


Exploring the eighteenth-century concept of soil as reflected in Sámuel Domby's *De vino Tokaiensi*

Eszter Sipos* 

Tokaj-Hegyalja Egyetem, Sárospatak, Hungary

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ABSTRACT

The treatise *De vino Tokaiensi (On Tokaj Wine)* written by Sámuel Domby of Gálfalva (1729–1807), is a valuable source on Hungarian history of culture and science which has become widely accessible thanks to its facsimile edition. This medical doctoral dissertation published in 1758 in Utrecht presents a study of the medicinal effects of Tokaj wine, mirroring the norms of philosophical-scientific literature in eighteenth century Hungary. It is unequivocally an exceptional document of the intellectual heritage of the educated classes in the early modern age regarding growth habitat, viticulture and winemaking, with specific reference to Tokaj-Hegyalja, a wine region and cultural landscape of historic importance in Northeast Hungary. The present paper aims at identifying the perceptions detailed in the candidate's argument in pedological terms.

KEYWORDS

scientific language, pedology, soil, earth, Tokaj, eighteenth-century peregrination

DID PEDOLOGY EXIST IN THE EIGHTEENTH CENTURY?

As a matter of fact, pedology¹ is a relatively young discipline that had separated from agro-geology,² a branch of applied geology, by the end of the nineteenth century. Still, the aspects

* Corresponding author. E-mail: siposeszter@gmail.com

¹Pedology is a “scientific discipline concerned with all aspects of soils”. See ‘Pedology’ (2023).

²Szabolcs (1983), 297–299, 321.

distinguishing soil science from earth science are already discernible in the geological research conducted by József Szabó (1822–1894) half a century earlier.³ By then the concept of *soil* had entered the scientific realm, and the language inevitably had to provide a tool for organizing related experiences. At the onset of the Hungarian language reform⁴ (1787) Dávid Barczafalvi Szabó (1752–1828) “invented” the word *talaj*⁵ to mean floor, using the archaic spelling “*talpaly*”⁶ (*bottom of the sole*⁷), where the “*whimsical contraction*”⁸ of *talp-alj* (*sole-bottom*) can easily be recognised: “*le függeszté könnyübe láppadt szemeit a’ talalyra.*”⁹ (*she is lowering her tearful eyes to the floor.*)

As early as 1861 József Szabó described the fertile layers of the earth’s crust in Békés and Csanád counties as “*talajnemek*” (*soil genera*).¹⁰

It would be unreasonable to expect a systematic approach in distinguishing *soil* from *earth* – or rather *bedrock* – in Döbly’s scientific work, as pedology did not become a distinct science until 150 years after he defended his dissertation. Likewise, it took decades before the word *talaj* (*soil*) was coined in the Hungarian language and its scope of definition broadened. Had he written his thesis in Hungarian, Döbly would obviously not have been able to use the expression *talaj*, as it did not exist at the time.

In the work written in 1791 by agronomist and agricultural writer János Nagyváthy (1755–1819) and titled *A szorgalmatos mezei-gazda* (*The diligent farmer*),¹¹ it reads as follows: “*A’ hideg agyagot mindazáltal nem szereti úgy, mint a’ meleg, ritka, és homokos, sőt köves földet,*”¹² (*Nevertheless, it does not like cold clay as much as warm, porous and sandy, even stony earth,*) where, in current terms, he discusses a plant’s soil requirement. Elsewhere, he argues for soil improvement: “*a’ mivelés által földje napról napra meg-javúlt*”¹³ (*through cultivation his earth improved day by day*).

In a translation of the work of abbot and scientist Lajos Mitterpacher (1734–1814)¹⁴ published in 1815, Calvinist pastor, János Pósfai (1778–18??), says:

“*Mikor a’ föld természetéről szólok, nem csak a’ föld színén lévő legfelsőbb területet akarom érteni, mellynek, hogy a’ plántákra nézve legnagyobb béhatása van, akárci is általlátja, hanem az ez alatt*

³Ballenegger and Finály (1963), 14–21.

⁴It is the reform movement affected by the enlightenment that aimed at rendering the Hungarian language suitable for sophisticated discourse in the arts, as well as the sciences at the turn of the eighteenth and nineteenth centuries.

⁵It took a while until the word *talaj* (*soil*) obtained its present meaning in modern Hungarian language.

⁶Barczafalvi Szabó (1787), unnumbered pages of *Dictionary* after page 720.

⁷Literal translation of the roots of the newly coined word.

⁸Szily (1902), 321.

⁹Barczafalvi’s translation of Miller (1787), 125.

¹⁰A nineteenth-century term used in soil classification.

¹¹Nagyváthy (1791).

¹²Nagyváthy uses *föld*, which literally translates today as ‘dirt’, ‘earth’, ‘land’ or ‘ground’, but at that time it meant what we call now *soil*. Nagyváthy (1791), 186.

¹³Here the Hungarian text once again contains *föld*, meaning ‘soil’. See Nagyváthy (1791), 206.

¹⁴The original publication cited in the inside title page of the Pósfai translation may be the one by Chaptal et al. (1801).



fekvő akár földeknek, akár köveknek területeit is, vagy vizenyős helyeket, (viz fészkeket), melyek hogy a' plántákban valami változást okozhatnak, alig tagadhatjuk.¹⁵

(When I talk about the nature of the earth, I mean not only the uppermost layer on the surface that has the most noticeable effect on plants, but also the layers of earths, rocks or damp areas (water filled cavities) underneath that can cause undeniable changes in plant growth.)

In his 1846 thesis on fixing sand, Adolf Érkövy Ploetz (1818–1883) uses the word *talaj* twice, inconsistently, but like many others of his time, he favours the word *föld* [earth],

“a' sovány homokos földben olly növények természetesenek, mik egy részt táplálékukat a' légkörből veszik, más részt mélyen, 4–5 sőt több lábnyira is lehető gyökereikkel a' különben haszonnélkül ott veszteglő tápszereket a' föld felső rétegébe hozván, — ezt termékenyíteni képesek.”¹⁶

(In poor sandy earth plants should be grown that absorb nutrients from the air or are capable of growing deep roots making their ways to 4–5 feet or further to bring nutrients to the surface otherwise wasted purposelessly in deeper layers to act as fertiliser.)

Further he writes:

“A fekete ürömmek szintén az a sajátága, hogy gyökerei mélyen járnak, 's a' talaj mélyén található növény-tápszert összebengészvén, a' felső rétegbe hozza, — embrenyi magosságra megnő, 's a' birka megeszi.”¹⁷

(Having deep-seeking roots is a characteristic of mugwort as well, and browsing for nutrients in the depths of the soil it brings them to the surface layer – it grows as tall as a person and is eaten up by sheep.)

In 1856 agronomist, winemaker, and author both on matters of wine and on economics, Antal Gyürky (1817–1890) already used the word *talaj* as if customary but in the sense of ‘deeper layer’ and ‘bedrock’ as shown in the following quote,

“A' mi a' szőlő' földét illeti, e' tekintetben egyik főtényező a' talaj, másik a' felréteg. A' talajra nézve legjobb vulkános, kövecses, murvás, márgás 's meszes réteg, kivált ha az agyagos s csak kevésé is termő földdel van vegyítve.”¹⁸

(As for the earth in the vineyard, one of the main factors is the bedrock and the other is the upper layer. Concerning the bedrock, volcanic, stony, gravelly, marley and calcareous are the best, in particular if it is clayey and is mixed with at least some fertile earth.)

later, writing in *Borászati lapok*¹⁹ (*Oenological Papers*) in 1858, he used the terms *föld* and *talaj* interchangeably without any distinct pattern:

“Azért, ha a legismertebb szőlőhegyeket futólagosan átnézzük, találni fogunk az úgynevezett Heremitageban magla-féle (gránit) talajra, Anjouban, Malagában és Grenadeban agyagos palakőföldre, Xeresben kovárczos fővényre, Médocban kovára és Cote-d'Orban meszes és márgás földre, Champagneben krétás földre, Tokajban elmállott bazáltra és Szicíliában és a Vesuv körül vulcannemű talajra.”²⁰

¹⁵In Pósfai's translation *föld* — i.e. ‘earth’ — means both *soil* and *bedrock*. See Mitterpacher (1815), 3–4.

¹⁶Here the word *föld*, which translates as ‘earth’, is again used to mean *soil*. See Érkövy (1846), 51.

¹⁷*Ibid.*, 51.

¹⁸Gyürky (1856), 32–33.

¹⁹Title of a periodical (1858–1943).

²⁰Gyürky (1858), 108.



(Thus, taking a cursory glance at renowned vine hills, we find various types of bedrock such as granite in the so-called Hermitage, clayey slate bedrock in Anjou, Malaga and Grenada, quartz sand in Xeres, flint in Medoc and limy and marley bedrock in Cote-d'Or, chalky bedrock in Champagne, weathered basalt in Tokaj and volcanic bedrock in Sicily and around the Vesuvius.)

The explanation of soil formation is an undeniable proof of scientific research distinguishing between bedrock and fertile soil as a result of weathering. In his book Nagyváthy quoted Count Carlo Antonio Pilati²¹ (1733–1802) who wrote as follows:

”Piláti Károly Uram Európának külömb-külobb Tartományiban való Utazásában azt írja, hogy a’ legszebb Szőlő-hegyeket, abban a’ földben lehet Siciliában látni, a’ melly a’ Tüzet-okádó Etnából kifolyt, és a’ mellyet a’ Természet-visgálók Lávának neveznek. Ez a’ Láva igen sok Esztendők múlva, lyukatos üregjeibe az esső ’s Levegő által, a’ hegyből ki-szórott hamut bé-szedvén, el-készül arra, hogy mor’sás és felette Termékeny legyék.”²²

(Mr Carlo Pilati writes in his Travels in Different Countries of Europe that the most beautiful vine hills can be found in the kind of earth of Sicily that had flowed from fire-spitting Mount Etna and which is called lava by natural scientists. Over time rain and air seep into the holes of this lava, collecting the ash scattered from the mountain, and the earth becomes crumbly and highly fertile.)

Domby’s work was only twenty years ahead of Pilati’s book, and it is reasonable to assume that he also differentiated the “crumbly” and “fertile” layers from the bedrock, and when he presented the best *earths* of Tokaj-Hegyalya,²³ he was actually referring to the *soil*.

WHAT SOILS DID DOMBY WRITE ABOUT?²⁴

The later chief medical officer of Borsod county, Sámuel Domby visited German universities, where the Hungarian Calvinist student on peregrination enrolled at the faculties of

²¹Nagyváthy is likely quoting the theory of volcanic rock weathering from the work of the Italian scientist, Carlo Antonio Pilati. See [Pilati \(1777\)](#).

²²Nagyváthy (1791), 17.

²³The wine-growing foothills of the *Zemplén Mountains* referred to in common usage as *Tokaj Mountains*.

²⁴The Hungarian words *föld* (dirt/earth/land/ground) and *talaj* (soil) have become widely used both in everyday and in scientific language. In the agricultural sciences the term *föld* is typically associated with economic interpretations such as *termőföld* (arable land), *földértékelés* (land value estimation) and *földhasználat* (land use). The perspective of soil science (pedology) is not directly economic in nature, and the subject of its investigation, the thinnest (more or less) fertile layer of the solid crust of our planet, is termed ‘*talaj*’ (soil): *talajdiagnosztika* (soil diagnostics), *talajművelő eszköz* (soil management equipment), *talajvédelem* (soil protection) and *talajminta* (soil sample). It certainly retains its inherited technical terms when they do not hinder understanding, such as *barnaföld* (brown earth) that belongs to Cambisols, and *földes kopár* (which literally translates as earthy barrens) that belongs to Regosols. See [Michéli et al. \(2015\)](#), 289. In contrast (or rather, in addition) to this, the subject of geology (earth science) is the study of the material composition and changes of our planet – simply put, the investigation of rocks, including bedrock or underlying formations beneath the soil. The most striking difference between the subjects of the two sciences is life. A fertile formation would not develop merely through the weathering of rocks without the presence of various life forms inhabiting them. Geology encounters organisms in their fossils and effects. Soil is a community of life forms that cannot develop on the Moon, even though rocks also weather there due to the laws of physics.



theology and medicine.²⁵ On accomplishing his studies in Utrecht, the candidate defended his dissertation on the medicinal use of Tokaj wine. In five chapters Domby argued the natural causes of the quality and beneficial health effects of Tokaj wines, attempting to synthesize reason and observation in the scope of scientific disciplines including ampelology, oenology, chemistry, geography, pedology, meteorology and various fields of medicine as recognised today. In the second chapter he provided noteworthy details of the epipedons:²⁶

*“Species multas terrae Tokaiensis utpote: albam rufam nigram rubricam gelatinosam sabulosam saxeam qui singulatim enumeratas legere cupit...”*²⁷

(Whoever wants to read about the many types of earth in Tokaj, these are: white, rufous, black, red, gelatinous, sandy, stony enumerated one by one ...)

Among physical properties he listed the colours and characteristic particle sizes, in modern terminology the *texture*, of the *soils*. Pedology identifies the colours of the formations based on the Munsell scale.²⁸ In accordance with this scale, the identified colours of dry and wet²⁹ samples from soil profiles in Mád,³⁰ Tarcál and Tolcsva³¹ are as follows (Fig. 1):



Fig. 1. Colours of soils in Tokaj-Hegyalja (Mád, Tarcál and Tolcsva) with codes of the Munsell-scale³²

²⁵N. Kis (2022), 115–117.

²⁶Epipedon is the uppermost horizon of a soil profile.

²⁷Domby (1758), 23.

²⁸The colour chart based on colour perception was created by American painter Albert H. Munsell (1859–1918). The resulting scale has been used in soil science, as well as in many other scientific disciplines since the first half of the twentieth century.

²⁹In his dissertation Domby does not refer to the water content of the evaluated soils.

³⁰Fekete (2010), 279.

³¹Madarász (2009), 115–116.

³²The coded colour exemplars corresponding to the soil samples are collected from the Hextoral catalogue as it offers a wide range of colour palettes from the Munsell scale. See Hextoral (2022).



“*Terra rufa*” (*rufous earth*) in Dombó’s definition cannot be identified with a single colour code as it is not a registered term for one colour but denotes various colours. In the dictionary by Albert Szenci Molnár (1574–1634) published in Heidelberg, we find the translation “*Vörhönyő, Sárgavörös*”³³ (*reddish, yellowish-red*), while in the work of Ferenc Pápai Páriz (1649–1716) “*Verhenyő, Sárga veres, mint a róka*”³⁴ (*reddish, yellowish red, like a fox*) matches the colours in the Munsell palette³⁵ identifying the Hegyalja samples, which indicate certain values³⁶ and chromas³⁷ of the intermediate hue between yellow and red. However, such quantified records have only been available since the first half of the twentieth century.³⁸

“*Terra rubrica*” (*red earth*) seems to be more easily identifiable at first glance. Szenci Molnár’s translation is “*Vörös creta, vörös tinta, vörös föld, agyag*”³⁹ (*red chalk, red ink, red earth, clay*), while Pápai Páriz writes “*Veres kréta, Veres ténta, Veres föld*”⁴⁰ (*red chalk, red ink, red earth*). Red ink was used for highlighting in ancient manuscripts, and in the Byzantine Empire only the emperor was entitled to use it. In Hungary it first appeared during the reign of King Béla IV. (1235–1270).⁴¹ It was made from both minium⁴² and cinnabar⁴³ which are intermediate hues⁴⁴ between yellow and red (Fig. 2).⁴⁵

³³The term “*rufus*” is also the definition of “*posgás*” according to that dictionary, which means *ruddy* in English. See Szenci Molnár (1621), 260, 829.

³⁴Pápai Páriz (1801a), 541.

³⁵In the codes of Munsell’s system the initial letters of the English names of the colours represent the principal hues, while the intermediate hues are represented by the initial letters of the two related principal hues. The principal hues and their intermediate hues are given the number 5 on a scale of 0–10. For example, 5YR means that the specified hue can be located in the system halfway between the principal hues yellow (5Y) and red (5R). Thus, 10YR can be identified between 5YR and 5R indicating that the hue is dominated by red. See Ábrahám et al. (2015).

³⁶The value on the Munsell scale provides information about the lightness of a colour, with 0 indicating the darkest shade (essentially black) and 10 indicating the lightest (essentially white). Therefore, 5YR 5 is lighter than 5YR 4. See Ábrahám et al. (2015).

³⁷The Munsell chroma or saturation index indicates the difference of the hue from grey. The higher the chroma index, the more saturated the colour is. Therefore, 5YR 4/8 is more saturated than 5YR 4/6. See Ábrahám et al. (2015).

³⁸The Munsell palette used in pedology is available in the Revised Standard Soil Color Charts. See Revised Standard Soil Colour Charts (2022).

³⁹Szenci Molnár (1621), 828.

⁴⁰Pápai Páriz (1801a), 541.

⁴¹Fejérpataky (1994), 271–272.

⁴²Szinnév-Szinszótár (2022), <http://www.szintan.hu/lista/m/m58.htm>

⁴³Szinnév-Szinszótár (2022), <http://www.szintan.hu/lista/c/c17.htm>

⁴⁴The displayed colours are only approximate. Although both names refer to compounds with specific chemical compositions, and their colour codes can be matched across different systems, different sources may display different colour as minium and cinnabar or any other colours for that matter. See Hextoral (2022), Szinnév-Szinszótár (2022).

⁴⁵Fejérpataky (1994), 271–272.





Fig. 2. Minium (left) and cinnabar (right) in the Munsell-scale

Besides *brown forest soil*⁴⁶ many vineyards in the Tokaj-Hegyalja region are characterised by *red erubase*⁴⁷ soil, commonly known as *vörös nyirok*⁴⁸ (*red damp clay*⁴⁹) in Hungarian. The dominance of red hue and chroma in these soils is due to the abundance of iron and aluminum oxyhydrates,⁵⁰ which are a result of leaching⁵¹ and may indicate favourable conditions⁵² for oxidation. These soils are rich in clay minerals that provide easily available nutrients and have a good water retention capacity. Both the *red-brown forest soils*⁵³ and the *red erubase soils* of Tokaj-Hegyalja can be identified as “*terra rufa*” and “*terra rubrica*”.

Fekete nyirok (*black damp clay*⁵⁴), an erubase soil that is a likely solution for “*terra nigra*” (*black earth*), has a restricted extension determined by the topography and the orientation the slope is facing. It develops under the extreme microclimates of mountaintops and southern slopes.⁵⁵ Conditions for microbial activity are absent for most of the year here, and organic matter accumulates contributing to the dark colour of the typically shallow fertile topsoil (Fig. 3).

⁴⁶*Brown forest soils* fall into various categories in WRB. See FAO (2015). Classification and adaptation are not accomplished endeavours. Hungarian pedology can be characterised by a genetic approach, while the WRB represents a diagnostic perspective and their synthesis is the subject of perennial dispute.

⁴⁷The term ‘*erubase*’ refers to soils formed on acidic, neutral or alkaline volcanic rocks, and was coined by the fusion of the words ‘*eruptive*’ and ‘*basic*’ (alkaline). The WRB classification system recognises a range of soil types at Tokaj-Hegyalja including *Leptosols*, *Luvisols*, *Cambisols* and *Phaeozems* that may fall into the category of *erubase* in the genetic classification system. See Michéli et al. (2015), 289., also Madarász (2009), 16, 92–94.

⁴⁸Its name suggests clay of high plasticity and water retention capacity with an abundance of mafic (rich in magnesium and iron) minerals.

⁴⁹The translation is only approximate.

⁵⁰Chemical compounds containing both oxygen and a hydroxyl functional group.

⁵¹Leaching is the process of water-soluble substances being carried downward through soil layers by percolating water leading to the accumulation of salts in lower soil horizons. See Füleky (2011), 14.

⁵²Fekete (2005), 310.

⁵³*Cambisols* See FAO (2015), 152.

⁵⁴The translation is only approximate.

⁵⁵Madarász (2009), 16.



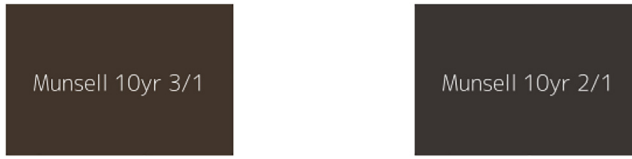


Fig. 3. The colour of black erubase according to Munsell's palette specified in dry (left) and wet (right) samples from soil profiles in Tarcsl

Nyirok (damp clay⁵⁶) formed by the weathering of andesite tuff gives the characteristic crumbly soils of Tokaj-Hegyalja, as described by Nagyváthy in his book published in 1791:

“A' Láva sok különböző részekből áll, úgymint van benne Hamu, a' melly kétféle porhanyós és kemény. Amazt Puttzolán földnek: ezt pedig Trássnak nevezik. Ide tartóznak a' ki-égett Kövek, a' mitsodás ama lyukatsos, és reszelő könnyű kő, (némellyek Tajték-kőnek, Pumex nevezik) és a' Puttzolán agyag. Illyen rész még ama közönségesen Láva-salagnak, vagy Czigány szarnak nevezett Scoria Vulcania is, a' mellyben sokféle testek tsigák, fa darabok, vas-szögek, Makk 's a' t. találatnak gyakran. Illyen Czigány-szARBól áll az egész Tokaji híres Bor-termő-hegy-is. És az Utazók, mint ritkaságot, nagy költséggel-is ki-hordják tőlünk.”⁵⁷

(Lava consists of various parts such as ash that is of two kinds – it may be powdery or hard. The former is called Pozzolana earth and the latter is Trass. Burnt-out rocks, some of them full of holes and some raspy and lightweight (some call them meerschaum or pumice), as well as Pozzolane clay belong here. Another part is Scoria Vulcania, commonly called Lava slag or Gypsy shit that often contains various objects such as shells, pieces of wood, iron nails, acorns and so on. This “Gypsy shit” is what the famous Tokaj wine-growing hill is made up of. Travellers often carry it away from our soil at great expense as a rarity.”)

What is interpreted as “*terra alba*” (white earth) may correspond to a light-coloured soil but there is no point in classifying it according to Munsell's chroma of 10 or around, since such a colour appears as crust on saline soils whose occurrence is not characteristic of Tokaj-Hegyalja. More probably, the lightest coloured soils formed on loess typical of several vineyards on Kopasz-hegy (Tokaj-hegy, Nagy-hegy, Nagykopasz-hegy)⁵⁸ may match the pedological formations with the “*albic*” attribute in WRB (Fig. 4).⁵⁹



Fig. 4. Munsell's colours based on loess researches in the Tokaj region⁶⁰ and definitions of WRB

⁵⁶The translation is only approximate.

⁵⁷Nagyváthy (1791), 17.

⁵⁸Common names for the Tokaj Mountains are Bald Mountain, Big Mountain or Bigbald Mountain.

⁵⁹World Reference Base for Soil Resources See: FAO (2015).

⁶⁰Incze (2017), 61.



On the sedimentary parent material exposed as a result of erosion we may identify *földes kopár*⁶¹ (*earthy barrens*⁶²) whose productivity is as low as its name suggests. Otherwise, various types of *brown forest soils*⁶³ can develop on loess under more favourable conditions. Despite anthropogenic erosion decreasing their extensions irreversibly (on a human scale), examples of all those soil types can be identified in Tokaj-Hegyalja. In viticulture, sedimentary bedrock rotated into the upper soil horizon makes the surface of these *soils* lighter in colour, while the fertile layer degrades further.⁶⁴

In terms of texture, if the *soil* is “*gelatinosa*” – that is gel-like or highly plastic –, it must be capable of swelling due to its high colloid⁶⁵ content and (phyllosilicate) structure, which characterises *soils* rich in montmorillonite⁶⁶ that are also prone to thixotropy.⁶⁷ *Soils* rich in the mineral named after the French town of Montmorillon⁶⁸ typically form on volcanic rocks. All “*terra rufa*”, “*nigra*” or “*rubrica*” can also be “*gelatinosa*”: this includes *Cambisols* and *Luvissols* of Tokaj-Hegyalja.

On the other hand, “*terra sabulosa*” is characterised by a sandy particle composition and its colour is most likely “*alba*” or possibly reddish-brown, indicating *soil* mostly formed on some type of loess.

“*Terra saxea*” is likely a gravelly or stony *skeletal soil* belonging to *Leptosols*⁶⁹ formed by the fracturing and slow weathering of andesite and basalt rocks and their tuffs accompanied by intense erosion. This results in a *soil* that is poor in organic matter and has a thin fertile layer. Soil horizons exposed by cultivation may show early stages of soil formation that could have affected how *soils* looked in the early modern period as well.

“*Derivanda est vini Tokaiensis diversa qualitas et a multiplici solo; terra albicans et rubella vites alunt nobilissimas.*”⁷⁰

(*The diverse quality of Tokaj wines has to be derived from the various soils; whitish and reddish earth nourish the most noble vines.*)

⁶¹It is a type of skeletal soil according to genetic soil classification that WRB recognises as one belonging to *Regosols*. See Michéli et al. (2015), 289.

⁶²The translation is literal.

⁶³Categories of *Cambisols* and *Luvissols* in WRB are applicable to the vineyards of Tokaj-Hegyalja. See Michéli et al. (2015), 289.

⁶⁴Light grey tuff or white ash also contribute to the light colour appearance of the epipedon (the uppermost horizon) on a highly eroded soil that is a characteristic of skeletal soils.

⁶⁵Colloid (interface) particles range between 1 nm and 100/1000 nm (there is no agreement) which results in a distinct phase of matter. See Gillányi (2005), 2.

⁶⁶F. Vogl (1954), 122–124.

⁶⁷The phenomenon of thixotropy can be well illustrated by the mud around the spinning wheel of a car that is stuck in it. The mud exhibits a reversible change from a solid- or gel-like state to a more liquid condition under the application of shear stress, such as mixing or stirring. The material then returns to its original state once the stress has been removed. See Balogh (2017).

⁶⁸Bergaya et al. (2001), 12.

⁶⁹Michéli et al. (2015), 288.

⁷⁰Domby (1758), 23.



"*Terra albicans*"⁷¹ (*whitish earth*) is not entirely "*alba*" (*white*), only *whitish*, that is light in colour. Similarly, "*rubella*" is not "*rubra*" (*red*), but *reddish* – compared to other *soils*. In Szenci Molnár's text it is called "*Vörhönyöczke*",⁷² while in Pápai Páriz' it is "*Vörhönyötske*",⁷³ indicating a slightly *reddish* colour. Domy must be providing a summary of the more detailed listing here by establishing that "*nigra*" is not the characteristic colour of the most favourable *soils* from the perspective of grape cultivation. Instead, shades of red are considered good signs, just like "*Fejéretske*"⁷⁴ in the translation by Pápai Páriz.

COULD LATIN HAVE BEEN A MORE SUITABLE TOOL THAN HUNGARIAN TO CONVEY DOMBY'S STATEMENTS OF THE FERTILE LAYER?

Hungarian scientists had undeniable merits in the birth of soil science, as it is no coincidence that the need for creating this new field was declared by the international scientific community at a conference held in Budapest in 1909.⁷⁵ As a result of mutually encouraging efforts at the turn of the century, soil science gradually became independent from geology worldwide. However, scientists in the early modern age did not yet have access to the analytical methods and intellectual heritage that manifested in the creation of numerous new scientific fields in the twentieth century. It is highly likely that in its eighteenth-century condition Latin⁷⁶ was not and could not be suitable for accurately describing the layer of the *earth's* crust distinguished by the *edaphon*.⁷⁷ Domy's interchangeable use of the terms "*solum*" and "*terra*"⁷⁸ supports this claim: "*a multiplici solo; terra albicans et rubella*."⁷⁹ (*from multiple soils; whitish and reddish earth.*)

The emergence of a new strand of scientific thinking is evident in the complexity of aspects he employs and in his pursuit of sound reasoning that resembles Barczafalvi's attempt to create a modernised scientific terminology in Hungarian⁸⁰ a few decades later. While the attitude of the

⁷¹Domy did not discuss medicinal soils and did not make statements regarding the suitability of "*terra albicans*" for human consumption or its effects on the body; instead, he described the *terroir*. Thus, it is unlikely that the greyish-white *diatomaceous earth* currently mined at Erdőbénye, a similar substance that was known as the medicinal *Lemnian* and *Chian Earth* in the past, may be identified in this instance. See Photos-Jones – Hall (2011). Similarly, the relation to "*terra albicans*", which appears in the nineteenth-century Hungarian pharmacopoeia, can also be rejected on similar grounds. See Linzbauer (1853), 88, 151, 700, 799, 824.

⁷²An archaic term for *reddish*. See Szenci Molnár (1621), 827.

⁷³An archaic term for *reddish*. See Pápai Páriz (1801b), 400.

⁷⁴This archaic term for *whitish/Albicans* does not occur in Szenci Molnár's dictionary, and in fact appears only in the trilingual dictionary created by Pápai Páriz. See Pápai Páriz (1801b), 85.

⁷⁵Babinszki (2019). 1103–1106.

⁷⁶Traces of the soil science related approach that might be found in the use of the terms *ager*, *humus*, *solum* and *terra* by Domy and his contemporaries, who may have had connections to Tokaj-Hegyalja, would be worth analysing in a separate study.

⁷⁷All living beings that spend at least part of their life cycle in the *soil*.

⁷⁸Examining word combinations in Hungarian historical dictionaries could provide a more detailed understanding of the subject.

⁷⁹Domy (1758), 23.

⁸⁰Barczafalvi Szabó (1792).



thinkers of the early modern age towards knowledge may be recognised in our own today, it is necessary to decode the language they used in order for us to understand the way in which it takes shape and leads us to who we are today. In the present investigation I have sought traces of current pedological knowledge in the early modern period and what has been found is the evidence of a 250-year-old body of knowledge in the methodology of pedology. Undoubtedly, Sámuel Dombó's dissertation and the academic literature of the eighteenth-century peregrinations have shaped the ways we describe the world around us now.

CONCLUSIONS

Assuming that an eighteenth-century academic work on the wines of Tokaj-Hegyalja presenting the terroir contains traces of a pedological approach, I attempted to identify descriptions of the vineyards in pedological terms. Prior to the mid-nineteenth century, when soil science sprung up, the concept of soil was vague, and scientific language was evolving synchronously with the notion then taking shape. However, I was able to establish clear evidence that, at least to some extent, the fertile layer of the earth's crust was differentiated linguistically from the bedrock as early as the eighteenth century in the works of various authors. Similarly, distinct physical properties of the fertile layer of the earth's crust could be identified with high probability in Sámuel Dombó's dissertation that allowed for recognition of the characteristic soil types of Tokaj-Hegyalja, a valuable piece of the natural and cultural world heritage⁸¹. Thereby, I was able to demonstrate that our heritage, both scientific and cultural, provides us with an early source of pedological knowledge.

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⁸¹The Tokaj Wine Region Historic Cultural Landscape was formally recognised by UNESCO in 2002. See [UNESCO \(2002\)](#).



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