Business History

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/fbsh20

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To cite this article: Heike Weber (2021): Nazi German waste recovery and the vision of a circular economy: The case of waste paper and rags, Business History, DOI: 10.1080/00076791.2021.1918105

To link to this article: https://doi.org/10.1080/00076791.2021.1918105

Published online: 18 May 2021.

BUSINESS HISTORY
https://doi.org/10.1080/00076791.2021.1918105

Routledge
Taylor & Francis Group

Nazi German waste recovery and the vision of a circular economy: The case of waste paper and rags

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ABSTRACT

In Nazi Germany (1933–45), reclaiming waste became an intrinsic component of the regime's economy as well as its ideological, racial, and expansionist ambitions. National Socialist interventions into waste streams began in 1934 with salvage campaigns. The state then brought urban waste policies and municipal waste services under its control, restructuring and 'Aryanising' the waste salvage trade. Moreover, both consumers and producers were prompted to collect and reprocess waste. Over time, the gradual expansion of the Nazi waste recovery policies and campaigns – here referred to as the 'Nazi waste exploitation regime' – brought forth a determined vision of a circular economy in which no waste whatsoever should escape its reclamation for the national community or *Volksgemeinschaft*. This article sketches the actors, structures, and objectives of this waste exploitation regime for the case of rags and paper and uncovers its entanglement with Nazi racist and genocidal ideology and expansionism.

KEYWORDS

Nazi Germany; waste; recycling; salvage; rag-and-bone trade; paper industry; textile industry; fibre industry; circular economy

During the First as well as the Second World War, governments of most warring nations implemented salvage drives and had scrap metal, paper, bones, or other waste materials exploited as a supplementary national resource base to back their war economies (Chickering, 2009, pp. 153–197; Denton & Weber, 2021; Oldenziel & Weber, 2013; Thorsheim, 2015). As explained in the introduction of this special issue, the Second World War in particular changed the waste business's economic conditions and its underlying moral economies. Even if the material outcome of the salvage efforts is questionable, certain waste materials – metal scrap or bones for example – supplied the war machines with pivotal resources, while at the home front, salvage drives served the ideological purpose of mobilising citizens; retrieving, sorting, and accumulating waste for its reclamation were identified as a national duty and an act of supporting the war.

The nexus of war and waste recovery is particularly notorious for Nazi Germany, yet its scope has so far been scarcely studied in business and economic history. As reclamation played (and still plays today) a major role in metal generation and processing – such as copper reclamation or the steel industry's substantial reliance on scrap metal inputs –, economic historians have focussed on the Nazi hunt for metal resources and scrap salvage, including tin, copper, or aluminium, all of which were predominantly imported (Blachut,

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2012; Maier, 2003; Scherner, 2015, 2018). Both in Germany and in occupied territory the Nazi requisition of metals included public goods like church bells or statues (Freeman, 2009). Jonas Scherner has recently shown how extensive Nazi metal and scrap metal drives, including the requisition of copper wires, bronze bells, or other metal objects, contributed to the so-called 'German metal miracle' (*deutsches Metallwunder*) that allowed Nazi Germany's metal resources to last much longer than calculations on the basis of known inventories would have assumed (Scherner, 2018).

In a similar vein, the Nazi regime intensified bone recovery – still a rather unexplored economic field, despite its economic and military significance (Denton & Weber, 2018; Vaupel & Preis, 2018). Imported bones as well as bones from slaughterhouses, restaurants, and households served as a resource for the contemporary bone and chemical industries, and they delivered a wide spectrum of chemical semi-products such as glues, glycerine, bone ash, or neatsfoot oil – needed in any precision equipment – some of which were not producible by other means. Other known examples for the National Socialist efforts to reclaim waste include the collection of tubes and foil by the Hitler Youth, kitchen scraps by municipalities, as well as rags, shoes, and used textiles through the wartime Reich Textile Collections (*Reichsspinnstoff-Sammlungen*) (Berg, 2015; Sudrow, 2010; Weber, 2013). Köstering has studied the Aryanisation of the national rag-and-bone trade (1997 & 1997), while Anne Berg (2015) and Anne Sudrow (2010) have explored the ways in which concentration and extermination camp prisoners were forced to sort or reprocess waste materials.

These scattered studies indicate that the Nazi waste reclamation efforts were more than extreme examples of wartime salvage drives; indeed, waste salvage was an intrinsic component of the Nazi economy as well as the regime's ideological, racial, and expansionist ambitions. Surprisingly, economic history lacks a systemic study on the field so far, while there has been a proliferation of studies on Nazi autarky goals and the Nazi interventions into economy, including the expropriation and Aryanisation of businesses, the economic war mobilisation, the exploitation of forced and slave labour, and the plundering of Nazi occupied economies (Boldorf & Okazaki, 2015; Buchheim & Boldorf, 2012; Klemann & Kudryashov, 2012; Schanetzky, 2016; Tooze, 2007; see also Denton & Weber, 2021).

To underline the significance of waste salvage in Nazi Germany, this article adopts Zsuzsa Gille's coinage of a 'waste regime' (Gille, 2007). As Gille has argued, any economy, including the socialist Hungarian case studied by her, is characterised by specific ways of identifying, defining, organising, and treating waste. Speaking of the 'Nazi waste exploitation regime' acknowledges the centrality that collecting and recovering waste had inside Nazi politics, economics, and ideology. These activities included producing, consuming, and discarding alike. Industries were prompted to reuse residues, citizens were supposed to collect reusable wastes; any wastage was to be avoided. As we will see, the diverse Nazi waste reclamation projects, undertaken under the header of a 'lossless' – even 'circular' – German economy and the dogma of a 'total' waste recovery, were deeply interwoven with Nazi Germany's racist ideology, its autarky goals, and its aggressive and often murderous exploitation strategies.

This article emphasises the pivotal role of waste salvage in the Nazi regime, its economy, and its ideology, but it cannot compensate for the lack of studies providing an overview of the field. It has the following focal points. For one, it concentrates on how the Nazis systematically tapped domestic waste in their reclamation policies and efforts. For another, rags

and waste paper – significant trade goods of the salvage business of the time – serve as case studies.

This article begins with an overview of the manifold National Socialist interventions into the field of waste between 1933 and 1945, before closer investigating the cases of rags and waste paper. They underline how intrusive the Nazi waste exploitation regime became, once we look not only into the salvage trade but also into production, consumption, and discarding practices. The article thus traces the Nazis' interferences into the rag-and-bone trade as well as the textile and paper industry; it describes the diverse industrial fields involved in the recirculation of rags and used paper, and shows how diverse salvage campaigns and structures involved the participation of the German people. The article concludes by critically reflecting on the Nazi vision of closing the loop through a 'total' waste recovery.

While drawing on the existent research, this article is mainly based on a detailed analysis of primary sources within a larger historical study on waste in twentieth century Germany (Weber, forthcoming). Sources include trade journals of the salvage trade and its respective industrial branches, journals for city administration or sanitary engineering, contemporary technical and economic literature, press and journal articles, official propaganda, as well as documents and archival material from the Bundesarchiv (hereafter BArch) and the 'Erhard Collection' (Sammlung Erhard), based at the German Environment Agency (*Umweltbundesamt*) in Dessau. Particularly helpful sources for the documentation of Nazi waste salvage projects were the decrees and instructions on Nazi salvage policy (among them, the Anordnungen und Richtlinien, 1940) as well as a handful of contemporary manuals on waste salvage (Fischer, 1942; Petzold, 1941; Stöcker, 1938; Tretter, 1939).

Archival documents produced by the Nazi bureaucracy contain pages of meticulous statistics on waste, and Nazi propaganda reported detailed numbers on how much waste certain regions (*Gaue*), cities, or schools had collected. One should keep in mind, however, that these numbers served as propaganda. Moreover, clear-cut categories for waste were absent – except for the commercial determinations within the rag-and-bone trade. For these reasons, the article refrains from providing exact figures unless there is additional evidence supporting them.

In general, understandings of and terms for waste of the 1930s and 1940s differed substantially from current ones. The National Socialists used the umbrella term of 'old material' (*Altstoffe* or *Altmaterial*) to refer to what we nowadays would call recyclable waste, and contemporaries might not have identified old things like rags as rubbish at all. In the following, terms such as waste salvage, recovery, or reclamation are used where the German equivalent would be *Altstoffverwertung*.

Establishing the National Socialist waste exploitation regime

Before the post-war era of affluence and mass consumption, household waste was by and large an urban phenomenon. By the late nineteenth century, more and more municipalities established municipal waste services to keep cities clean. At the same time, the rag-and-bone man remained a common figure who bought reusable wastes from private households and small businesses and resold them to the salvage trade to make a living. Diverse industrial sectors absorbed such wastes as old leather, paper, rags, waste rubber, or animal skins (Jones & Spadafora, 2014; Weber, 2014), and manifold enterprises were involved in waste reprocessing measures. Trading and reprocessing metal scrap, followed by rags, then bones, and fourth, waste paper constituted the major fields of this business (Weber, 2014).

By 1930, municipal waste services had been set up in just over half of the 51 German cities with 100,000 and more inhabitants and a quarter of municipalities with 20,000 to 50,000 inhabitants (Erhard, 1934a, 1934b). The average German urbanite of the 1930s was estimated to 'produce' around 400 to 500 grams of daily waste – mostly ashes, followed by food scraps, and then a mixture of broken pottery, rags, paper, bones, or other items (Naumann & Thiesing, 1935). Where municipal waste services were lacking, domestic waste was either reused or dumped in nearby pits which were emptied every now and then by carters or farmers. But in any city, recovering urban waste was still common. Housewives burned paper in domestic fireplaces for heating and cooking, handed kitchen scraps over to those who came into the city from the countryside to deliver milk, or, in smaller communities, fed them to pigs, hens, or rabbits kept in the backyard.

The Nazi regime could thus easily revive traditional practices of reuse or intensify commercial waste salvage activities. Moreover, in respect to its reverse logistics – the agents and channels that collected, transported, sorted, and traded waste from its diverse points of origin to its final re-integration in production (Denton & Weber, 2021) –, the nascent Nazi waste exploitation regime mainly built on existent waste collecting and disposal infrastructures: the rag-and-bone trade and municipal waste services with their labour force, their facilities, and their respective transport and trade networks. In addition, it engaged NSDAP members and Nazi organisations to serve in salvage campaigns or to monitor waste streams. As early as 1934, NSDAP party officials began to study the existing municipal waste services (Arbeitsgemeinschaft, 1934; Rundfrage der Stadt Düsseldorf, 1933) and party organisations initiated and organised waste salvage drives, such as the youth organisations' tin and foil collections. In 1936, the Four Year Plan (*Vierjahresplan*) codified Nazi waste recovery policies in the name of autarky, and an apparatus of party members began to supervise the implementation of the existing and forthcoming Nazi waste policies. According to economic calculations, the German Reich had invested 34 million Reichsmark (RM) for the import surplus of rags, followed by 5.2 million RM for scrap iron, nearly 2.5 million for bones, and 1.43 million for waste paper – funds that more rigid waste collections could save (Stöcker, 1938). In the Nazi planning for waste salvage, besides reducing such imports, waste reclamation was supposed to enhance the material efficiency of existent resources. Moreover, in parallel to waste reclamation, any wastage was to be eliminated, in both private consumption and industrial production. Consequently, Nazi propaganda defined salvage along with thriftiness as a means to conserve national assets for the well-being of the autarkic German *Volk*. It propagated the idea of a 'total' recovery of any waste, and *Altstoffe* were presented as genuine 'raw' materials.

In 1937, the field of waste recovery came under the aegis of the newly established Reich Commissioner's Office for the Recovery of Salvage (*Reichskommissariat für Altmaterialverwertung,* hereafter RfA), led by Wilhelm Ziegler and from 1940 onwards by Hans Heck. When appointed in 1937, Ziegler envisioned a 'total waste material economy in the framework of the Four Year Plan' which would extend beyond the traditional – and in his eyes, insufficient – capture of waste materials by the existing waste business (Ziegler, 1938, p. 672). The RfA made a great effort to calculate the material and economic value of the waste material (*Altmaterial*), recording its amounts and sites of origin and trade in order to enhance the RfA's capture and control of the waste streams.

Establishing an outline of what became a decisive waste exploitation regime involved several levels: state surveillance and policing closely monitored the waste streams; any field

related to waste and its reclamation saw economic interventions, from the rag-and-bone trade to municipalities and their waste services, as well as domestic discarding practices and resource allocation for industry; volunteer, and to an increasing extent forced, labour provided the necessary waste collecting and sorting work. All of this was accompanied by massive propaganda that set out to re-define the moral economies of waste and helped to conceal the objectionable dimensions of the new waste order. Moreover, as in other fields of the Nazi regime, different institutions competed for competencies and responsibilities, while actors changed over time as novel positions or regulations were issued. By 1940, the RfA's directives on waste recovery, for instance, filled an entire 300-page book (Anordnungen und Richtlinien, 1940). The Nazi waste exploitation regime did not have a stable organisational structure, even if earlier research has suggested so (Huchting, 1980).

Under Ziegler, Commissioners for the Capture of Salvage (*Beauftragte für Altmaterialerfassung*) were appointed on the levels of region (*Gau*), district (*Kreis*), and locality (*Ort*). The objective was to control waste flows at any stage – in the case of household waste, from the place of origin in urban households and apartment buildings to the rag-and-bone trade and the municipal waste services, with their final disposal activities. When competencies were transferred in the 1940s, such commissioners, made responsible for the capture of waste, were appointed within the regional economic authorities (*Landeswirtschaftsämter*).

The most severe interferences into the waste salvage business were its Aryanisation, as it had traditionally been dominated by Jews, and the so-called *Pflichtsammler* ('compulsory rag-and-bone men') system of 1937. 'Aryan' persons now were appointed by the regional Commissioners for the Capture of Salvage (*Gaubeauftragte für Altmaterialerfassung*) to service predefined districts, regions, or urban neighbourhoods as rag-and-bone men (Köstering, 1997, 2003). Moreover, the prices of reusable waste (*Altstoffe*) and sorting categories were regulated for each stage of the trade – from the rag-and-bone men's trade at the household's door up the hierarchical stages of the waste's gradual sorting on its way back to final reprocessing.

In 1933, the German Reich had counted 4964 enterprises in the rag-and-bone trade, next to 1607 scrap metal businesses, and 3300 operations dealing with skins and furs (Fischer, 1942, p. 19; Köstering, 1997, 2003). Most of these 4964 businesses were one-man companies with family members giving a helping hand. Only five percent of the rag-and-bone businesses employed six or more workers, and only nine major companies had a workforce of 51 or more. In total, around 100,000 people found work in the waste business, including the estimated number of around 25,000 rag-and-bone men (Tretter, 1939, pp. 55, 62). Köstering's research suggests that the number of *Altstoff* businesses shrank to around a third due to Aryanisation and then to the recruitment of soldiers for the front (Köstering, 1997). By summer 1941, Hans Heck confronted the fact that 14,000 rag-and-bone men were serving as soldiers, leaving only around 4000 peddling collectors to channel local waste into the waste business (Heck, 1941b). As a consequence, schools were transformed into major waste collection centres.

Contemporary waste salvage included production, trade, and domestic waste. The Nazi waste exploitation regime targeted household waste in particular, even if domestic consumption hardly rose over the 1930s and would be rationed from 1939 onwards. Here, the ideological function was essential, as waste collections and salvage campaigns mobilised the average German citizen in his or her everyday life for the regime's aims. In cities, public housing and apartment buildings were asked to locate not only the specific bin for kitchen

scraps but also a container for *Altstoffe* which should serve as a so-called 'pre-collection point' (*Vorsammelstelle*) for items such as waste paper. These 'pre-collection points' were to be looked after by local caretakers or dedicated representatives of Nazi organisations such as the *NS-Frauenschaft* (National Socialist Women's League) or the *Reichsluftschutzbund* (National Air Raid Protection League). They were supposed to oversee the bins' usage, and thus, their neighbours' discarding practices, and manage the absorption of the collected waste by the rag-and-bone trade. In the long run, this highly decentralised, dispersed 'pre-collection point' system never operated as desired and authorities regularly repeated the call to implement them.

In a parallel development, from 1937 onwards, towns of 35,000 inhabitants or more were obliged to salvage *Altstoffe* at the final stage of waste disposal, either at municipal dumps or inside the waste incineration plants which operated in just four cities. Calculations by the Four Year Plan Authority (*Vierjahresplanbehörde*) claimed that around ten percent of the dumped waste could be recovered – while in practice, municipalities reclaimed significantly less and only material of minor quality (Köstering, 1997, p. 144; Ungewitter, 1938, pp. 186f). Many municipal waste services drew upon forced labour to keep their services running and to implement the waste salvage obligations.

It is difficult to decide where coercion and where collaboration were at work; many of these interferences were conflictual as they trimmed existing competencies or trades, others were characterised by cooperation. An outstanding example for the latter, with clear instances of cooperation between Nazi representatives, the rag-and-bone trade, or even municipal waste services, occurred in 1937 with the so-called 'decluttering campaigns' from urban attics and rural sheds and barns (*Entrümpelung von Landschaft und Dorf* and *Entrümpelung der Dachböden* respectively). Defined as air-raid protection – old papers or furniture stored in attics for future use would easily burn when bombed –, these campaigns allowed the confiscation of unused old things for salvage; rural households were especially attractive targets as those with large storage space often hoarded old metal objects. Supported by the local police, members of the Nazi party, the SA or the NSV (the National Socialist People's Welfare) cleared the attics and transported the waste to the local rag-and-bone trade. In Würzburg, for example, the decluttering campaigns took the form of regular bulk waste collections, operated by the municipal waste service in cooperation with the civil air-raid authorities; once sorted, the waste materials were sold to the rag-and-bone trade (*Gemeindetag,* 1938, p. 129).

The decluttering campaigns had mixed objectives, as they combined air-raid protection and waste salvage, even if propaganda emphasised the former. Instructions issued on 17 July 1937 for the actors involved within the *Altstoff* sector were quite clear about these combined motives; they stated that the campaigns should first, render attics fire-proof, second, reclaim reusable objects for 'ethnic comrades' (*Volksgenossen*) in need, and third, recover 'resources by seizing salvage material' (Anordnungen und Richtlinien, 1940, p. 35f).

From reports of the exiled socialist party (hereafter SOPADE) we know that individual citizens complained about these campaigns as they often also seized piles of pulp novels or old diaries as 'waste paper' and took away old wires, tools, or bicycles; these citizens understood the salvage campaigns as state-sanctioned theft (SOPADE, Oct. 1937, pp. 1396f, A 30, Bericht aus Rheinland-Westfalen; SOPADE, June 1938, p. 630, A 89, Richtlinien für die Arbeit der Luftschutzhauswarte zur Altmaterialerfassung im Rahmen des Vierjahresplans). Such historical records on the citizens' willingness or aversion to participate in waste salvage

are rare, and we must acknowledge that people's support for the Nazi waste campaigns was by far not univocal.

In economic terms, the rigidity of the Nazi waste exploitation regime hardly made sense, and it was feasible only by exploiting volunteer as well as forced labour which upheld the waste salvage's reverse logistics. Salvage drives represented ritualistic performances of the national community or *Volksgemeinschaft*, while the domestic practice of separating wastes was defined as the daily responsibility of the German housewife. It was particularly housewives and school children who sorted, collected, and micro-transported waste materials free of charge or with symbolic bonuses. In early 1940, when the 'compulsory collectors' (*Pflichtsammler*) were increasingly lacking, schools became waste collection centres under the supervision of regional economic authorities (*Landeswirtschaftsämter*) (Anordnungen und Richtlinien, 1940, p. 144; Fischer, 1942, pp. 2, 20; Köstering, 1997). School children now had to bring scrap materials to their schools, where teaching staff had to act as 'salvage teachers' (*Altstofflehrer*), checked the deliveries and channelled them to the rag-and-bone business.

The other pillar of the waste work force was constituted by forced and slave labour, and it would eventually dominate the reverse logistics within the waste salvage trade. A 25 August 1937 decree enabled Nazi authorities to have prisoners do waste work. Prisons now turned into dismantling facilities for electrical and technical equipment such as radios, gas metres, motors, capacitors, or light fittings (Reichskommissar für Altmaterialverwertung, 1937: addendum; Ungewitter, 1938, pp. 167f). In addition, Jews were forced to do waste labour and many municipalities relied on this exploitation scheme to comply with the imposed waste salvage obligations. Soon foreign prisoners of war and forced labourers were assigned to do waste work. Concentration and extermination camps eventually served as relays or dismantling and refurbishing stations for waste recovery (Berg, 2015; Sudrow, 2010). Moreover, even textiles, hair, or gold, extracted from Holocaust victims, were 'reused' as waste resources (Berg, 2015).

The regime's salvage efforts were by no means scaled back after 1940 when occupied economies began to function as sources of booty and buffer stock. Quite to the contrary, the Nazi regime intensified its waste exploitation strategies back home and imposed them on occupied economies (Denton, 2009, 2013; Oldenziel & Veenis, 2013). In 1941, scrap, rags, waste paper, and used rubber were declared as vital to the war effort (Reichskommissar für Altmaterialverwertung, 1942), which was a prerequisite for the allocation of transport facilities and work force. Forced labour soon began to dominate inside the reverse logistics of waste salvage work. Moreover, the systematic plundering of occupied territories included waste materials. Next to and often in direct combination with forced labour, the extraction of resources from occupied countries included extracting waste materials; salvaging waste became a tool of war and of wartime exploitation (Berg, 2015; Denton, 2013) – a dimension largely ignored in the historical literature.

Reprocessing textile waste and rags: 'Reißwolle' as a needed complement to (semi) synthetic fibers

Ranking second behind scrap metal in the early twentieth century waste business, rags also constituted a significant material flow inside the Nazi waste exploitation regime. Rags and other textile waste, originating from private consumption as well as industrial production,

used to be traded on a global scale, and these waste materials were reprocessed for reuse in diverse fields. In 1928, for instance, German industry recovered 130,000 tons of rags, with approximately 60,000 tons reused in the paper and cardboard industry, roughly the same amount became fibres for the textile industry, and 10,000 tons were recovered elsewhere, such as for upholstery (Brasch, 1935, p. 106). High-quality rags were made into banknotes, low-quality rags into cleaning rags or roofing felt; the final products consisting of rag and waste paper residues comprised a diverse array of goods, everything from blankets, to buffing wheels and organic fertilisers.

In 1933, the German textile industry was the second largest economic sector behind the metal and iron industry. As it largely depended on imported cotton and wool, the Nazi economic planning for autarky meant that the German textile industry had to reduce the volumes of imported fibres and replace them with 'domestic' (*heimische*) raw materials, including fibres recovered from rags. An economic study of the mid-1930s suggested that 5 to 6 percent of the German fibre need might be covered by sheep raising and 11 to 22 percent through rayon and staple fibre production – the semisynthetic fibres of the day (*Kunstseide* and *Zellwolle*) –, while recovered fibres might cover even higher rates, with a maximum of around 50 percent (Brasch, 1935, pp. 142f).

These numbers were much too optimistic. Reprocessed fibres seem to have constituted around 12 percent of the fibres processed in the German textile industry in 1937, with a total of 110,000 tons of rags being channelled into textile production (Petzold, 1941, p. 36f). Other sources claim even higher volumes of around 155,000 tons (*Frankfurter Zeitung*, 1941; Höschle, 2004, p. 96). In any case, this amount represented a substantial growth of the textile industry's quota of rag reuse when compared to the early 1930s. Moreover, synthetic fibres attained a higher share as textile resource only by 1938, but even afterwards, reprocessed fibres retained their critical role as a needed complement. Their significance to the Nazi economy was presumedly higher than that of vegetable substitutes such as flax or bast whose utilisation for fibres was explored starting around 1940 (Luxbacher, 2004). Moreover, in the situation of total war, reprocessed fibres were needed for basic equipment such as insulating, padding, or protective fabrics.

National Socialist intervention in the textile industry began in 1934 (Höschle, 2004, p. 31, pp. 114–119). Economic history studies have shown how supervisory agencies oversaw the industry's resource inputs for cotton, wool, and other fibres and how the state succeeded in pushing textile manufactures to add rayon fibres into their products. Jonas Scherner demonstrated that the German chemical industry complied with the National Socialist programme to increase (semi)synthetic cellulose fibre production without any drastic coercion since it envisioned growing markets for the novel fibres (Scherner, 2002 & 2008). The production of semisynthetic fibres (*Zellwolle* and *Kunstseide*) rose from 37,000 tons in 1933 to 220,000 tons in 1938 – with nearly half of the necessary wood or pulp-based cellulose being imported (Schanetzky, 2016, p. 93; Scherner, 2008, p. 872). The (semi)synthetics fibres now outdid the reprocessed fibres in their significance as a resource of the textile industry, as they represented around 20 to 25 percent of textile fibres consumed in Nazi Germany, with a subsequent maximum of over 40 percent.

Recovered fibres figured as a needed complement to the synthesised substitute (*Ersatz)* products of the German chemical industry, and they remained an essential pillar for fibre supply inside the textile and other industries. The situation differed in many ways from the case of synthetic fibres which promised potential future markets. Recovered fibres seemed

to have indeed figured as a reserve, where the Nazi system of resource allocation limited the use of more appropriate fibres, even if they resulted in inferior material qualities: reprocessed fibres lost quality and length with every lifecyle and recovery process. Consequently, salvage experts assumed that rags could tide over the shortage of fibre supplies for a maximum of eight years, and some argued that their share in total fibre consumption would be limited to 15 percent (Petzold, 1941, pp. 38, 48f., 96, 102).

In the 1930s, rags from households still represented profitable objects of purchase for the local rag-and-bone men. Inside the Nazi system of 'compulsory collectors' (*Pflichtsammler*), these were paid around 11 *Pfennige* for one kilogram of coloured rags and 73 *Pfennige* for woollen rags, when delivering them to the next stage of the rag-and-bone trade, while used newspapers only yielded three *Pfennige* per kilogram (Petzold, 1941, p. 97). The Nazi waste exploitation regime aimed to tap increasing amounts of rags from households, and preferably at low costs. Exploiting schools as waste collection centres was one means to do so; establishing a yearly Reich Textile Collection (*Reichsspinnstoffsammlung*) from 1941 to 1944 was another.

If we are to believe the painstakingly recorded figures on the results of school collections, school children accumulated around 280,000 tons of rags (1941–1942) to 360,000 tons of rags (1943) annually (Weber, forthcoming). These are astonishing results for that time, because domestic waste was minimised by wartime scarcity and rationing. Nearly any consumer good – from textiles to paper or kitchenware – was subject to a rationed economy, and ration cards for clothing (*Reichskleiderkarten*) had been in effect since 1939 (Buchheim, 2010, p. 306). Most housewives tended to reuse, mend, or patch textiles where possible – with pieces of clothing being fashioned from bedcovers or other reusable cloth (Dörr, 1998, pp. 71f).

The annual Reich Textile Collections from 1941 to 1944 prompted citizens to hand over any domestic rag or unused cloth. Consumption statistics from around 1940 claimed that old textiles could amount to 400,000 tons annually – but only half that amount had been recovered so far (Ala-Anzeigen-Aktiengesellschaft, 1941, p. 11; NSDAP Reichsorganisationsleiter und Reichsbeauftragter für Altmaterialerfassung, 1942/3). The missing remainder was suspected to be hoarded in the 'rag bags' commonly kept by housewives, a private reserve which was claimed for the national war economy. In 1944 the 'duty of honour of the entire German people' was called upon, and the German 'community of destiny' was confirmed by oath (propaganda posters, filed in: NSDAP Reichsorganisationsleiter und Reichsbeauftragter für Altmaterialerfassung, 1942/3). According to *RfA* statistics, between 110,000 tons (1941) and 75,000 tons (1944) of rags, clothing, and linens were collected by the Reich Textile Collections (Reichskommissar für Altmaterialverwertung, 1944c, 1944d). But these results contained a hidden source: the textiles of dead extermination camp prisoners which found their way into the reprocessing industry through these salvage drives.

The Nazi regime boasted of its success in collecting materials. But the real – and unsolved – challenges lay in the subsequent steps along the waste salvage's reverse logistics, namely in transporting, sorting, and reprocessing the different waste materials. As described above, the state also interfered in these intermediary stages between collection and final industrial reuse, for example by Aryanising the rag trade. Even more, the established protocol for how to categorise and classify the more than 400 different sorting grades along the hierarchical trade and sorting chain of the rag business – beginning with the rag-and-bone men and

ending with the few large-scale sorting enterprises – were modified, in order to keep more fibres in the textile sector (Tretter, 1939, p. 62).

Along with forthcoming wartime effects, many of these interferences impaired rather than boosted the industrial recovery of rags. First, the rag business suffered from its Aryanisation, as it translated into a substantial loss of personnel, expertise, and established trading networks. Inside this sector, the sorting enterprise Lippmann Wolff & Sohn (situated in Stuttgart-Zuffenhausen) constituted the largest case of Aryanisation; with several hundred employees, it continued its operation under non-Jewish ownership (*Rohproduktengewerbe*, 1938). For Berlin and its prominent rag trade, it is estimated that Aryanisation resulted in a significant reduction of enterprises, and by 1941, the number of wholesale rag businesses had shrunk by half (Köstering, 1994, p. 107).

Second, the labour-intensive sorting work relied more and more on forced labour which lacked the necessary tacit knowledge. A glance into a sorting enterprise for paper and textiles, the *Papier- und Textilverwertungs-Gesellschaft Dresden*, illustrates the desperate conditions in the final years of war (*Altmaterialwirtschaft*, 1944c). In 1944, half of its work force consisted of forced labourers from Russia, Ukraine, Poland, France, or Croatia. For the sorters among them, sorting grades were thus explained via visuals and captions in several different languages. Aryanisation and the withdrawal of a skilled workforce irrevocably damaged the German rag trade. A textbook on rag sorting from 1950 noted that the skills and expertise confined to trained personal had been extensively lost, while it did not name the causes for this, namely the Nazi interventions in the existing reverse logistics and its competences (Bruns, 1950, p. 5).

Third, the increased use of synthesised fibres caused disruptions within the traditional recovery processes (Petzold, 1941, p. 74). To separate traditional organic fibre mixtures, workable procedures existed which recovered the valuable fibres, but it was an open question for how to extract the *Zellwolle* fibres from textile cloth, how to recognise their quality, and how to apply such separation process to them.

Under wartime conditions, above all, collecting and transporting waste turned into a logistical challenge. Lacking means of transport meant that piles of rags were left to decay. Long-stored rags eventually became too inferior for even the roofing felt industry. In the situation of total war, rag reprocessing facilities eventually predominately fed the most basic needs of the war industry. The mentioned enterprise, the *Papier- und Textilverwertungs-Gesellschaft*, for instance, ran a sewing workshop that repaired sacks needed for transport and produced protective clothing. High-quality rags were obviously lacking, and the main goods reprocessed from rags were cleaning textiles, blankets, or padding, and insulating material for industrial and military purposes.

‘Every leaf of paper destroys a green leaf in the forest’: paper reclamation and the Nazi propaganda of conserving the German woods

Paper was once a product made entirely from waste products, namely vegetable fibre rags. When wood pulp substituted for rags as the main paper-making resource in the late nineteenth century, much more paper could be produced, while paper production continued to reprocess small amounts of rags and waste paper. Mass produced paper was used nearly everywhere – in offices, newspapers, packaging, or bullet casing, and in wartime paper and waste paper substituted for other, more scarce materials such as textile fibres (Pristed, 2021 Thorsheim, 2013).

In the early twentieth century, waste paper became a common secondary resource in the paper industry. In the United States where high volumes of packaging paper were in demand, nearly a third of the industry's resources stemmed from waste paper by 1930 (Weber, 2015). This share of waste paper was lower in the German paper industry; by 1936, around 23 percent was reached when the German paper makers reprocessed 700,000 tons of waste paper for a total production volume of 3 million tons of paper (Reichskommissar für Altmaterialverwertung, 1940c). The quota would amount to around 30 percent in the late 1930s and then peak at roughly 40 percent in the early 1940s (Fischer, 1942, pp. 8, 52).

As in the case of rags, the Nazi regime not only interfered in the conditions of the salvage trade, but also in those of paper production and consumption. It applied fixed prices for waste paper and intervened in the existing reverse logistics. Again, total salvage volumes were increased by tapping domestic waste and by intensifying its yields. Calculations suggested that around 35 percent of Germany's paper consumption took place in private households (Petzold, 1941, p. 39), and in contrast to textiles, most domestic paper products were short-lived. The Nazi salvage projects even targeted the so-called *Knüllpapier* (paper crumpled after its use) which lacked any commercial value for the rag-and-bone men; even the few *Pfennige* gained by delivering one kilogram of bundled old newspapers hardly justified the rag-and-bone man's tiresome amassing effort from local households.

At the same time, the Nazi regime regulated paper production and paper products, for example, by constraining resources for production, by formulating principles for the 'saving of packing material' (1937), or by restricting the raw materials for bags and pouches to waste paper (1938) (Schmidt-Bachem, 2011, pp. 281–283, 301). In 1939, commercial and administrative mailing letters were restricted to paper without any content of rags. As in the case of reprocessing rags, waste paper figured as a reserve for paper makers, once the Nazi regime had decided to limit wood imports and to channel increasing wood pulp volumes to other industrial purposes – a link stressed in internal documents. When the Nazi apparatus recruited SA members for paper salvage collections, the respective letters specified 'that the amount of collected used paper must be further increased, in order to set German wood production free for other purposes' (Schmid, 1938, p. 13). These initial waste paper collections of 1937/38 led to excess quantities which piled up and sometimes even decayed instead of being reused. As a consequence, the state obliged paper makers to reprocess set quotas of waste paper (*Beimischungszwang*), forcing many of them to modify processing methods.

Further regulations followed with the war. The production of newspapers, journals, and books as well as paper consumption were severely limited. Retailers eventually asked customers to return used packing materials (Reichskommissar für Altmaterialverwertung, 1940b, addendum, p. 3). In the early 1940s, theatres and cinemas had to collect used tickets and programme leaflets for recovery. In 1940, the reverse logistics were entirely modified in a way that shaped schools and the domestic 'pre-collection points' (*Vorsammelstellen*) into main assembly junctions and limited the rag-and-bone trade's role as solely a subordinate intermediary to paper makers. It comes as no surprise that the sorting categories were now reshaped and reduced to 29 basic sorts, and in total, 50 different categories (Fischer, 1942, p. 34) – the simplified system presumably enabled lay men to sort and grade paper. In the final years of the war, paper production volumes declined, and limited paper consumption levels caused the available waste paper volumes to drop.

Given the substantial proportion of paper inside the waste bins of urban households in the 1930s, used paper constituted an obvious target within the Nazi waste exploitation

regime. Figures for Hamburg show that paper and cardboard comprised around 20 percent of the municipal waste bins' content in the summer, with winter amounts sinking to 5 percent (Neuy, 1938, p. 10). In the cold season, waste paper was regularly burned for heating, in summer, it helped to ignite the domestic cooking stoves. Nazi propaganda tried to inhibit such individual paper burning which the NSDAP critiqued as 'squandering the assets of the people' (Schmidt, 1938, p. 5). Educational material instructed housewives that they might, if nothing else was available, use paper to start a fire, but then only one or two sheets (Kühn, 1939, pp. 24–26).

Salvage drives to collect domestic paper began as early as 1934 and were intensified from 1937 onwards. The system of 'pre-collection points' (*Vorsammelstellen*) was intended to enhance the capture of waste paper, in particular crumpled paper, as rag-and-bone men regularly undermined the official order to collect it. While these failed for other waste materials, they seemed to have operated to some degree for paper. Nazi caretakers were supposed to hand the domestic waste paper over to the rag-and-bone trade and they would receive between two to three Reichmarks per 100 kilograms in 1940 (Anordnungen und Richtlinien, 1940, p. 266). Eventually, even smaller municipalities were pushed to install paper 'pre-collection points' with the help of SA men who were to ensure the final delivery to the rag-and-bone trade (Schmid, 1938, pp. 10, 12–13).

Moreover, some cities such as Erfurt, Stuttgart, and Königsberg installed separate waste paper collections (Fischer, 1942, p. 70; *Gemeindetag*, 1940, pp. 85–88; Neuy, 1938, p. 15; Schwarz, 1943). Stuttgart's municipal waste service transported the collected waste paper directly to local paper factories; purportedly, the proceeds paid for the costs of collection. Königsberg delivered its waste paper to a local pulp mill and forced Jews to do the waste sorting work.

Wartime conditions forced the reverse logistics for waste paper to adapt. In coordination with the regional economic authorities (*Landeswirtschaftsämter*) and the local commissioners for waste salvage, the paper industry needed to provide trucks to channel waste paper directly into its production facilities (Fischer, 1942, pp. 2, 16f, 28). In 1944, the local NSDAP representatives were made responsible for paper collection (*Altmaterialwirtschaft*, 1944a; Reichskommissar für Altmaterialverwertung, 1944a). Late that year, a new bonus scheme was established. When delivering a certain amount of waste paper, citizens received a token that authorised them to acquire a given amount of paper products (Reichskommissar für Altmaterialverwertung, 1944b). A similar 'barter' system existed for bones which were compensated with tokens for soap acquisition.

But what is more, the Nazi regime requisitioned new sources for 'waste' paper such as libraries and archives – a process that Peter Thorsheim has also described in Great Britain's wartime waste salvage efforts (Thorsheim, 2013). The retention period for business and public administration files was lowered, and old books were pulled from libraries for salvage; in 1943 'dispensable' archival materials were pulled from public administrations (*Altmaterialwirtschaft*, 1944b). The plan to 'extract' such 'sleeping reserves' of old paper from libraries, archives, or offices began as early as in July 1937 (Anordnungen und Richtlinien, 1940, pp. 255–257; Fischer, 1942, p. 14; Reichskommissar für Altmaterialverwertung, 1937, p. 19). Similar to the case of metal collections (Scherner, 2018), these removals most likely were postponed due to fears of civil resistance.

On the one hand, waste paper recovery compensated for sinking wood and pulp imports in an autarkic economy that limited imports to save foreign exchange. In 1930, Germany

had imported around 60 percent of the wood for paper production from Northern and Eastern Europe; the National Socialist autarky goals had shrunk this to 26 percent by the late 1930s (Fischer, 1942, p. 3; Laufer, 2008, p. 230; Mutz, 2013, p. 203). On the other hand, waste paper reprocessing helped the Nazi economic planners to free up wood resources for other, non-paper production purposes, once wood pulp became an increasingly important component of the autarkic policies. The growing field of wood-based chemistry (*Holzchemie*) pushed logging in order to produce more or new derivates such as wood cellulose, glucose, or semisynthetic fibres (Brauer, 1936, pp. 24f, 31; Trendelenburg,1939).

Nazi propaganda prompted citizens to salvage paper in order to help save Germany's national wealth and to efficiently use existent 'domestic' resources. But from 1940 onwards, a further motivation appeared in propaganda and soon dominated the discourse. Waste paper salvage was propagated by the argument to conserve German forests – an argument we would nowadays perceive as 'green' but which stood in stark contrast to the overexploitation of wood by the German chemical industry at that time. 'Every leaf of paper destroys a green leaf in the forest,' the *RfA* stated in a 1940 appeal for the collection of old paper (Reichskommissar für Altmaterialverwertung, 1940c). Calls for paper salvage drives claimed that salvaged paper 'helps preserve the German wood.' According to *RfA* figures, 20 tons of used paper saved a total of 66 square metres of woods – a relation visualised in schematic drawings of the 'German' forest and the saved amount of wood (Figure 1). Some drawings displayed the widely used, fast-growing spruce; Figure 1 included an oak tree (on the left) – a paradigmatic icon of the 'German wood' myth so central to Nazi ideology (Imort, 2005; Zechner, 2016, pp. 161–193).

Back then as now, reusing waste paper in paper making preserved resources; it saved pulp, sulphur, coal, and energy (Breitkopf, 1938). But within the Nazi economy, the pulp savings by paper salvage were not left as green leaves in domestic forests but consumed by the wood-based chemistry. Moreover, reprocessing growing amounts of waste paper in the paper industry was only one way to fill the gap left behind by sinking wood imports, another was gaining access to the forests of Austria, and from 1940 onwards, exploiting the woods of Northern and Eastern occupied countries.

The Nazi vision of 'total' waste recovery and closed material loops

The driving actors of the Nazi waste exploitation regime were motivated by the idea of fully incorporating wastes into agrarian and industrial production and profiting from waste as a seemingly infinitely renewable reserve where raw materials were scarce. Such a 'fantasy of reclamation' was not novel and it had also characterised nineteenth century hopes to reutilise waste generated by new production processes (Cooper, 2011). Nevertheless, the Nazi case stands out in its ideology of a 'total' waste recovery inside the German *Volksgemeinschaft* and its explicit claim of a 'circular' management of material flows that would keep these materials inside closed loops.

Terms, numbers, and visualisations played a major role in propagating these ideas. The adjective 'total' became as present in the Nazi waste propaganda as that of 'lossless.' Moreover, the term *Altstoff* was equated with or even replaced by *Rohstoff*, or raw material, as if no reprocessing was needed – as in Figure 2, entitled 'The Raw Material Rag.' And next to excessive figures on waste amounts, the metaphors of the circle and of a continuous flow

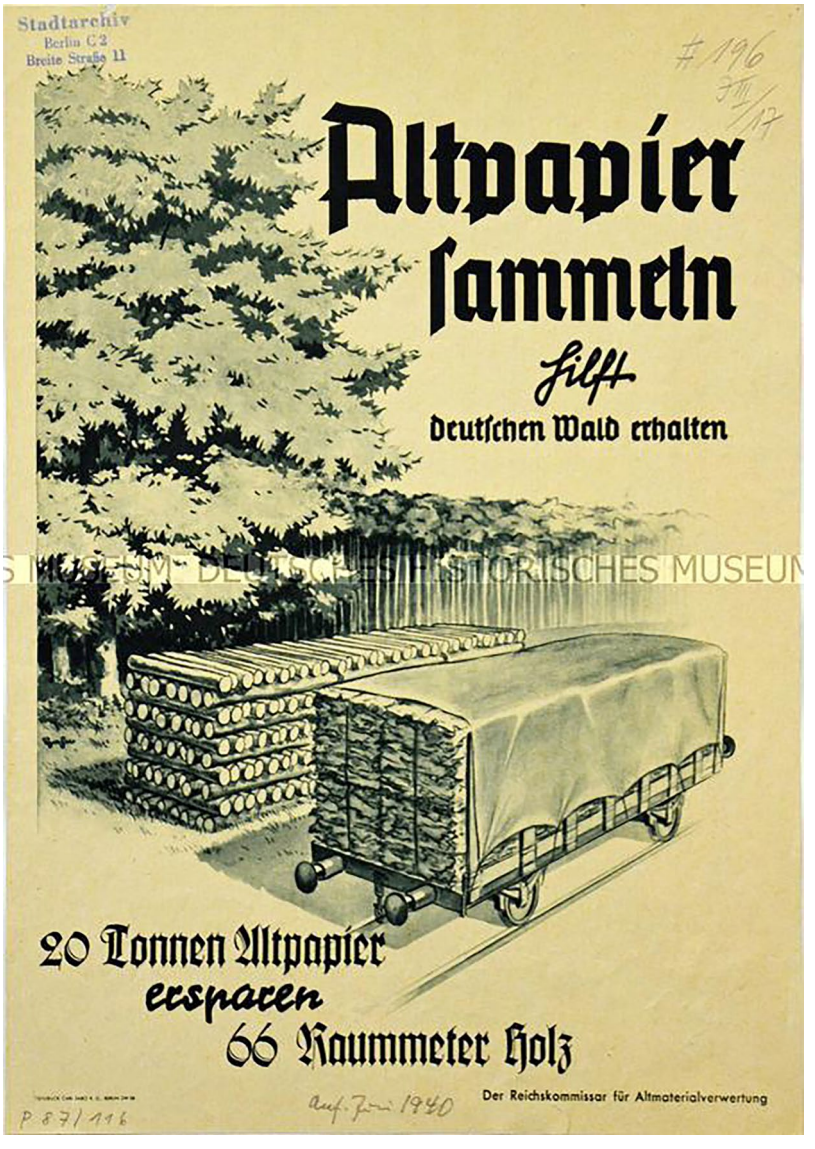

Figure 1. Propaganda poster by the *Reichskommissar für Altmaterialverwertung* (1940) for waste paper recovery with the slogan 'Collecting used paper helps conserve the German wood.' Below, the poster explains that 20 tons of waste paper 'save' 66 cubic metres of wood. On the left, oak trees are pictured, next to the common fast-growing spruce.
Source: Deutsches Historisches Museum (Berlin; PLI25620).

that transformed residues to resources and finally to finished products (as also in Figure 2), became key in the texts and visuals of the Nazi waste propaganda.

The National Socialist desire for 'total' waste salvage produced extensive statistics and calculations on waste flows. In retrospect, the collated data on potentially available waste and salvaged waste amounts underlines the gaps between how much was generated as waste, how much was being accumulated as potential resource, and how much was ultimately recovered in production. In Nazi propaganda, however, these figures were pivotal

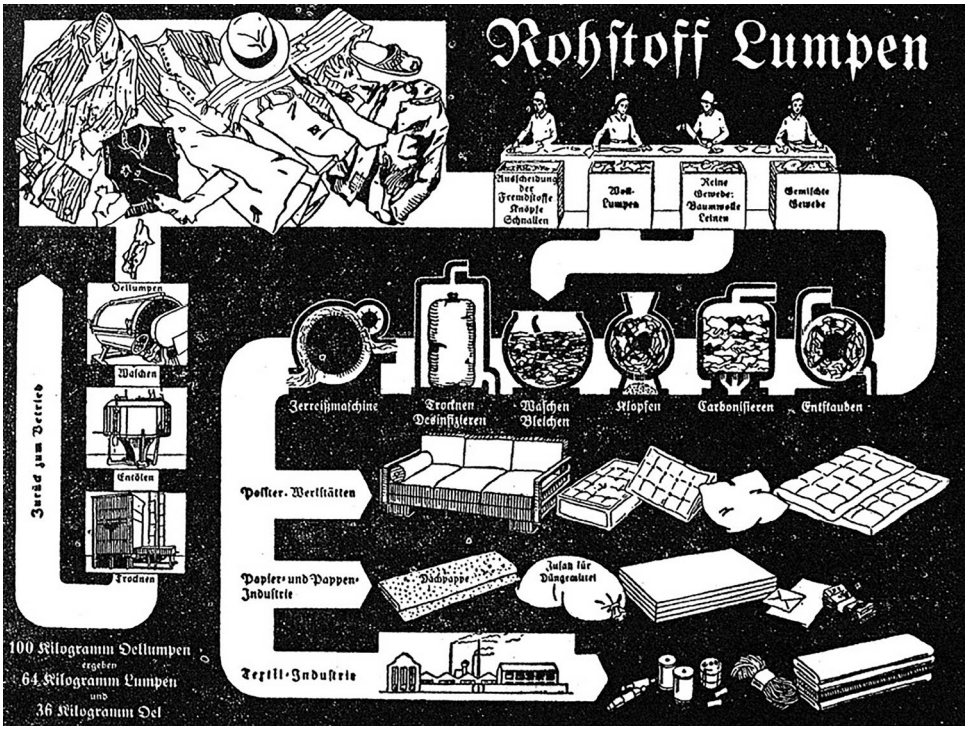

Figure 2. Didactic propaganda drawing of the *Reichskommissariat für Altmaterialverwertung* on 'The Raw Material Rag' for use in school teaching. Similar flow charts existed for scrap iron, waste paper, and bones.
Source: Reichskommissar für Altmaterialverwertung (1940c).

to underline both the *Volksgemeinschaft*'s need for expanding the exploitation of waste, as well as its success so far achieved by salvage efforts. Moreover, on the side of Nazi bureaucracy, counting every single gram of captured waste represented a performative act of contributing to the regime's desired 'total' waste capture and recovery.

Over time, the idea of closing the economy's material flows by their 'circular' management became a guiding directive in policies and propaganda discourse. In 1937, when municipal waste services were obliged to establish salvage triage on municipal dumps in addition to the formation of local domestic 'pre-collection points', an official in the Raw Material Distribution Business Group (*Geschäftsgruppe Rohstoffverteilung*) declared this as an option to help 'capture any usable salvage and re-route it into the raw-material circle' (Tobler, 1937, p. 320). Claus Ungewitter's propaganda book *Using the Useless* (*Verwertung des Wertlosen*, 1938) described the potential for waste recovery in multiple economic sectors, including private consumption. Next to municipal waste, he treated sewage and how to recover its fat and nutrients content; he explored the possibilities of utilising the residues of the chemical or forestry-based industries. But he devoted just a few pages on what he termed a 'rational material economy' which would have material 'cycles' at its base (Ungewitter, 1938, pp. 287–290). But by the time that Hans Heck summarised his thoughts on the waste salvage economy in 1940, the circulation metaphor had turned into a fixed idea (Reichskommissar für Altmaterialverwertung, 1940a).

According to Heck, 'an organically structured exploitation of scrap materials integrated into the larger economy' would 'be of towering significance for the [future] raw materials economy' based on 'complete cycles' of raw materials. Likewise, salvage drives were propagated by the circulation metaphor. In Heck's terms, the 1941 Reich Textile Collection (*Reichsspinnstoff-Sammlung*), for instance, was supposed to make the German people aware 'that there is a perpetual cycle of raw materials'; if the individual consumer discarded or destroyed a piece of clothing or a rag instead of recovering it – only because it had lost in personal value –, the 'cycle' was broken and could no longer effect its 'usefulness for the collectivity' (Heck, 1941a, p. 595).

The metaphor of the closed loop also found its way into the wider discourse on household or national economics. To name but one of many examples published in journals and the press, the *German Women's Welfare Organisation* stated in its official journal that 'the idea of using the […] technical possibilities to bring the raw materials in waste products into a continual cycle' must be considered as 'one of the most ingenious ideas, in terms of political economy, ever to be thought up' (*Deutsche Hauswirtschaft*, 1940).

Similar to the circle or circulation metaphor in written discourse or speeches, visual propaganda simplified the complexities of waste recovery in its imagery. Flow charts suggested continuous flows or even closed loops between waste material and finished product. The propaganda poster for the bone-soap exchange of 1944, for instance, showed a hand holding a piece of soap over a plate covered with bones.

Figure 2 represents a widely distributed didactic drawing on the rag recovery process. Under the header 'The Raw Material Rag', it visualised how the rags on the upper left side transformed into products such as sofas, cushions, and other padding, linens, roofing felts, fertilisers, letters or banknotes, and yarn or cloth. The drawing reduced the (usually female) sorting workforce to four, skipped the question of several hundred sorting grades, and oversimplified the reprocessing process. On the left, oil is extracted from rags; on the right, the three main industrial branches – upholstery, paper, and textile industries – reuse rags for their final products.

What is left out from the picture is the fact that rags not only found their way into consumer products; on the contrary, industrial and military needs eventually dominated. But even if the reprocessing quotas of the textile industry and in particular also that of the paper industry were enhanced, the much-vaunted closed circle was neither attained, nor even attainable, since any waste reclamation or recycling necessarily involves losses, a fact that Nazi waste experts were aware of. By contrast, Nazi waste propaganda ignored the expenditures, costs, inefficiencies, and wastage which were bound up with the collection and processing of scrap materials but expressed the idea that mechanical and chemical transformation processes would close the material loop.

Conclusion: how unique was the Nazi waste exploitation regime?

Recycling waste is no 'green' invention of environmental-conscious societies (Oldenziel & Weber, 2013; Reith, 2001) – for most of human history, utilising waste was the norm. In the early twentieth century, recovering waste materials such as paper, rags, or bones still contributed to the economic balances of both industry and private homes, while the First and

Second World Wars constituted periods in which warring nations intensified waste reclamation for the purpose of war-making. What then makes the Nazi waste exploitation regime – as I have termed it in this article – so specific?

In contrast to other national war-time waste mobilisation programmes (Denton & Weber, 2021), the Nazi waste exploitation regime set in well before the war. In the initial years, intensifying waste salvage was linked to the Nazi autarky goals and it was entangled with Nazi ideology and totalitarian rule. Over time, the nascent Nazi waste exploitation regime became part and parcel of racist Nazi ideology, the regime's territorial expansion as well as its exploitation and extermination strategies.

At the level of rhetoric and propaganda, the Nazi waste exploitation regime was driven by material efficiency and the idea of mobilising waste as a resource. But the rigorous interventions into the existing waste trade and its reverse logistics caused manifold conflicts and disruptions, inefficiencies as well as additional waste work. The Aryanisation of the rag-and-bone trade undermined given expertise and trading networks; the diverse parallel waste collecting efforts to approach the Nazi 'total' recovery ideal were cost- and labour-intensive and only operable by exploiting volunteer as much as forced waste work.

At the core of the Nazi waste exploitation regime lay a rigid ideological claim, namely, to set up a 'lossless' material economy which would expand the Reich's resource base, even if additional municipal and national funds were needed and the given infrastructures of municipal waste services or the rag-and-bone trade were exhausted for that purpose. The German *Volk* was asked to participate in waste salvage as a form of voluntary sacrifice to demonstrate loyalty to the nation, its order, and its prosperity, while Jews and other socially expelled individuals were forced to do the dirty waste sorting work. The Nazi salvage methods were imposed on occupied economies, and concentration and extermination camps eventually figured as hubs in the reverse logistics of waste collection and salvage. While the Japanese case shows some parallels (Denton, 2021), the latter refrained from the racist and ideology-driven murderous purge inside the waste workforce that characterised the Nazi case.

Like wartime waste salvage efforts elsewhere, the Nazi waste exploitation regime generated familiar paradoxes. Wartime shortages and rationing caused quantities and qualities of waste material to shrink, and while still surprisingly vast amounts were tediously collected and sorted by voluntary and forced labour, large proportions never made it back into production due to the manifold challenges of the reverse logistics such as declining material qualities, lacking manpower, and insufficient transport and processing facilities. Moreover, the Nazi vision of closing the material loop stood in stark contrast to the wartime situations in households, industry, or the waste trade, but even more so, to the destructive power and murdering of the German Reich and the wastefulness of war.

Past studies on the question of the Nazis' 'greenness' have shown that nature conservation and environmental protection, though regularly propagated, were rigidly subordinated to the objectives of autarkic economy and war-making, for instance, in the case of German forestry (Brüggemeier et al., 2005; Maier, 1992; Uekötter, 2006). The same is true for waste recovery. Considering the named losses, disruptions, perversities, and the contexts of war and exploitation, a discussion on the potential 'effectiveness,' 'success,' or even the sustainability of Nazi waste salvage is pointless altogether, even if recycling quotas – as we would call the share of secondary resources inside production today – were enhanced. By contrast, the role of waste salvage for the Nazi economy and the mobilisation of the German people

cannot be overestimated. In the considered cases, rag recovery filled the gap of lacking fibre resources that the autarkic synthetic fibre project could not bridge; waste paper helped save wood pulp that was needed in the chemical industry. Contributing waste to the Nazi salvage channels was shaped as an essential element of daily live in Nazi Germany and became an act of supporting the war.

The fact that the Nazi waste exploitation regime propagated the idea of 'circular' material flows can inform current debates. While there are no direct lines between Nazi or wartime waste recovery and late twentieth century 'green' recycling, the historical case might serve as a critical warning to the vision of a circular economy which presently serves politics, industry, and consumers as a utopian hope to save the earth's resources. The extreme Nazi case makes evident that no waste recovery – whatever its aspirations and methods – is neutral. Recycling cannot be reduced to economic and technical questions of its reverse logistics, its reprocessing methods, and its production techniques. Rather, waste salvage and recycling were and are deeply interwoven with ideology, society, economy, and culture.

Acknowledgements

For helpful comments and suggestions, I would like to thank Chad Denton and the two anonymous reviewers as well as the participants of the June 2018 'Waste, Recycling, War and Occupation' workshop held at Karlsruhe Institute of Technology (KIT). My gratitude also goes to the *Institute of Technology Futures* at KIT for financial support of this workshop.

Disclosure statement

No potential conflict of interest was reported by the author.

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