-3459/48962

Friedrich Bieri in Switzerland

Switzerland, in the first half of the 19th century, experienced a demographic transformation, a change of structure in agriculture, as well as the occurrence of an epidemic in the 1840s, as well as mass poverty which led to difficulties in socio-economic relations, which was passed on to the educational system. The people did not recognize the need or the meaning of schools, considering them a weight (Kellerhals, 2010). Two thirds of the population of the Bern Canton, despite industrialization, worked in agriculture and depended on child labor. The same happened afterwards in factories. In this environment Friedrich was born in Wabern in 1844. With respect to his childhood he reports that his mother was a seamstress and his father a cowboy. As far as he could remember, his father was a laborer in the field. He had a sister. His father died early and he had few memories. His mother died when he was still a child and thus sent to the care of a family in Schangnau.

The life of an orphan, according to his autobiography, could yield a book, but he would not report it, "I had lost father and mother, but the love of God flowed into me without my suspecting" (Bieri, 1869, p. 1). At the age of twelve, he was sent to an orphanage in Köniz. There, he learned useful things, such as working with the plantation and gardens, but also began to learn "bad things" (Bieri, 1869, p. 1) with his buddies. There was no religious spirit in the orphanage, no one learned about religion, and according to him, it would have been useless to try to teach it. Nonetheless, he made progress in school with the aid of Schenkel, an assistant professor, who led him to religious belief, taught him to pray, admit his mistakes and not to lie. There he decided to pursue a career as a school teacher. Bieri´s document does not record how long he remained in the orphanage, but possibly around six years. He then went to *Lehrerseminar Münchenbuchsee*[3]. According to his statement he devoted himself to learning drawing and learned "good knowledge" (Bieri, 1869, p. 2), having taken as reference professor Langhans, who requested him as a class assistant. He completed his studies in 1866, which was an important date for him since "in the spring of 1866 I entered the world" (Bieri, 1869, p. 3).

Bieri's experience as a teacher began in Lauterbrunnen, where he stayed for one semester, followed by another year in Magglingen and, according to his self-evaluation, "the world was always pleased with me and my pride was flattered by this" (Bieri, 1869, p. 4). He believed that he needed to intensify his studies in French and went to Grandchamp, near the canton of Neuchâtel. But there, in his words,

> i was very unhappy because with this biblical spirit, I did not know how to make my way with my ideals and soon I had to offend somebody. Here my pride was something to grind myself, because humility is firm and brave. I prayed a lot and wept very bitterly. [...] With the children I was terribly strict, and not only the children suffered with my bad mood, but also my superiors. (Bieri, 1869, p. 5)

About his spiritual doubts and his struggle to believe and to devote himself to religion, he wrote several paragraphs, perhaps believing it to be necessary to express these feelings, since he intended to apply for a religious career: "I could not find peace until I

[3] Münchenbuchsee á Teacher´s Seminary.

http://dx.doi.org/10.1590/2236-3459/48962

looked for the Lord with my undivided heart. I've come to believe a little and then more and more I started to believe in me" (Bieri, 1869, p. 5). In 1868 he joined the Institute Hl. Tauxe-Dufour as an assistant in order to improve this knowledge of French. In that year, in his words, he fulfilled the civil service. His questions seem to have been extinguished and, according to his testimony, "now I love the Lord, the Lord above all" (Bieri, 1869, p. 6). Therefore, he came to the conclusion that he would join a religious order. He probably stayed two years in *St. Pilgermission Chrischona* because, according to Telles (1976), Bieri married in 1871 and, in the same year he emigrated with his wife to Brazil.

The Immigrants were mostly farmers, but among them were some with higher education, such as priests and pastors, who represented the most literate contingent that would exercise a leadership role in the communities in formation, called colonies. This was the case of Bieri who, upon arrival in the country, already had training and experience in primary school teaching. Upon landing on Brazilian soil the young Friedrich Bieri brought in his luggage much more than usual objects for long transatlantic sea voyages: he carried beliefs as well as knowledge acquired in *the Seminar of Münchenbuchsee* in Bern and in the *Mission School of Saint Chrischona* in Basel (Bieri, 1869).

The Seminar of Münchenbuchsee in Bern, Switzerland, was founded in 1833 with a view to training teachers for primary schools. Influenced by the ideas of Pestalozzi, in the teaching plan of 1861, the orientation was towards a visual teaching, based on intuition - Anschauungsunterricht (Kellerhals, 2010). For example: it was recommended that in the first four years geometry would aim at the presentation of forms focused to understand the geometry would of the presentation focused on the visualization ways, concurrent with the writing and drawing. The course for teacher training had a duration of three years and would include the teaching of religion, pedagogy, German, French, arithmetic up to equations of second degree with several unknowns, geometry and trigonometry, theory of nature, physics and chemistry, history, geography, singing, piano and violin, drawing, fine arts, gymnastics, and also work in agriculture and home organization. The students had at least 40 hours of weekly studies. Upon approval in the final examinations the seminarian received a letter and was required to serve for at least three years in the civil service in a School of the Canton of Bern (Palmer; Wildermuth, 1870).

With respect to the teaching of mathematics for elementary schools, the teaching plan of 1861 recommended: extend to the 3rd and 4th year the teaching of the numbers 1 to 1000 and, in addition, the teaching of mathematics, especially geometry, should focus on easy tasks and for day-to-day life. Calculations with the rule of three, interest, discounts, calculation of profit and loss and of society rule should be left to the 9^{th} and 10^{th} years (Kellerhals, 2010). We will see, in the analysis of Bieri's textbooks, which of these ideas he assimilated and incorporated in the books published in Brazil.

Bieri in Rio Grande do Sul

Bieri reached the city of São Leopoldo in 1871 and, in this same year, he was appointed professor at the evangelical parish school. He remained there until 1877 (Wulfhorst, 2004). In 1867 professor Heinrich Wilhelm Stahl, coming from Lübeck and Pastor George Hermann Borchard founded in São Leopoldo, the German Institute of Secondary Education, whose classes began with 18 students. It was a German-evangelical institute with lodging for students from distant colonies and where there was

http://dx.doi.org/10.1590/2236-3459/48962

the teaching of Portuguese, German, French, Mathematics, Geometry, History, Art and Singing. In 1871 Friedrich Bieri replaced Stahl as a teacher in elementary school education[4].

The first reference to the name of Bieri we found in official documents[5] is a chart with a list of the private schools in the province. In the list of schools there was a reference to a school in São Leopoldo, with 70 male students, whose director was Frederick Biersi[6]. In 1876 we find a new mention of Frederick Bieri as a teacher at a private school in São Leopoldo, with 60 male and 33 female students. At this early stage of life in Brazil Pastor Friedrich Bieri was linked to the evangelical church, once he chose as godparents for his daughters two important religious in the community: Pastor Carl Wengel and Wilhelm Rotermund[7].

Upon arrival in Brazil he was an evangelical. However, in 1877 there appears to have occurred a break with the evangelical church, when he left the parish school to start his own school - Colégio Perseverança. This institution was non-denominational and possessed the regime of boarding. In 1880 his wife, with whom he had three children, died of tuberculosis. Telles (1976) assumes that Bieri would have made contact with the ideas of Allan Kardec while still in Switzerland, but on his arrival to Brazil he was still evangelical. His conversion to spiritualism might have occurred in Rio Grande do Sul[8]. In his own words it was in this religion that he found the basis for what he was looking for: "I began studying spiritualism and found therein, what I had long searched for in vain: the Christian religion in a comprehensible and sensible way, the teaching of Jesus, based in recognition of reason" (Telles, 1976, p. 128).

In the early 1880s his name appears as a teacher of the seventh chair, German Language, and as a substitute teacher of drawing. In 1886 he still worked at the Normal School and was again appointed substitute professor of Drawing[9]. His name constantly appears in the list of teachers of the Normal School who acted as examiners of annual examinations.

In 1885, in the commercial section of the journal *The Federation*[10], his name appears as an importer of books. Bieri would continue for several decades, to import books, as can be seen in the same newspaper[11]. Among the various activities undertaken one can find, in 1885[12], textbook evaluator upon request of the Council Directory Board of Public Instruction. In Porto Alegre he acted as an examiner of preparatory exams for entrance in

[4] Available at <http://www.ieclbhistoria.org.br/home/index.php?option=com_content&task=view&id=1182&Itemid=40>.

[5] The writing of his name shows up incorrectly. Director´s Public Instruction Report dated 1873.

[6] In official documents his name shows up with different writings: Frederick Biersi, Frederico Bieri and Friedrich Bieri. Taking into account the date of his arrival in Brazil, we assumed to be the same person. Incidentally we found reference to Frederico Bier, who was the Public Instruction director in 1878, the second director of the public library in the same province, but who died in 1879. Therefore, he does not relate to the same person.

[7] Wilhelm Rotermund had an important role in the publication of newspaper and textbooks production.

[8] The performance of Bieri as a spiritist was intense. He wrote *Der Trostreiche Unsinn*, published in 1901, and was treasurer of the Sociedade Espírita Rio-Grandense, founded in 1894.

[9] According to a note in the journal *A Federação* dated April 8th, 1886.

[10] Announcement of import in the newspaper *The Federation*, March 10th, 1885.

[11] Notes related to the importation of books, in April 9th, 1885, July 8th, 1887, March 14th, 1893, June 30th, 1906, March 13th, 1908 and July 31st, 1911.

[12] Journal *A Federação*, March 17th, 1885.

http://dx.doi.org/10.1590/2236-3459/48962

the superior courses in the university[13], besides having been an examiner along with professors Fernando Ferreira Gomes, João Pedro H. Duplan, Ignacio Montaha, Francisco Borges de Freitas, in the Escola Brasileira (Brazilian School) in 1892[14].

For many years he must have exerted the function of examiner in school examinations in the capital, since his name is mentioned in 1905, composing the examining committee of the school Cecília Corseuil du Pasquier[15]. In 1906[16] he was appointed professor of Drawing and Music of the Escola Complementar[17] of Porto Alegre. He was, for a long time, an interim teacher of drawing, since in 1888 and in 1889 he still appeared as conductor of this discipline, in addition to the discipline of German. According to Telles, he was a professor at this institution until 1917.

For the bilingual teaching of German and Portuguese he wrote *Lehr- Deutsches und für Lesebuch Brasilien. Mit einer Anleitung zur Erlernung portugiesischen der* Sprache[18], whose first edition dates from 1876. According to Telles (1976), it was the lack of textbooks that led Bieri to devote himself to writing them for the German-Brazilian schools: they should be "books that, although written in German, should reflect the spirit and the thought of immigrants, thus freeing them from using imported German textbooks, written for an environment already unknown to these same immigrants" (p. 120). There was an edition of this work in 1913, with 340 pages (Roche, 1959).

The governor Antonio Augusto Borges de Medeiros, in April 25, 1917[19], signed the retirement of professor Frederick Bieri as professor of Complementary School because he had completed more than 35 years of teaching and was unable to continue to practice due to health problems. Bieri died in Porto Alegre in 1924. We are not aware of reprints of his works after this year.

Transfer of knowledge from the Swiss to the Brazilian context

According Espagne (1999), individuals who cross frontiers do carry ideas that are transported and transformed, since they are subject to context change. The knowledge that Bieri, formed in Swiss school and influenced by the ideas of Pestalozzi and his followers, brought to the New World suffered modifications since he, himself, did his own reading and interpretation. Considering the local context he made a link between production and reception.

Bieri acted in an educational environment favorable to the dissemination of ideas, where its impact was made without slowness and with followers. For Bourdieu (2002, p. 7), "the education system is one of the places where, in different societies, produces and reproduces systems of thought." To the extent to which Bieri was inserted in the educational context and began writing textbooks for the German-Brazilian schools, he became an agent who used education to convey new ideas, especially those related to the methodology of Arithmetic.

[13] According to information posted in the journal *A Federação* dated December 12th, 1891.
[14] Journal A Federação, December 15th, 1892.
[15] Journal *A Federação,* November 23 rd, 1905.
[16] Journal *A Federação,* May 17th, 1906.
[17] Created by the decreet n. 907 dated May 16th, 1906, by the governor Borges de Medeiros. Journal *A Federação,* May 17th, 1906.
[18] The book for the learning and acquiring German language includes a guide for the learning of the portuguese language. The book with 456 pages reached the 13th edition in 1908.
[19] Journal *A Federação* dated April 25th, 1917.

http://dx.doi.org/10.1590/2236-3459/48962

For Rodrigues (2010) the writers and teachers are, among others, in the group of those who serve as intermediaries in the process of cultural importation and exportation. In the context of this present investigation we identified August Grube, Jakob Egger and Friedrich Bieri as examples of such agents.

August Grube (1816-1884), German pedagogue, became well known for his work *Guia prático para o cálculo nas classes elementares following the principles of a heuristic method*[2020], published in Berlin in 1842. As a follower of Pestalozzi, he adopted the intuitive method:

> Pestalozzi has freed us from the bad method of elementary objective classes (from the scientific-abstract) and has led us to the naturally subjective method (psychological); if we do not do this, thus moving away and transitioning to the intuition flag, which is something great, but with great violence to the other side, will we not change towards a new enemy? (Grube 1873, iii)

In Grube´s view, the great merit of the Pestalozzi School was to have snatched the arithmetic calculus of an abstract and dead formalism and planted it based on the concrete of the animated intuition. Grube suggested that students need to understand the abstract concept of unity, that is, make out of it a concrete thing, just as he called the attention to the confusion between the concepts of one and the unit. The one is a number, as well as ten or one hundred, and each number can be understood as comprising of units of number and thus composed of a multiplicity. He distinguishes between pure number, and applied number, for example, 2.

Table 1 -
Pure number.

Measure and compare	Quick Calculation	Combination
|| 2 | 1 | 1 $\begin{cases} 1+1=2 \\ 2\times 1=2 \\ 2-1=1 \\ 1\div 2=2 \end{cases}$	Nothing written	Which number is twice in number two? What is the number that two is the double of? From what number is one half of ? What is the number that I have to double to reach 2? I know a number which has 1 plus 1. Which number is it?

Source: Grube, 1873, p. 28

The same procedure was adopted for the numbers from 1 to 10. Instead of following the method of presenting first the numbers and the numbering system and then introducing the four operations, he instead focused his attention on the construction of each number, accompanied by the four operations, thus exhausting the possibilities to operate with that number and their predecessors.

[20] This work, which originally had the title *Leitfaden für das Rechnen in der Elementarschule nach den Grundsätzen einer heuristischen Methode*, reached the 5th edition in 1873.

http://dx.doi.org/10.1590/2236-3459/48962

Jakob Egger (1821-1904), Swiss pedagogue and educational Inspector, was professor in 1852, in Münchenbuchsee Seminary, and author of the book *Rechenbuch schwerische Volksschulen und für Seminarien*, 1858. The analysis of this work let us foresee the influence of Pestalozzi and Grube, besides showing that it was a book aimed at the Arithmetic teaching methodology, intended more for the teacher than the student. However, the appropriation that it makes out of Grube´s ideas is partial. He sums up Grube´s method as: "Each number from 1 to 4 is simultaneously subjected to the four operations and in such a way that the progress is no longer in the operation that the child learns, but in the number she arrives at" (Egger, 1874 p. 36). Further, he notes that to each step one puts a heavy weight on the progress of the number and little progress in the numbering system. He alerts to the fact that this method is only positive with a competent teacher, but even so the presentation of the sequence of numbers in this way can be tiring for the student and he may not take his school homework seriously. Furthermore, Grube's method might not correspond to the intellectual development of the child entering school and the demand, being very high, could become an obstacle.

Following this view he believed that the teacher should train children with simple operations of addition and subtraction, and then introduce multiplication and division. He drew attention to the most advanced step that Grube (Egger, 1874) had given, by performing the four operations at the same time. Egger, partially supported by Grube, proposes, in the first level, that the numbers must be understood from the visualization, with strokes, dashes, dots, beans, beats on the table, with coins, steps and fingers. Next, it follows the calculation without visualization, with pure numbers, and only later gets started with the exercises applied to life, which already began in the first school year. How will these guidelines and pedagogical innovations be appropriated by Friedrich Bieri? The analysis of his books have provided us with some clues.

We selected three Brazilian textbooks geared to primary school of arithmetic from the decades of 1850, 1860 and 1870 in order to identify the methodology used by the authors in the presentation of content. The authors had some training in the area, they were engineers, teachers or school principals. The first author was living in Rio de Janeiro, the second in Minas Gerais and the third in Rio Grande do Sul.

The first textbook is of Ascanio Motta Ferraz[21], 1859, entitled *Pequeno curso de arithmetica para uso das escolas primárias*, published by Garnier in Rio de Janeiro. The second is the book by Victor Renault[22] entitled *Postillas de arithmética para* meninos[23], 1865 The third book is of José Teodoro Souza Lobo, for primary education, with the title *Primeira aritmetica para meninos,* whose first edition was in 1874 and approved for teaching by the Board of education.

It appears, in these three works of Arithmetic, the following peculiarities: the authors use definitions to introduce the concepts, using a scientific language, without any concern for adapting to a child's language; with no illustrations; the numbering system is introduced in an abstract form; there is no smooth transition between numbers having one digit or more digits; most of the proposed exercises are in the form of questionnaire, where the

[21] Director of Normal School, effective and honorary member of several national and foreign scientific and literary societies.
[22] Civil engineer and professor in Barbacena.
[23] Professor of the Normal School of Porto Alegre.

http://dx.doi.org/10.1590/2236-3459/48962

student must repeat by memorizing the presented definitions; the four arithmetical operations are presented separately, one after another, always following the same order: addition, subtraction, multiplication and division; no gradual transition with respect to the addition operation, which may start with examples containing three digit numbers, which already involves the knowledge of positional system; the proposed problems do not relate to everyday life of the child, nor to the region where the child lives; there is an appeal to oral exercises, which suggests the application of mental calculation. Thus, it is assumed that the student should memorize the presented definitions, thereby giving value to the theoretical part and leaving in second place the practice of numerical operations. All authors used the multiplication tables for the four operations and emphasized its use in mental calculations.

After this brief description, we will better understand the innovations that Bieri brought to the textbooks that he produced for students of German-Brazilian schools.

The mathematics textbooks by Bieri

The German immigration in Rio Grande do Sul was formed by ethnic groups with significant linguistic differences, therefore the language was a strong barrier in communication during the 19th century. The colonists spoke different dialects and were still unaware of the Portuguese language (Willems, 1980).

Bieri, since arriving in Brazil, realized the difficulty of immigrants and descendants in the confrontation of the two languages, German and Portuguese. Why did Bieri begin writing textbooks in German shortly after he arrived in Sao Leopoldo? He answers the question in the preface of the book *Rechenbuch für die Deutsche Schule in Brasilien*:

> New times require new developments for our schools. Increased demand requires larger forces, but these should not be sought only in the person of the teacher, but in the improvement of the conditions of the school and, especially, in better teaching tools. A common complaint of teachers, school friends and of all is that there is a huge need to edit books for our German schools. Especially in recent years it has proved to be more an intense the desire for a book of calculations in general (arithmetic). After much concern and consideration at the time of preparing the book, I believe that I have fulfilled my duty to my colleagues, with my school, and in general with the German youth. (Bieri, 1974, p. 3)

Among the tools that he considered necessary was the textbook. Incidentally, at that time there was, in the Germanic community, a demand for a specific book of arithmetic in the German language. A demand that he tried to address through the production of this book, whose explicit objectives are stated in the following terms:

> First, that this collection of exercises attend many teachers (parents) as a guide in the area of calculations, on the other hand, attend to alleviate the teacher of lengthy dictation of arithmetic and third to slowly alleviate the students who suffer from inhibitory influences on classes. (Bieri, 1874, p. 3)

Among the books published by Bieri we highlight those destined to the teaching of mathematics: 1) *Rechnenbuch für die Deutsche Schule in Brazilien. Eine Aufgabesammlung in methodisch- Auswahl und Ordnung und praktische faßlicher mit*

http://dx.doi.org/10.1590/2236-3459/48962

Anleitung (first part)[24], in 1873; 2) *Rechenbuch für deutsche Schule in Brasilien. Eine Aufgabesammlung in methodisch-und Ordnung und praktische Auswahl satzlicher mit Anleitung* (second part)[25], in 1874; 3) *Schlüssel zum Erste Teile für deutsche Schule des Rechenbuches in Brasilien*, first edition in 187?; 4) *Schlüssel zum zweiten Teile des Rechenbuches für deutsche Schule in Brasilien*[26], third edition in 1878; Schlüssel zu beiden Teilen für deutsche Schule des Rechenbuches in *Brasilien*, in 1897, without reference to the editing.

Nothing is known about the site and editor of the first editions. Although there are still copies of the second edition (Kreutz, 2007), they are incomplete, there is no cover, they start with the preface, but the reading allows us to infer that the first part was written in 1873 in São Leopoldo, and the second part[27] in 1873 or 1874. On the other hand, the fourth edition of the second part was published in Basel, by the publisher of St. Chrischona and a 1897 edition[28] by the publisher Gundlach & Cia., in Porto Alegre.

The book that refers to the first part has 48 pages, with a foreword and nine parts: 1) calculate from 1 to 10; 2) calculate from 1 to 20; 3) calculate from 1 to 50; 4) calculate from 1 to 100; 5) the four operations[29] from 1 to 100; 6) the 4 operations from 1 to 1000; 7) Addition and subtraction from 1 to 10,000; 8) the four operations 1 to 100,000; 9) the four operations in any interval of numbers. Without much detailing, he indicates “I followed advice of the new pedagogy and as well as the experience of those school teachers, but mostly I kept myself attentive to the book of J. Egger” (Bieri, 1874, p. 4).

Entitled *Prático e metódico livro de contas para as escolas primárias e seminários suíços*, Egger’s book presents, in addition to the contents of Arithmetic, a methodological proposition for teachers. This is based, as he himself declares, on the August Grube method.

We analyzed the fourth edition of Egger’s book of 1874, with 586 pages. Bieri probably used a previous edition. The Swiss author presented himself as an inspector of education, but his attitude toward mathematics and to the methodology demonstrates the same experience with the teaching of this discipline. In the introduction he justified the elementary mathematics education stating that “arithmetic must, on one hand, strongly develop the students thinking and on the other hand allow him to solve with confidence and skill the cases that will arise in the future life” (Egger, 1874 p. 2). Moreover, he criticized how despicable the teaching of calculations, before the year 1830, since it was just rules of things and mere training for future careers. In his view, the ideal was pure calculation and the one that gives spiritual strength to children. According to him, it was clear that the treatment of the four operations with indeterminate numbers should take into account the nature of the child and would need to gradually progress from easiest to most

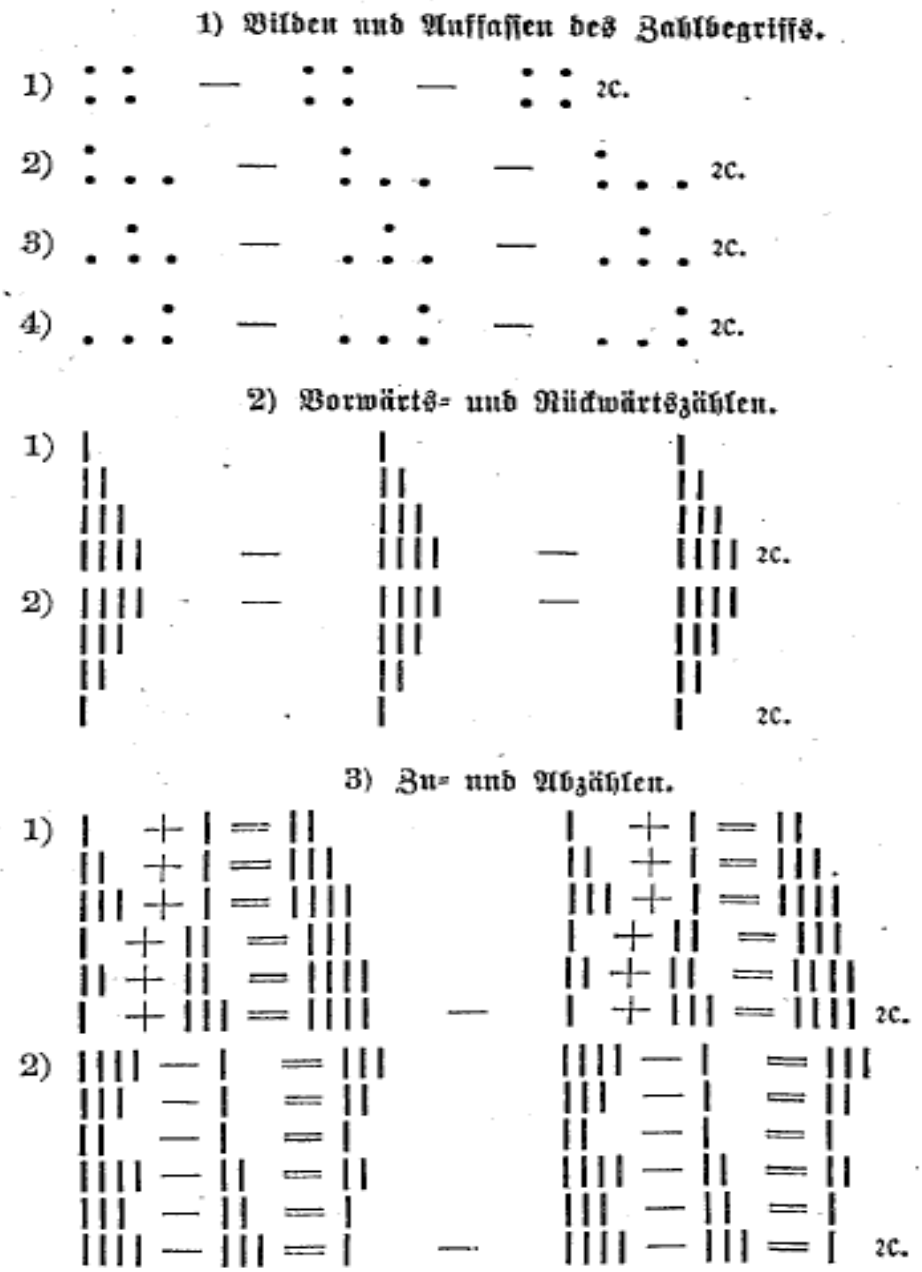
[24] Kreutz and Arendt (2007) inform that the 7th edition was published in 1900 and that a 9th edition was published after this date, but they did find the exact year.
[25] With regards to the second part, Kreutz e Arendt (2007) inform that there was an 8th edition, but it does not indicate the date.
[26] Found in the 1890 edition.
[27] This work was found in the Archive of Nova Petrópolis.
[28] Kreutz and Arendt (2007) did not discover with certainty which was the edition but only its year and location. In 1895 there was an 8th edition and 9th edition of this book.
[29] The literal translation would be species but in the modern terminology this means operations.

http://dx.doi.org/10.1590/2236-3459/48962

difficult. He presents the operations of addition and subtraction simultaneously, initially without using the digits only with circles and strokes, as can be seen in figure 2.

Egger (1874) explores the operations of addition and subtraction using a small amount of balls and strokes to give an idea of the formation of the number 4. Thus, in the first representations of figure 2, with this provision, he features the number 4 as a whole formed by four units, next the four units are arranged so that the display 4 can also be obtained by juxtaposing the 1 plus 3; 2 plus 2 and 3 plus 1. Item 2 shows an increasing count of 1 to 4 and a decreasing count from 4 to 1; Item 3 is intended to show how to add and subtract numbers 1- 4.

Figure 2 -
Fragment from Page 43, Egger, 1874.



http://dx.doi.org/10.1590/2236-3459/48962

We understand that Bieri tried to follow the methodology proposed by Egger (1874), with little differentiation, since it uses in the same representation strokes and numbers. In the first part he introduced the numbers 1 to 5, represented by strokes and simultaneously presented the addition and subtraction involving such numbers. Exercises 2 and 3 suggest that the equalities be completed. See the figure that follows, with a fragment extracted from p. 5 (Bieri, 1877, p. 1): No theoretical explanation accompanies this text. It is assumed that the task of explaining the meaning of the symbols +; - and = was the teacher's responsibility.

Figure 3 -
Calculation with cyphers (figures).

Source: Fragment of *Rechnenbuch für die Deutsche Schule in Brasilien. Eine Aufgabesammlung in methodisch-Auswahl und Ordnung und praktische faßlicher mit Anleitung - first part* (Bieri, 1877, p. 1).

There is a close proximity to Eger's proposal and, to a lesser extent, with those of Grube. The resolution of the problems began with the presentation of the numbers 1 to 10, while simultaneously addressing the operations of addition and subtraction. Example: "Ludwig must write 7 lines, but he only wrote 4. How many lines are still missing?" Children are called by traditional German names, but while introducing monetary issues and everyday objects, the author uses the Brazilian standard. Examples: "Heinrich must buy bread. He receives from his mother 10 vintens (vinten is an old Brazilian and Portuguese coin) and each bread costs 4 vintens. How many breads does he get and how much money does he get back as change?" (Bieri, 1877, p. 7).

http://dx.doi.org/10.1590/2236-3459/48962

Egger (1874) distances himself moderately, from Grube's proposal since he does not simultaneously bring, the four operations: for example, while working with number 2, he performs all possible operations without going over number 2. In the case, he could do the following operations: 1 + 1 = 2, 2 - 1 = 1, 2 : 1 = 2 and 2 x 1 = 2. However, he anticipates the division operation before multiplication, soon after presenting addition and subtraction operations. He poses questions like: "How can I divide 4 into two parts? He answers: 4 is 2 plus 2, 4 is 3 plus 1 and 4 is 1 plus 3" (Egger, 1874, p. 44) In his view, the division should begin this way, so that to gradually reach the division of equal parts.

In Bieri´s proposal multiplication and division are presented simultaneously in the sixth lesson, when dealing with numbers from 1 to 20. He uses no symbols but as Egger, he presents multiplication and division problems: "How many days are there in two weeks? Six children equally divide among themselves 12 oranges. How many oranges does each child receive?" (Bieri, 1874, p. 12). "Our neighbor had 10 geese, sold half of them and afterwards bought three others. How many geese does he have now?" (Bieri, 1874, p. 8).

In the 19th century the teaching of mathematics stood in mental calculation (Reis, 1892). Upon the introduction of numbers up to 20, Bieri made explicit reference to the two types of calculation: oral and written. After the presentation of the numbers from 1 to 100 and having explained the use of the multiplication sign, the multiplication table (in German: Einmaleins) of number 1 through number 10 is introduced.

The theoretical explanations inserted in this text were directed both to parents as well as teachers and appear in the text, for example, when he introduces an algorithm for adding the following numbers: 47, 23, and 15:

> Theoretical explanation: [...] three numerical quantities that have to be added. As such, it is necessary to clearly think that number 47 is equal to seven units and four tens, and 23 is equal to three units and two tens; and 15 is equal to five units and one ten. All three numbers are formed of two different parts, namely from units and tens, and course when added it includes these two parts. But since you cannot add different kinds of things, it is necessary for units to be added to units and tens added to tens. When this is done, it appears that 7 units and 3 units are 10 units and that 5 more units give 15 units; also that four tens and two tens are 6 tens and one more ten are seven tens. As such, the three numbers, when added together, equals 15 units and seven tens or equal to 5 units and 8 tens because it it adds 1, which is contained in the number 15, which whenwritten in numbers is expressed by the number 85. (Bieri, 1874, p. 19)

In the second part of *Rechnenbuch für die Deutsche Schulen in Brazilien. Eine Aufgabesammlung in methodisch- Auswahl und Ordnung und praktische faßlicher mit Anleitung*, in figure 4, Bieri continues the proposal made to the first part: he starts by the simple to reach the difficult, noticeably repeating the ideas of Grube and Egger.

http://dx.doi.org/10.1590/2236-3459/48962

Figure 4 -
Cover of the *Livro de cálculos*, part 2, 1889.

Translation: *Book of Calculations for German schools in Brazil*. A collection of problems chosen and ordered in practical method with more understandable instructions. From Friedrich Bieri, professor in Porto Alegre. Reviewed by P. Gerlach, director of the German School in Porto Alegre. Second Part. Fourth Edition. Basel. Publisher St. Chrischona. 1889

http://dx.doi.org/10.1590/2236-3459/48962

The contents of the second part of the book of arithmetic are as follows: Measuring system: metric system for weights and masses, including measures of length, area and volume; coal and other things to measure land, measures for liquids and grains, measures for light, heavy and very heavy weights, measures of time, paper dimensions, as well as conversion of old measurements to the metric system. The four operations: problems involving measurements and trade accounts. Simple rule of three. Common fractions. Operations with fractions. Prime numbers and composed numbers. Reducing fractions to the same denominator. Composed rule of three composed. Decimal fractions. Operations with decimal fractions. Applications of decimal fractions. Simple interest rate. Special cases of simple interest rate calculation. Calculating discount. Calculation of gain and loss. Calculating percentages. Partnership Proportions. Calculation of transformations. Extraction of square and cubic roots.

A detailed analysis of the problems proposed in the 95 pages of the book allows us to infer that this was a proposal of application of arithmetic, even though there was also a theoretical nature, aimed at developing the ability to reason. As for the applications of arithmetic, these were toward everyday problems, needed to understand and solve the problems of measurements, both of land, as of goods, counting of time and monetary system.

The problems of inheritance were also part of the cast of statements. Another concern was to prepare students for the questions about commerce, money applications, involving interest rates, discounts, gains and losses. It was not enough to only master the four operations with any numbers, but to use these operations in concrete situations of purchase and sale of land and other goods, understanding the monetary system of Brazil, involving mainly interest rates. The applied problems involved buying and selling of goods, animals, lands and rural trade work; sources and water flow; ages; land measurement; inheritances, among others.

Examples:

> Of a piece of land measuring $35\frac{5}{6}$ hectares of land, $15\frac{5}{7}$ hectares are sold, how many hectares of this land still remain? (Bieri, 1889, p. 40)
>
> What is the cost of corn ration for a horse from October 5 until March 13 of the following year, if a hand (ein zu bund 8 vintens) of 8 vintens for the each day is needed? (Bieri, 1889, p. 17)
>
> A father left an inheritance of 70845 and $\frac{2}{5}$ thousands of Mil. As per the testament, the younger son should receive 24810 and $\frac{1}{2}$ thousands mils, the second youngest son should receive $\frac{4}{5}$ more than the younger and the oldest son the rest. How much should each receive? (Bieri, 1889, p. 44)

On the other hand, there are theoretical problems, such as common ordinary fractions, prime numbers and extraction of square and cubic roots of numbers. Examples of fully theoretical questions:

http://dx.doi.org/10.1590/2236-3459/48962

> Give the prime numbers from 40 to 100! Problem of mental calculation. (Bieri, 1889, p. 34)
> Divide a line in half and in the same way in 3, 4, 5, 6 and 7 equal parts and give the amount and the number of equal divided parts! Problem of mental calculation. (Bieri, 1889, p. 35)
>
> Extract the cubic root for $\sqrt[3]{0,095711845}$ (Bieri, 1889, p. 95)

We note that the book would be a guide for the teacher in the classroom, which would save his time, dismissing him of dictating problems and thus allowing him to focus on the explanation and resolution of them, according to his own words in the preface, "with this economy of time, the teacher can engage more in the mental calculation" (Bieri, 1889, p. 7). Moreover, by avoiding the copying of the lessons dictated by the teacher, students would have more time to work out the calculations.

The author exposes the problems, in an ordained numerical sequence and suggests that its resolution occurs in two forms: mental calculation, [mündlich], and written calculation, [schriftlich]. Mental calculations appear more in the first part of the book, in simpler tasks. There, for example, exercises on square or cube root extraction of numbers are not proposed since this is a matter which requires a more detailed algorithm.

> Rule of three integer numbers
> Example: 4 m (m = meter) of fabric cost $ 32000 reis[30], how much will 16 m cost?
> Resolution
> by mental calculation.
> If 4 m cost $ 32000 reis then 1 m costs a quarter of that amount or $ 8000 reis and 16 m cost 16 x $ 8000 or $128000.
> Written
> The problem has two parts.
> That which is given in the sentence: 4m cost $ 32000 reis
> That what is asked in the sentence: How much do 16m cost?
> In the example above we find two sentences:
> 4m cost $ 32000 reis. 16m cost?
> The resolution of the written calculation is as follows:
> 4 m cost $ 32000 reis
> 1m costs the one fourth, that is, 32 / 4 = $ 8000 reis
> 16m cost 16 times more, also 16x$ 8000 reis = $ 128.000 reis. (Bieri, 1889, p. 23)

The mental calculation, one of the methods outlined in the book, aimed at the development of mathematical reasoning, but it was also justified in view of the lack or sometimes the absence of writing materials such as: paper and pencil, as Kreutz (1994) states.

The author manifests himself on common ordinary fractions, stating that the calculation with fractions would not have much practical use, but he presented it with rigor because he believed that it would serve to develop the power of thought.

[30] Reis is a former Brazilian monetary unit.

http://dx.doi.org/10.1590/2236-3459/48962

We found, while analyzing the various editions of part 1 and 2 of Bieri's book of calculations, that they suffered small changes. From the fourth edition of the second part the author himself states that the modifications made: language and spelling corrections, the paragraph addressing money exchange rates was completely redesigned, the exercises were placed in another order, some examples were deleted as they were considered superficial and others with greater importance were introduced (Bieri, 1889).

When starting, in the 1870s, with a book with an answer key of the exercises and proposed problems of the two books of arithmetic, Bieri became an innovator in 19th century. Silva (2000) points out that with the books of Antonio Trajan, in late 19th century, a stage of special textbooks geared to teachers was started. They were named answer key or teacher's books. Nonetheless, Bieri initiated this proposal at least twenty years earlier.

In the preface to the 1897 edition Bieri defended the need for such a book, even for the parents of the students who accompany the studies of their children. But not only the results were given since for many problems he even presented a detailed problem resolution strategy.

In addition to the answers to the problems and problems with resolution, theoretical issues not contained in Parts 1 and 2 were presented such as for example, a long algorithm to multiply decimals, including approximations. In this sense, the book *Chave de respostas* can be seen as a didactic innovation among books devoted to primary schools in the 19th century.

The work of Bieri for the teaching of mathematics had at least nine editions. The initiative of this author was followed by Rotermund (1879), who published the didactic textbook named Rechenfibel with a proposition similar to Bieri´s proposal, but bilingual. The book of Rotermund, with 50 pages, involves only the four basic operations of arithmetic, without theory and exercises and problems posed unanswered. After the Republic other authors of textbooks appeared, both in German and in Portuguese. Among them Rechenbuch Schule für deutschen in the Brazilien of Mathaeus Grimm (1930) and Arithmetica Practice in four parts of Otto Büchler, first published in German in 1915 and in Portuguese in 1925 and 1930.

As a harsh critic of his own production Bieri manifested himself many years after its last edition, contrary to the reissuing of his Lesebuch stating[31]: "the book is old-fashioned, something better should come" (Telles, 1976, p. 124). As a wire that breaks, Bieri, son of his time, the immigrant who came to stay, understood the pace of his time and foresaw the future that would follow him. The textbooks for the German-Brazilian schools books began to be written in Portuguese from the 1920s on, as a reflex on a change of policy. Upon severing relations with Germany, on April 11, 1917, and later, in October of the same year with Brazil declaring war against German alliance, the situation in the colonies suffered consequences. The governor of the state Borges de Medeiros began to manifest himself on the education in the German colonies as follows: "to forbid the functioning of German

[31] 15th edition in 1907.

http://dx.doi.org/10.1590/2236-3459/48962

schools, such as those skilled ones, in which teaching was done exclusively in German and subjected to the programs and methods of German teaching" (Medeiros, 1918, p. 20th). He continued arguing about the need for nationalization of schools and banned the use of textbooks written in German on: "history, geography, arithmetic, reading, etc". The textbooks in German language, such as Bieri, were gradually disappearing and new books inspired in a nationalization policy emerged gradually displacing those which, for a long time, occupied a prominent place. But it should be noted that the official ban did not immediately reflect in the practice of publishing books in German. In the list of German-language books Kreutz and Arendt (2007) we find editions of textbooks in German, for example Praktische Rechenschule in vier Heften fur Deutsche Schulen in Brazilien of Otto Büchler, with editions in 1924, 1928, 1930, 1933, and the Mein Rechenbuch, of Nast and Tochtrop, with the first edition in 1933. However, Nast and Tochtrop, in 1934, began publishing the same work in English.

Conclusions

Most of the German immigrants who arrived in Rio Grande do Sul were farmers without much education. However, Friedrich Bieri already had training for teaching and experiences in schools in Switzerland. With this, he assumed activities geared exclusively for education, as a teacher in different schools, assessor of exams and textbook author: it was necessary that students have in hand a textbook aiming to depart from reality and the local context, and that at the same time, helped the teacher, thus avoiding that all problems and contents were dictated.

The applications listed in the Book of arithmetic for German schools in Brazil, 1st and 2nd parts, were directed to the Brazilian reality, adopting the monetary system of the country and old measures such as stick, bag, braça (fathom), hand, arroba (ca. 15 kg), such words that were not translated into German, as well as certain foods such as corn, or objects such as calico or cigars. The method of Grube was the one adopted, but with adaptations. The theory appeared in the text without great emphasis, since the application in the form of problems and exercises were the focus of the book. Some concepts were heavily-worked on like common and decimal fractions, as well as interest, discount and proportions. The more theoretical content had justified inclusion since it served to develop the intellectual faculties.

Considering the emphasis given by Egger on the intuitive method[32], even though Bieri had not used that name, he tried to follow such orientation. We conclude that the new pedagogy, centered on the intuitive method, also counted with the participation of European immigrants, primarily through publications in textbooks directed for the elementary teaching of mathematics, where Friedrich Bieri was one of the cultural agents.

We note that, 140 years after the publication of this book, there are problems presented therein that are still proposed in current books, such as those regarding to the

[32] The references to the intuitive method show up in the official documents, in Rio Grande do Sul, as in decree n. 239 of 1899. Available in <https://repositorio.ufsc.br/xmlui/handle/123456789/98894/search?query=1899&rpp=10&sort_by=0&order=DESC&submit=Go>. Acessed on April 24th, 2014.

ages of parents and children, inheritance, sales and interest. The proposal that aims to start from the student's reality constituted a backdrop where the problems are not truly real, but school mathematical problems formulated with the intention to teach mathematical concepts.

Bieri, as a mediation agent, transferred a method of teaching mathematics created for the European cultural context, where an organized educational structure already existed, with training courses for teachers, internships for teaching practice and production of textbooks for a new cultural context - Brazil.

In this new place, in the early 1870s, the school system was not yet fully organized. A school for teacher training - Normal School - in Porto Alegre, founded in 1869 (Schneider, 1993, p. 245), was still in a consolidation phase and many teachers in primary schools were lay. In this context, Bieri wrote and published innovative books for the teaching of Mathematics, bringing a European methodology, that when adapted to the national context, supplied the lack of textbooks for German-Brazilian schools, until the political change in the decade 1920 presented other senses and forms for books.

References

ALMEIDA, Manoel Ribeiro. *A instrucção pública*. Rio de Janeiro, 2 jun., 1872, p. 59.

BIER, Frederico. Relatório do diretor da Instrução, 1879, p. 11. In: Relatórios dos presidentes da Província do Rio Grande do Sul - de 1830 a 1889. Available in <http://hemerotecadigital.bn.br/acervo-digital/relatorios-presidentes-provincias-brasileiras/252263>. Acessed em: 10 out., 2012.

BIERI, Friedrich. [*Carta*] 9 de fev. 1869. Aigle, Suíça [para] Pilgermission Saint Chrischona, Basel. 8f. Autobiografia manifestando interesse em entrar para a missão.

BIERI, Friedrich. *Novo methodo para aprender a língua alemã sem fazer traduções*. Porto Alegre: Gundlach, 1894.

BIERI, Friedrich. *Rechnenbuch für die deutsche schulen in Brasilien*: Eine Aufgabesammlung in methodisch- und praktische Auswahl und Ordnung mit faßlicher Anleitung. Erster Teil. [s.n.] 1873.

BIERI, Friedrich. *Rechnenbuch für die deutsche schulen in Brasilien*: Eine Aufgabesammlung in methodisch- und praktische Auswahl und Ordnung mit faßlicher Anleitung. Zweiter Teil. 4. ed. Basel: Druckerei St. Christchona, 1889.

BIERI, Friedrich. *Schlüssel zum beiden teilen des Rechenbuches für die deutsche Schulen in Brasilien*. Basel: Druckerei St. Christchona, 1887.

BITTENCOURT, José da Cunha. *Relatório da Inspetoria Geral de Instrução Publica da Provincia de S. Pedro do Rio Grande do Sul*. Porto Alegre: Typografia do Constitucional, 1873.

BOURDIEU, Pierre. Les conditions sociales de la circulation internationale des idees. *Actes de la recherche en sciences sociales*, n. 145, 2002, p. 3-8.

BRAUDEL, Fernand. *Escritos sobre a história*. São Paulo: Perspectiva, 2009.

BÜCHLER, Otto. *Praktische Rechenschule in vier Heften für deutsche Schulen in Brasilien* - 2. Heft: Erziehung der Rechenfertigkeit in den 4 Grundoperationen im unbegrenzten

http://dx.doi.org/10.1590/2236-3459/48962

Zahlenkreise bis zum Abschluß der Bruch- und Dezimalbruchrechnung São Leopoldo: Verlag Rotermund &Cia, 1933.

EDITORIAL. *Rio Post,* Rio de Janeiro*,* 8 dez., 1886, p. 1.

EGGER, Jakob. *Methodish-pratisches Rechnenbuch für schwerische Volkschulen und Seminarien*. Bern: Druck und Verlag von R. J. Wyss, 1874.

EINGEGANGENE BÜCHER UND ZEITSCHRIFTEN. *Rio Post*, Rio de Janeiro, 16 ago., 1887, p. 5.

ENGELMANN, Erni et al. *A saga dos alemães*: do Hunsrück para Santa Maria do Rio Novo. Igrejinha: [s.n.], 2005.

ESCOLA BRASILEIRA*. A Federação,* Porto Alegre*,* 12 dez., 1891, p. 1.

ESCOLA BRASILEIRA*. A Federação,* Porto Alegre*,* 15 dez., 1892, p. 2.

ESPAGNE, Michel. Les Transferts culturels franco-allemands. Paris: PUF, 1999.

EXPEDIENTE DA INSTRUÇÃO PÚBLICA. *A Federação,* Porto Alegre*,* 8 abr., 1886, p. 1.

EXPEDIENTE. A Escola: revista brasileira de educação, Rio de Janeiro, 1877, p. 227.

EXPOSIÇÃO GERAL DE BELAS ARTES. *Gazeta de Notícias*, Rio de Janeiro, 10 out., 1894, p. 1.

FERRAZ, Ascanio Motta. *Pequeno curso de arithmetica para uso das escolas primárias*. Rio de Janeiro: Garnier, 1859.

GOVERNO DO ESTADO. *A Federação,* Porto Alegre*,* 25 abr., 1917, p. 1.

GRIMM, Mathaeus. *Rechenbuch für deutschen Schulen in Brasilien*. Porto Alegre: Livraria Selbach, 1930.

GRUBE, August. *Leitfaden für das Rechnen in der Elementarschule nach dem Grundfassen einer heurischenden Methode* - ein methodischer Beitrag zum erziehenden Unterricht. Berlin: Verlag von Theod. Enslin, 1873.

KELLERHALS, Katharina. *Der gute Schüler war auch früher ein Mädchen*: schulgesetzgebung, fächerkanon und geschlecht in der volkschule des kantons Bern. Bern: Haupt, 2010.

KREUTZ, Lucio. *Educação no Brasil*: história e historiografia. Campinas: Editores Associados, 2001.

KREUTZ, Lucio. Livros escolares e imprensa educacional periódica dos imigrantes alemães no Rio Grande do Sul, Brasil 1870-1939. *Revista Educação em Questão*, Natal, v. 31, n. 17, 2008, p. 24-52.

KREUTZ, Lucio. *Material didático e currículo na escola teuto-brasileira*. São Leopoldo: Unisinos, 1994.

KREUTZ, Lucio; ARENDT, Isabel Cristina. Livros escolares das escolas de imigração alemã no Brasil. *Acervo documental e de pesquisa*. Unisinos. DVD, 2007.

LIVROS DIDÁTICOS. *A Federação,* Porto Alegre*,* 17 mar., 1885, p. 2.

LOUBO, José Teodoro Souza. *Primeira aritmetica para meninos.* Porto Alegre: Editora Globo, 1893.

MACIEL, Leopoldo Antunes. Relatório do vice-presidente da Província, em 28 de outubro de 1882. In: Relatórios dos presidentes da Província do Rio Grande do Sul - de 1830 a 1889. Available in <http://hemerotecadigital.bn.br/acervo-digital/relatorios-presidentes-provincias-brasileiras/252263>. Acessed em: 10 out., 2012.

MEDEIROS, Antonio Augusto Borges. Mensagem enviada à base dos representantes do Estado do Rio Grande do Sul. Em 20 de setembro de 1818. Available in <http://hemerotecadigital.bn.br/relatorios-dos-presidentes-dos-estados-brasileiros-primeira-republica/720500>. Acessed em: 20 nov., 2013.

NAST, Wilhelm; TOCHTROP, Leonhard. *Mein Rechenbuch* - 4. Heft. São Leopoldo: Rotermund & Co., 1935.

PALMER, Christian; WILDERMUTH, Johann (ed.). *Encyklopädie des gesamten Erziehungs und Unterrichtswesens*. Tübingen: Verlag von Rudolf Besser, 1870.

REIS, Luiz Augusto. *O ensino público primario em Portugal, Espanha, França e Belgica:* escolas primarias elementares e superiores, maternais, profissionais, normais, asilos e jardins infantis, museus pedagogicos, etc: relatório apresentado a inspectoria geral de instrução publica da capital federal. Rio de Janeiro: Imprensa Nacional, 1892.

Relatórios dos presidentes da Província do Rio Grande do Sul - de 1830 a 1889. Available in <http://hemerotecadigital.bn.br/acervo-digital/relatorios-presidentes-provincias-brasileiras/252263> Acessed em: 10 out., 2012.

RENAULT, Victor. *Postillas de arithmética para meninos*. Rio de Janeiro: Garnier, 1865.

RIO GRANDE DO SUL. *Deutsche Zeitung,* Curitiba*,* 5 mar., 1897, p. 2.

ROCHE, Jean. *La colonization allemande et le Rio Grande do Sul*. Paris: Univ. de France, 1959.

RODRIGUES, Helenice. Transferência de saberes: modalidades e possibilidades. *História:* Questões & Debates, Curitiba, n. 53, 2010, p. 203-255.

ROTERMUND, Wilhelm. *Rechnenfibel*: primeiro livro de aritmética. São Leopoldo: Evangelische Buchandlung, 1879.

SCHNEIDER, Regina Portela. *A instrução pública no Rio Grande do Sul*: 1770-1889. Porto Alegre: Ufrgs, 1993.

SEÇÃO JUDICIÁRIA. A Federação, Porto Alegre*,* 17 maio, 1906, p. 2.

SILVA, Circe Mary Silva. O livro didático de matemática no Brasil. In: John Fossa (org.). *Facetas do diamante*: ensaios sobre educação matemática e história da matemática. Rio Claro: Sociedade Brasileira de História da Matemática, 2000, p. 109-162.

TELLES, Leandro. Friedrich Bieri: professor evangélico e pioneiro do espiritismo no Rio Grande do Sul. SIMPÓSIO DE HISTÓRIA DA IMIGRAÇÃO E COLONIZAÇÃO ALEMÃ NO RIO GRANDE DO SUL, 2, 1976. Anais ... São Leopoldo: Unisinos, 1976, p. 115-134.

VERMISCHTES. *Rio Post*, Rio de Janeiro, 19 jul., 1887, p. 5.

WILLENS, Emilio. *A aculturação dos alemães no Brasil*: estudo antropológico dos alemães e seus descendentes no Brasil. São Paulo: Brasiliana, 1980.

WULFHORST, Ingo (org.). *Espiritualismo/espiritismo*: desafios para a igreja na América Latina. São Leopoldo: Sinodal, 2004.

http://dx.doi.org/10.1590/2236-3459/48962

CIRCE MARY SILVA DA SILVA is adjunct professor and researcher at the Graduate Program in Education at the Federal University of Espírito Santo, a PhD in Education from the University of Bielefeld and is dedicated to research on the history of mathematics in Brazil, mathematics education and cultural diversity.
Address: Avenida Fernando Ferrari, 514 - 29075-910 - Vitória - ES - Brazil.
E-mail: cmdynnikov@gmail.com.

Received in July 18, 2014.
Accepted in September 15, 2014.