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## **“A SACK OF GOOD CHARCOAL”. PRODUCTION AND USE OF CHARCOAL IN METALLURGY IN MEDIEVAL SERBIA AND CZECHIA\*\***

**Abstract:** Charcoal (*drveni ugalj, ćumur*) is a product that was as necessary as wood itself for all processes related to the use of fire, and its use is particularly emphasised in metallurgy due to its specific needs, all the way up to more recent times. However, despite this, the topic of charcoal production has remained on the margins of medieval historiography. Therefore, in this paper, we have attempted to examine this issue in more detail within the territory of medieval Serbia, both based on existing sources and through a comparative approach, from the perspective of medieval Europe, with a particular focus on the regions of medieval Czechia due to the fact that both states had not only highly developed metallurgical and mining centers, such as Kutná Hora or Novo Brdo, but also that their mining legislation, which is interconnected, addresses the issue of charcoal supply.

**Keywords:** charcoal, *ćumur*, Middle Ages, Europe, Czechia, Serbia.

The use of wood, whether as fuel or raw material, has been known since time immemorial. Apart from its use as a material in construction, shipbuilding or the crafting of everyday objects and their components, it has since antiquity served as a means to kindle fire and has been used as firewood. However, unlike timber and other plant resources, which were mainly employed for obtaining fire for daily needs, the

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use of large logs and high-quality wood as firewood was reserved for those industries that required sustained high temperatures, such as metallurgy. Moreover, wood served as the principal raw material for obtaining charcoal – a higher quality fuel, which found particular application not only in iron and steel metallurgy but also in the working of precious metals, as well as in the artisan crafts of metal finishing, whose rise increased the demand for it.<sup>1</sup>

Yet charcoal production in the Middle Ages has scarcely been examined from a historical perspective, even within domestic historiography. In international scholarship, the work of Václav Husa stands as an exception. He analysed charcoal production in Kutná Hora, the famous Czechian mining and metallurgical centre of the Central European region. Drawing on extensive source material, he illuminated the place and status of charcoal burners, some of their rights, and the development of charcoal production in the mine and its settlement.<sup>2</sup> Also noteworthy are the works of Jiří Woitsch and his collaborators, who devote particular attention to questions of the timber industry, the extraction of non-timber products, and the production of charcoal.<sup>3</sup> Furthermore, Srđan Katić has addressed charcoal production, including in the Balkans, in his work on consumable materials in the Ottoman Empire,<sup>4</sup> while a series of studies have examined charcoal production from the perspective of traditional production history, based primarily on sources and data from the 19<sup>th</sup>

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Considering that the research was conducted under the mentorship of Jiří Woitsch, Ph.D, and in collaboration with Mgr. Robert Novotný, Ph.D, in the libraries of the Institute of Ethnology of the Czech Academy of Sciences and the Center for Medieval Studies in Prague, as well as on-site in the region of Čejkov-Tršov, in the mining district of Pelhřimov, under the guidance of doc. Mgr. Petr Hrubý, Ph.D. from the Department of Archaeology and Museology (Museum Studies) at Masaryk University in Brno, I would like to take this opportunity to express my gratitude to them.

<sup>1</sup> Also, charcoal was used in glassmaking, the production of lime, pottery, and the extraction of salt from inland brine springs. Maria Soler-Sala, Marta Sancho i Planas & Rosa Lluch-Bramon, “The Mediterranean Forest as a Resource in the Eleventh–Fourteenth Centuries: Mapping Medieval Catalan Forests”, in: *European Forest – Our Cultural Heritage*, eds. Elisabeth Johann, Jürgen Kusmin & Jiří Woitsch, Praga 2021, 71–74; Alexa Dufraisse, “Salt Springs Exploitation Study in Franche-Comté (France): Contribution of Charcoal”, *Journal of Archaeological Science* 29 (2002) 667–675. For more details about wood and vegetative cover as both material and source of fire strength see: Александра Фостиков, *Занатство средњовековне Србије*, Београд–Пожаревац 2019, passim;

<sup>2</sup> Václav Husa, “Uhlířské tovaryšstvo na Kutnohorsku ve 14. až 16. století”, *Středočeský sborník historický* I (1957) 7–66.

<sup>3</sup> In the given context, it must also be noted that Jiří Woitsch has for many years studied older techniques and technologies of production not only of charcoal but also of other non-timber forest products. Bohumír Dragoun, Václav Matoušek & Jiří Woitsch, “A contribution towards learning about ‘Forest industries’”, *euroREA. Journal for (Re)construction and Experiment in Archaeology* 3 (2006) 83–87.

<sup>4</sup> Срђан Катић, „Потрошни материјали у османском рударству и металургији”, *Историјски часопис* 58 (2009) 197–207.

century, including the recent period, among which are works by domestic researchers across various disciplines. Additionally, foreign archaeological literature provides data on charcoal production, wherein the subject is far better represented; in this regard, it must be noted that many such works discuss the use of specific types of wood for charcoal production and are predominantly related to data from Central Europe.<sup>5</sup> Thanks to certain sources – both written and material – as well as a body of works that occasionally touch upon charcoal production, including analyses based on novel methodologies, and on the basis of comparison, it is possible to outline the main characteristics of medieval charcoal production, including its domestic variant.

However, before addressing specific elements of charcoal production, we must establish several basic facts regarding terminology and chronological demarcations. Thus, although the term *charcoal* (Old Slavonic: *жель*, Latin: *carbo*, *carbonis*) appears in both dictionaries and source material with local variations, in the Balkans it is also known by the Turkicism *ćumur* (*kömür*).<sup>6</sup> Yet following the shift to other types of charcoal (stone charcoal, lignite), the term *ugalj* was extended to them as well, and for the purpose of a more detailed classification the term *charcoal* was introduced to signify coal obtained through traditional methods, i.e. the treatment of wood with fire.<sup>7</sup> At the same time, charcoal burners became miners, and the original link between charcoal production and the timber industry faded, save where it persists today as one of the so-called traditional crafts, which are a relic of the past.<sup>8</sup>

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<sup>5</sup> Given the multitude of works addressing this matter from diverse perspectives, and as a more comprehensive bibliography of works devoted to charcoal production will be made available within the mentioned CA22155, we shall here cite only those works that are important for our research.

<sup>6</sup> М. Фасмер, *Этимологический словарь русского языка*. В четырех томах, перевод с немецкого и дополнения члена-корреспондента АН СССР О. Н. Трубачева. Издание второе, стереотипное, IV, Москва 1987, 146; Petar Skok, *Etimologijski rječnik hrvatskoga ili srpskoga jezika* III, Zagreb 1973, 537; Abdulah Škaljić, *Turcizmi u srpskohrvatskom jeziku*, Sarajevo 1966, 199.

<sup>7</sup> Only such wood-derived charcoal was known and used during the Middle Ages. Precisely for this reason does the world literature classify it within the forest industry. Given the topic of our paper, we shall draw attention to the fact that, whereas charcoal production belongs to the forest industry, primary metallurgy, i.e. ore processing, is classified among those crafts that take place in the forest, i.e. it is the forest economy. This space, in the case of smelters, implied access both to timber resources and to water, which is why the first metallurgists are termed in sources as *silvani*, with later distinctions giving rise to the division between *silvani atque montani*, i.e. metal processors and miners. Petr Hrubý, *Silver Mining in the Kingdom of Bohemia (13th–14th Centuries)*, Brill 2024, 75–76. Within this, we can probably classify charcoal burners into *silvani* in the later period.

<sup>8</sup> This transition of charcoal production from a traditional forest industry to mining brought about the cessation of preserving traditional methods of its production on a broader scale. These methods persist chiefly either in regions where production for one’s own needs continues (as in territories of Southeastern Europe), or within associations in those European states where such production is protected as a traditional activity. Given such state of affairs,

When we speak of chronology, it must be stated that the history of charcoal production, like that of metallurgy and mining, may be traced across Europe, including the Balkans and Serbia, to the earliest historical periods, particularly during the Roman era. However, with the fall of the Roman Empire and the migrations of peoples, Roman mining practices waned, and with them charcoal production on its former scale, due to the destruction of established structures and the transformation of prevailing economic patterns, phenomena and processes. During the Middle Ages, charcoal production as an industrial activity forming part of metallurgical infrastructure followed two phases of mining development. The first, less intensive phase was characterised by charcoal manufacture closely tied to blacksmithing and production for local needs. The second phase witnessed a sharp rise, when charcoal production, owing to the revival of mining and metallurgy – both of precious and non-ferrous metals, as well as iron – evolved into a distinct industry. Charcoal burners became craftsmen in the broader sense, leading to the establishment of professional charcoal-burning organisations and master settlements. The rise of new techniques and technologies, followed by proto-industrial processes, brought innovations in production that directly influenced the further development of some economic branches which, after several centuries, gave rise to industrialisation, i.e. a new economic paradigm.<sup>9</sup>

Whereas the first period of charcoal production development is scarcely documented, with surviving evidence being largely illustrative in nature and our understanding derived chiefly from archaeological findings, the second period – when charcoal production gained momentum – is illuminated by both written sources and material remains from the late Middle Ages. Since it is impossible to examine all elements of charcoal production within a single study, we have decided to consider it specifically within the context of metallurgy and mining as the economic activity with which it was fundamentally and closely connected during the medieval period. Through the analysis of laws and regulations concerning charcoal use, i.e. based on source materials, material remains, traditions and comparative methodology, we shall examine medieval Serbian charcoal production from the perspective of medieval Europe, with a particular focus on medieval Czechia, due to the fact that both states had not only highly developed metallurgical and mining centres, such as Kutná Hora or Novo Brdo, but also that their mining legislation, which is interconnected, addresses the issue of charcoal supply.<sup>10</sup>

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charcoal is disappearing from oral tradition. In the case of the Republic of Serbia, no such association exists, nor is charcoal production protected as a traditional craft. For more details about the definition of traditional crafts and cultural heritage, see: Ivan Šestan, "Tradicijski zanati. O problemima etnološkog definiranja 'jasnog pojma'", *Etnološka istraživanja* 11 (2006) 111–121, in English 123–134.

<sup>9</sup> Сима Ђирковић, Десанка Ковачевић-Којић & Ружа Ђук, *Старо српско рударство*, Београд – Нови Сад, 2002, 19 and further passim; Aleksandra Fostikov, "Mining in Medieval Serbia", *Časopis za političku teoriju i praksu "Napredak"* 5–3 (2024) 25–36.

<sup>10</sup> Hermenegild Jireček, *Codex juris Bohemici, Aetatem přemyslidarum continens* I, Pragae 1867, 265–435; No. 102; Jaroslav Bělek, *Ius regale montanorum, aneb, Právo královské horníkuov*,

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Though we possess no direct records on mining, metallurgy and charcoal production following the arrival of the Slavs, the existing terminology, including the very Slavic term *ugalj*, allows us to conclude that it was both produced and used. It is thus entirely expected that it was known in the territories of Slavic states, including Serbia and Czechia.<sup>11</sup> However, in accordance with its developmental path, charcoal production was not initially regarded as a distinct craft or occupation. Rather, metalworkers engaged in its production, likely throughout the year, according to their own needs or needs of a local nature. Viewed from this perspective, it falls under the occasional activity of metallurgists. In this regard, it must be noted that instances of blacksmiths who were simultaneously charcoal burners are attested in England, in considerable numbers, as early as the 13<sup>th</sup> century. As we may observe from English examples of the same period and subsequent decades, the demand for charcoal led to the development of an infrastructure of labourers who produced it either seasonally or according to own needs.<sup>12</sup> Supporting this connection are data from the Charter of the Holy Archangels monastery, which reveals that when iron smelters were donated to monasteries, the necessary woodland for fuel production was also granted.<sup>13</sup>

The growing needs of the mining and metallurgical industries for ever-larger quantities of readily available, high-quality charcoal were dictated not only by the market but also by production, which now required continuity rather than sporadic activity within woodland crafts. Accordingly, Milenko Filipović noted that the origins of more serious charcoal production in the territory of medieval Serbia may be linked

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Kutná Hora 2000, cf. Никола Радојчић, *Закон о рудницима деспота Стефана Лазаревића*, Београд 1962; Биљана Марковић, *Закон о рудницима деспота Стефана Лазаревића, превод и правноисторијска студија*, Споменик СХХVI. Одељење друштвених наука 24 (1985). For more details see below.

<sup>11</sup> A great part of the terminology pertaining to mining, as well as primary metal processing, derives from Slavic terminology, or the terminology that was Slavicised in earlier periods, which suggests that the fundamentals of mining and ore processing, as well as metal production, were known to the Slavs even in earlier times. А. Фостиков, *Занатство*, passim, with sources and older literature. For the Slavic term *ugalj* see note 6 above.

<sup>12</sup> Though it is commonly held that charcoal production is a seasonal occupation, the given examples reveal that taxes on its production were paid not only for a single summer or winter, but for the entire year. Jean Birelli, “Peasant Craftsmen in the Medieval Forest”, *The Agricultural History Review* 17 (1969) 98–101.

<sup>13</sup> Синиша Мишић & Татјана Суботин-Голубовић, *Светоарханђеловска хрисовуља*, Београд 2003, 138–139. А. Фостиков, *Занатство*, 47. Also, the close connection between mines, smelters and charcoal production is further evidenced by toponymy. Thus, the name Ugljari is recorded in proximity to toponyms related to the metallurgical activity – specifically to places of operation, such as Kovači, Kuzmin, Vignjišta. А. Фостиков, *Занатство*, 47.

to the arrival of Saxons, a group of mining experts.<sup>14</sup> His view is largely corroborated by data from other European mining regions, though it must be emphasised that the rise of metal mining, as primary, and then as secondary metallurgy, dictated the development of charcoal production. In this process, Saxon mining experts were the very agents who disseminated new mining technology, along with the accompanying infrastructure of occupations and crafts. Within this framework, it is not improbable – as Filipović's cited evidence suggests – that they also brought their own traditions in charcoal production, advancing the already existing terminology and knowledge.<sup>15</sup>

That the rise of mining similarly influenced charcoal production across medieval Europe can also be seen in the case of Czechian-Moravian regions. The most eloquent example in this regard is that of Kutná Hora, which clearly demonstrates how the ascent of the mining economy led not only to intensified charcoal production but, in the case of a major and significant mining centre such as that one, even to the establishment of a charcoal burners' organisation – one of the oldest confirmed corporate associations in the region. Thus, Wacław II granted the first charter of privileges to the charcoal burners of Kutná Hora, likely shortly after enacting the mining law, to support the needs of metallurgy. The significance of charcoal burners in the chain of production and supply is further evidenced by the confirmation of their rights in the same charter – first by John of Luxembourg in 1327, then by Wacław IV in 1396.<sup>16</sup> Without delving into all the details of this charter and its confirmations, two points must nevertheless be stressed. First, charcoal burners were permitted to

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<sup>14</sup> In this context, Filipović highlights Germanisms related to stacking and combustion techniques (*rauna*, *ravuna* from *Rauchfang*, *štup* from *Staub*, *šetina* from *Stattl*), while also noting that it was from mining settlements that those charcoal burners who worked for wages later emerged. Milenko S. Filipović, „Baština srednjovekovnih rudara Sasa“, in: *Godišnjak*, knj. XXXI. Centar za balkanološka ispitivanja, knj. 29, Sarajevo 2000, 17–18. About the arrival of Saxons and their influence on the development of crafts: Александра Фостиков, „Утицај Саса на развој занатства у средњовековној Србији“, in: *Између Подунавља и Средоземља : тематски зборник посвећен проф. др Синиши Мишићу поводом његовог 60. рођендана*, ур. Катарина Митровић & Александар Узелац, Ниш–Пожаревац 2021, 153–171. About the influence of Saxons on the development of towns also see: Владета Петровић, „Друштвено раслојавање у српским средњовековним рударским градовима“, *Наша прошлост* 12 (2011) 79–88; idem, „О помену Прѣбѣгара или прѣб(р)ѣгара у Брскову“, *Иницијал. Часопис за средњовековне студије* 12 (2024) 125–137.

<sup>15</sup> *Žežnica* also appears as a domestic term. About domestic charcoal production terminology: Биљана Сикимић, „Терминологија производње дрвеног угља у селу Равна гора“, *Јужнословенски филолог* 56, no. 3–4 (2000) 1009–1028. See also above.

<sup>16</sup> Although the charter of Wacław II has not been preserved, data from it are recorded in John's confirmation of privileges in 1327. Also, by an act of 1401, potential disputes concerning charcoal and matters of payment for delivered charcoal were also regulated. Jaromír Čelakovský, *Codex juris municipalis regni Bohemiae*, Díl II, *Privilegia královských měst venkovských z let 1225–1419*, Praha 1895, 244–248, 882 No. 146, 687; Václav Husa, „Uhlířské“, 12–13. As far as we know, this is the only charter preserved for a charcoal corporation from the Middle Ages.

bear arms and transport charcoal in carts by any route they chose, provided that they took care not to damage crops.<sup>17</sup>

In both instances, whether in domestic and Czechian sources, the first mention of charcoal production is found only within mining legislation. However, though in both cases it concerns an article relating to the supervision or jurisdiction over smelter operations (*kolo*), within the *Ius Regale Montanorum* (JRM), the matter of charcoal arises within the mining code itself. In Serbian mining legislation, charcoal is not mentioned in Despot Stefan's Code, but features twice in the Excerpt from the Statute of Novo Brdo (SNB), which is preserved alongside the Cyrillic transcript of the said code – first regarding judicial jurisdiction, and second concerning price regulation.<sup>18</sup> Thus in Article VI, entitled *On Kolo Law and Mining*, it is stipulated: *What the kolo courts are for charcoal,... that is the customs court*. Then in Article XVII *On Drvari*, the price for a sack of “good” charcoal is set: “A load of wood at 2 dinars, and a sack of good charcoal at 2, with smith's load at 5”.<sup>19</sup>

As already established in the first instance, there is an additional difference compared to original Czechian mining law, whereby in such cases jurisdiction lies with the *urbarlar* (*urbararius*), while oversight was carried out by the *hutmanlar* (*hutman*), whereas in the domestic case, customs officials were responsible for *kolo* courts for charcoal.<sup>20</sup> Yet,

<sup>17</sup> J. Čelakovský, *Codex*, 246. It should be noted that neither in the Moravian-Czech region nor in the territory of medieval Serbia did guilds – including those of charcoal-burners – emerge simultaneously. For more details about the organisation of artisans in the territory of Serbia see: Александра Фостиков, „Организација занатства у урбаним центрима средњовековне Србије“, *Историјски часопис* 70 (2021) 91–115.

<sup>18</sup> Н. Јиреček, *Codex I*, 308 Cap. XIII.11; J. Bilek, *Ius*, 34 Cap. IX. 11; Б. Марковић, *Закон*, 20 чл. VI. For more details about the discussion about the name see: Н. Радојчић, *Закон*, 31, cf. Б. Марковић, *Закон*, 53–56, cf. Сима Ђирковић, *Латинички препис Рударског законика деспота Стефана Лазаревића: Увод, текст, превод и коментари*, Београд 2005, 11–13, cf. Андреја Б. Катанчевић, „Датирање Законика о рудницима деспота Стефана и садржина његовог ћириличног преписа“, *Српска политичка мисао*, год. 23. vol. 51–1 (2016) 230–233, cf. Александра Фостиков & Мелина Рокаи, „Франгарица деспота Стефана“, *Историјски часопис* 74 (2025), in press.

<sup>19</sup> Б. Марковић, *Закон*, 20, 23 чл. VI, XVII. At present, it remains unknown what precisely was meant by *kovački tovar* (*smith's load*). Given that the other two articles were products of the forest industry, and that these are classified within the *drvars'* domain, it must be presumed that the smith's load also belonged to the same category, i.e. was a product of the forest industry. As the name indicates, it was intended for smiths or metallurgists, and its price was two and a half times greater than both remaining products. Whether the smith's load can be connected with the later-known term *kovački ugalj* (*smith's charcoal*) cannot be stated with certainty. In accordance with the account of charcoal production, it should be further noted that within traditional production, a distinction later emerged between smith's charcoal (used for forging) and common charcoal (used for heating and cooking). About these types of charcoal and their production and characteristics see: Драгољуб С. Петровић, „Шуме и шумска привреда у Македонији“, *Šumarski list*, год. 49, br. 11 (novembar 1925) 653–657 (entire pages – 642–657).

<sup>20</sup> Андреја Б. Катанчевић, „Институт урбарара у средњовековној Србији“, *Баштина* 51 (2020) 268.

supervising charcoal in smelters was an indisputably important matter – while the JRM stipulates oversight, which is absent from the preserved domestic Cyrillic transcript of the Despot's mining code, a parallel is at least partially preserved within Article VI, which likewise notes the existence of a court dealing with charcoal matters in smelters. The rationale for such supervision appears in the JRM, which prescribes that overseers must ensure smelters maintain not only constant supply with designated charcoal supplies, but that charcoal is used not “wastefully” but “prudently”, with meticulous records of weekly charcoal *kolo* consumption.<sup>21</sup>

Though in Article XVII there is no parallel in the JRM, the fact remains that the price of charcoal as an exceptionally important commodity required regulation in overseeing a major mining market. Furthermore, Article XVII indicates that not only did a sack of charcoal equal an entire load of wood in value, but that charcoal quality was specially emphasised, as Agricola<sup>22</sup> also notes, and that there was an established measure, which further suggests either public or private law charcoal-burners' corporations in Novo Brdo as well.<sup>23</sup> Later evidence of smelter supply arrangements in Žeravice shows that charcoal was a competitive commodity and was delivered at pre-agreed prices, and that, as metallurgy and charcoal production expanded, mine and smelter owners emerged as intermediaries in trade between producers and consumers, and even bore transport costs. This contract suggests that in 1492, 50 kg of charcoal cost approximately 1 asper.<sup>24</sup>

Regarding the protection of charcoal burners, domestic sources preserve virtually no data, apart from those mentioned. Yet the Kutná Hora charter, general knowledge of corporate organisation, price regulation and oversight through *kolo* courts for charcoal suggest its trade and use were supervised, whereby producers were indirectly protected. Given that, due to their business activities, charcoal burners

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<sup>21</sup> H. Jireček, *Codex I*, 308 Cap.XIII.11; J. Bílek, *Ius*, 34 Cap. IX. 11. Given that the *kolo* was not to cease operation, not even on Sundays, as we learn from the same Article VI (Б. Марковић, *Закон*, 20 чл. VI), it follows that the smelters had to be continuously supplied with sufficient charcoal reserves in order to function. This need for continuous charcoal supply is underscored by a later contract on the lease of the smelter in Žeravice. Ђуро Тошић, „Уговор о закупу рударских постројења у мјесту Жеравице“, *Мешовита грађа (Miscellanea)* 22 (2004) 146, 148.

<sup>22</sup> Apart from describing in detail charcoal use in metallurgy for different purposes, including as charcoal dust for separation of silver and lead, Agricola emphasises the quality of charcoal. Thus, for steel production purposes, he notes that the “best charcoal” should be used. Georgius Agricola, *De Re Metallica* (1556). Translated by Herbert Clark Hoover & Lou Henry Hoover, 1<sup>st</sup> English ed. London 1912, 425–426, 474.

<sup>23</sup> About the price and measure as elements of organisations see: А. Фостиков, „Организација“, 104. However, within the given article, one must also raise the question of whether, in the given case, the *drvar* can be identified with the charcoal burner, or whether it is a merchant who sells wood and charcoal. In Kutná Hora, charcoal burners initially sold their own produce, with intermediaries in sale emerging later. J. Čelakovský, *Codex*, 244–248 No. 146.

<sup>24</sup> Ђ. Тошић, „Уговор“, 141–149.

were exposed to changes in their place of habitation, the settlements that formed in connection with charcoal production would fall into the category of temporary, like those arising around smelters.<sup>25</sup>

Even though for the given period we presently have no knowledge of additional mentions of charcoal or charcoal burners in domestic sources, judging by the Saxon (mining) privileges, which were present throughout Europe, including in the territories of Czechia and Serbia, the right to cut timber was directly linked to the use of wood for charcoal production. In an environment where unauthorised felling was considered an offence – not only was the timber confiscated, but a monetary fine was also imposed – the sovereign’s approval to fell a forest had to be included in the mentioned privileges. That this was the case is clearly evident from Emperor Dušan’s Code.<sup>26</sup> As a parallel to this, we may cite a later reference from Czechian mining legislation concerning the use of forest resources for charcoal production, which states: “However, when someone requests from the forester to take wood from clearings for boundaries or for charcoal production, the forester should not deny him...”<sup>27</sup>

All other currently known sources about charcoal and charcoal burners in Serbia date from a later period, i.e. the Ottoman era. Nevertheless, based on these sources, particularly the earlier ones, we gain insight into certain elements and system of production, the types of wood used for charcoal, and the methods of taxation. From these sources, we learn that charcoal was produced by villages within the mining hâss, that charcoal burners paid a basic hearth tax for charcoal, as well as an additional market levy (*badž*), and that the number of hearths depended on the needs of mines. For instance, in Srebrenica in 1548 alone, there were 267 hearths in operation.<sup>28</sup>

<sup>25</sup> J. Čelakovský, *Codex*, 244–246, cf. Татјана Катић, „Топионице – језгра нових насеља у рударским областима Вучитрнског санџака (15–16. век)“, *Историјски часопис* 73 (2024) 129–150.

<sup>26</sup> About Saxon privileges and forest felling: Никола Радојчић, *Законик цара Стефана Душана, 1349 и 1354*, Београд 1960, 123 чл. 123 н. 2; Jelena Mrgić, “Some considerations on woodland resource in the medieval Serbia and Bosnia”, *Beogradski istorijski glasnik* (2010) 92–94; Katalin Szende, “Iure Theutonico? German settlers and legal frameworks for immigration to Hungary in an East-Central European perspective”, *Journal of Medieval History* XLV (3) (2019) 360–379. About the prohibition of cutting wood without a permit: А. Фостиков, *Занатство*, 151–152.

<sup>27</sup> Ludmila Kubátová, Václav Vok Filip & Václav Bok, *Statuta horního města Jáchymova z roku 1526*, Praha 2012, f. 61r. Although the statute of the mining town of Jáchymov is a relatively recent written source, it should be noted that it is very detailed, containing provisions concerning the operation of both the *montana* (mining settlement) and the mine. It must also be emphasised that Georgius Agricola resided in this very location at the outset of his career, where he acquired considerable experience and knowledge about the functioning of a mine. Jiří Majer, “Ore Mining and the Town of St. Joachimsthal/Jáchymov at the Time of Georgius Agricola”, *GeoJournal*, Vol. 32, No. 2, In Commemoration of Georgius Agricola, 1494–1555 (February 1994) 91–99.

<sup>28</sup> Among other uses, the finest charcoal – produced in domestic territories from willow and hazel wood – was used for gunpowder production. Due to frequent attacks, charcoal burners were protected by *martolos* detachments. С. Катић, „Потрошни“, 197–207. In case of

Finally, it must also be emphasised that it was precisely the production of charcoal that was the main cause of deforestation in the late Middle Ages, which, judging by the attention devoted to the issue as early as the mid-14<sup>th</sup> century, had already taken hold by that time. Thus, Article 123 of Emperor Dušan's Code stipulates that even if miners were henceforth permitted to cut forests for their own needs or those of the mine and settlement, the place where the forest was felled had to be left unused so that the forest could regrow.<sup>29</sup> Just how extensive deforestation actually was can be clearly seen in the example of the Kutná Hora mining region, whose broader surroundings were irreversibly altered – already during the Middle Ages – so much that after the local forest was depleted, charcoal had to be brought in from “great distances”.<sup>30</sup>

Given all the above, it must be finally noted that, judging by foreign, including Czechian examples, new data on medieval charcoal production in the territory of Serbia may be expected to encourage new research, not only of written records but particularly of material findings, i.e. future archaeological reconnaissances. On the basis of comparison, it may be anticipated that the remnants of charcoal burning will also be discovered in the vicinity of domestic mines.

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Ottoman legislation, the supervision of charcoal delivery was carried out by şafars. Srđan Katić, “Şafars in Medieval Serbian and Ottoman Mining”, *Istorijski časopis* 73 (2024) 105–127.

<sup>29</sup> “... henceforth, the Saxons shall not cut, and what they have cut, they shall not process nor accommodate people; the forest shall remain untouched and grow wild; no one may forbid the Saxons' forest; they may cut only as much as the market needs”. Н. Радојчић, *Законик*, 123 чл. 123; Срђан Шаркић, „Може ли се говорити о заштити животне средине у средњовековној Србији?“, *Зборник радова Правног факултета у Новом Саду*, vol. XLVIII, br. 1 (2014) 45–52.

<sup>30</sup> V. Husa, “Uhlířské”, 12.

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**Александра Фостиков**

**„УГЉА ВРЕЋА ДОБРА“. ПРОИЗВОДЊА И УПОТРЕБА ДРВЕНОГ УГЉА  
У МЕТАЛУРГИЈИ У СРЕДЊОВЕКОВНОЈ СРБИЈИ И ЧЕШКОЈ**

**Резиме**

Употреба дрвеног угља (ћумур), није узимана у обзир као истраживачки проблем све до новијег времена, а посебно у домаћој историографији, са освртом на средњовековну употребу и производњу. У том контексту сматрали смо да је неопходно да исте истражимо детаљније у оквиру металургије, у којој дрвени угаљ постаје примарни потрошачки материјал са новим успоном рударства, како на територији Србије, тако и Европе. Са обзиром на то да су подаци о дрвеном угљу, као и о употреби самог дрвета у оквиру металургије и рударства изнимно ретки у писаним изворима, те да дрвени угаљ није посебно истраживан ни у оквиру домаће археологије, као и да заправо једина два писана податка потичу из законодавства, дати су и упоређени са подацима из средњовековног чешког рударског законодавства и података о истом са територије Кутне Хоре, која представља пандан по свом значају Новом Брду, а чији су рударски законици и у непосредној вези. Додатно, чињенице да је рударско право, као и право монта на домаће територије пристигло са доласком Саса, као и да је у саске повластице спадало коришћење шумског ресурса, те да су та права била раширена у средњовековној Европи, у виду тачно прописаних привилегија, као и да се германска терминологија бележи и у оквиру домаће угљарске, указују и да је долазак Саса утицао на развој угљарске производње неопходне за континуирани успон металургије, а посебно примарне која се заснивала на обради и преради сирове руде.

Како се из изнетих података може закључити, дрвени угаљ представљао је посебан производ чија је трговина посебно надзирана, цена прописана, а посебна пажња посвећена томе да топионице увек имају довољну залиху. Судећи према паралелама угљари су још у средњем веку постали посебно занатско занимање, те су вероватно још тада и на територији средњовековне Србије, бар у случају важнијих рударских монта, попут Новог Брда, исто онако као и у Кутној Хори, имали и своју корпорацијску организацију. Са обзиром на високу потражњу током времена, у трговину и производњу угљем укључују се и поседници рудника и топионица, како то сведочи и случај закупа постројења из Жеравице, а након пада српске средњовековне државе под власт Османлија, дрвени угаљ као важан потрошни материјал постаје обавеза становника села рудничког хаса.

Такође, у оквиру самог разматрања угљарства, мора се истаћи и да је исто одиграло главну улогу у процесу дефорестације, те су вероватно и стога

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првобитне саске повластице још у време цара Душана делимично ограничене. Пример дефорестације управо даје сам кутнохорски рударски регион, који је практично због повећања потребе за угљем и неповратно измењен.