

**Zeitschrift:** Ferrum : Nachrichten aus der Eisenbibliothek, Stiftung der Georg Fischer AG  
**Herausgeber:** Eisenbibliothek  
**Band:** 92 (2022)  
**Rubrik:** English Summaries

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# English Summaries

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**Reinhold Reith**

## **Approaches to raw materials throughout history: Strategies of resource use**

The term “recycling” was coined in the 1970s – an era in which resource consumption, waste, and general environmental devastation were on the rise – to describe a strategic option for creating a circular economy. Strategies for dealing with scarce and expensive raw materials can also be observed in pre-industrial societies, however. People would use materials and products more sparingly or for longer periods of time; often a lively trade in used goods sprang up as well. Based on the assumption that resources are limited and once again becoming scarce, we may justifiably use the term “scarcity economy” to describe our present age and the future as well. A look at historical developments lends perspective to current debates about sustainability and strategies for resource use.

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**Tina Asmussen**

## **Poor, useful, poisonous, or promising? Lead in the early modern era**

Not only today, but already in the early modern period, has lead been perceived as an extremely ambivalent resource: it was an indispensable material with numerous applications, but also an environmental toxin and health risk for workers and residents, inhabitants of mining regions. As this paper shows, the importance of lead was not limited to its role as a raw material in production and a commodity in economic and technological terms. The relevance of lead as a resource opens up a complex web of material meanings and perceptions that have since disappeared from modern consciousness.

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**Matthias Baumgartl**

## **The copper trade around 1600: Commercial challenges and opportunities**

The copper trade in the sixteenth century was characterized by oligopolistic structures. Since copper mining was a capital-intensive business, mining contracts were chiefly awarded to affluent investors. At the turn of the sixteenth century, changes in supply and demand led to an increase in prices for this raw material. As a result, intense competition arose between rival businesses vying for copper contracts. Based on the activities of the Wolkenstein-Rodeneggs, a noble family involved in copper mining, the article examines the strategies by which merchants sought to succeed in the copper trade.

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**Hailian Chen**

## **Zinc for coin and brass: A commodity chain analysis approach to studying resources in early modern Chinese history**

Zinc was an essential base metal used to produce coin and brass in late imperial China and was also a global commodity exported from China to other parts of Asia and Europe in the early modern period. This article is a highly condensed result of the author’s zinc research project. It provides a methodological approach to our understanding of natural resources in history by tracing zinc’s commodity chain (including demand, production, transport, commercialization and consumption). At the intersections of technology and resources, the history of the Chinese zinc enterprise was an integration of a variety of resources (including zinc ores, capital, coal fuel, human labor, draft animals, and many other raw materials and types of “ecological footprints,” such as food resources).

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**Elisabeth Vaupel & Florian Preiß**

## **Technological uses of chicken’s eggs in the nineteenth and early twentieth centuries**

The eggs of chicken and geese contain egg white, fat, and emulsifiers. Small-scale technological and commercial uses go back thousands of years. From the 1950s onwards, however, eggs became an important raw material of which a number of industries required huge amounts. The ovalbumin derived from egg whites was used in cotton printing and photography, for example, while egg yolk was utilized in the leather and food industries.

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**Matthias Heymann**

## **Investigating global resource chains: The case of the global Danish plant oil complex**

This paper aims to investigate the establishment of global resource chains in the plant fat industry from the late nineteenth to the late twentieth century, in which the plant oil producing company Aarhus Oliefabrik in Aarhus, Denmark, and oil plantations in Malaysia of the Danish company United Plantations played a pioneering role. It summarizes details of a research project on the building and operation of resource chains from two different vantage points, one from the Aarhus plant oil industry reaching out to global resources, and one from the building and operation of Danish plantations in Siam, Malaya and Indonesia, reaching out for metropolitan users.

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**Bastian Linneweh-Kacmaz**

**Raw materials, global markets:**

**The conflict over caoutchouc in the interwar period**

International trade in raw materials has long been a sign of growing globalization. Its impact on the countries involved is not purely beneficial, however, since it can result in overdependence and supply insecurity. Moreover, government interference tends to undermine merchants' confidence in global networks. The trade in caoutchouc – also known as rubber – during the interwar period provides a case study of market intervention and the risks it spells for the countries and companies involved. An analysis of value chains sheds light on the challenges that confront nation states seeking to control global markets.

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**Egor Lykov**

**Underdevelopment as an engine of innovation:**

**Petroleum as a fuel in the Russian Empire, 1880–1914**

During the early phases of modern petroleum use from around 1880 to 1914, pathbreaking inventions by Russian engineers made it possible to exploit oil for rail transport. Based on numerous unpublished documents from the central and regional archives of the Russian Federation, books published in Russia on the production and use of petroleum, and other contemporary Russian scientific media, this article demonstrates that most innovations in the Russian oil industry around that time were aimed at saving resources and minimizing costs. This made oil more attractive to customers and encouraged the European parts of Russia, particularly Transcaucasia and the Volga Region as well as St. Petersburg and Moscow, to make the transition to oil as the main source of energy more swiftly than was the case in most other parts of the world.

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**Jørgen Burchardt**

**Recycling Scrap for Steelmaking:**

**The case of the Danish Steel Rolling Mill**

Steel scrap is one of the most recycled materials. It uses approximately 35 percent less energy and reduces emissions of greenhouse gases up to 87 percent. The use of scrap is not unproblematic, however, and the accumulation of quality-compromising tramp elements has become an increasing threat to its use and viability as a "raw material" for steel. As a steelworks in a country without iron ore, the Danish Steel Rolling Mill and its history between 1943 and 2002 provide a good case study for looking at these facets in the nature of scrap. The successful recycling

of scrap at the mill required a well-organized collection regime, while quality control at the mill ensured that industries such as the Danish shipyards could remain competitive.

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**Luise Elsässer**

**Undertaking the full circle:**

**The working horse's utility in the first half of the twentieth century**

The use of horsepower remained a significant energy source for Western European economies until the 1950s. Horsepower was needed for everything and by everybody in one way or another. If working horses were an industrial and agricultural energy source of the nineteenth and early twentieth centuries, then the horses' carcasses were its by-product. The end of a working horse's life eventually brought usage full circle, as the remains were fed back into economic circulation. This paper looks at the different uses of horsepower and its disappearance, using the example of England. The use of horsepower was socially and culturally coded, while the animals served as raw material, commodity, working power, and food, from its breeding to its disposal.

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**Martin Baumert, Michael Farrenkopf & Torsten Meyer**

**When the digging is done:**

**Landscape rehabilitation research and methods in the Lusatian lignite mining district, 1950–1980**

As lignite was of strategic importance to the economy of the German Democratic Republic, surface mining was an expanding industry in the Central German and Lusatian mining districts. The waste heaps, dumps, and open pits that it left behind, however, called for some form of reuse. The Lusatian mining district was the GDR's main source of coal and energy from 1957 onwards. The article examines research on mine rehabilitation in this region and discusses rehabilitation methods implemented there in the 1950s and 1960s, although these were often based on earlier studies from the 1920s. The innovative rehabilitation methods developed in these decades were to dominate landscape rehabilitation efforts throughout the remainder of the GDR's existence.

## English Summaries

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**Ole Sparenberg**

**How do you define a resource?**

**The colorful history of the manganese nodule, 1873–2021**

Manganese nodules provide an interesting case study of our concepts of materials and resources. No material is inherently a resource; whether or not it is perceived as one is essentially a question of context. The discovery of manganese nodules in the deep seabed dates back to the late nineteenth century, but it was only in the 1950s that these polymetallic minerals began to be considered as a potential resource. In the late 1970s, mining seemed about to take off, but then economic interest in the nodules began to wane, only to recover in the twenty-first century, although without so far arousing any commercial activity. These ups and downs are accounted for by changes in economic, political, and legal frameworks as well as fluctuations in environmental awareness. Thus a material can become a resource – and cease to be one – in a process that is both open and reversible.

the library's old and rare books collection, this article will provide an insight into these raw materials histories. Along the way, it will also show some of the more curious material qualities of individual works in the collection that are indicative of trends in the resource consumption of the publishing industry or else highlight features of the books' unique biographies.

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**Franziska Eggimann**

**Raw materials tell a story:**

**Material procurement at GF as a mirror of the company's and the world's history (1899–1932)**

From the long-standing cultivation of a Europe-wide trading network to the introduction of technical innovations to overcoming times of war and crisis: the raw materials directories of GF from 1899 to 1932 with their sober series of figures speak of a multifaceted company and world history, on closer inspection. Using this extensive source, the article provides an overview of the origin and procurement of the primary raw materials used in the GF plants in Schaffhausen, as well as internal and external developments and events in the three decades from the turn of the century to the global economic crisis at the beginning of the 1930s.

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**Christopher Zoller-Blundell**

**The stuff of literature:**

**Raw materials and the books of the Iron Library**

While the Iron Library's guiding interest in the history of materials science makes it an incredibly rich assemblage of literature for examining the development and uses of innumerable raw materials in the history of science, industry and economics, the physical substance of the books themselves presents fascinating raw materials stories too. Using a few selected examples from the holdings of