

# THE TUA VALLEY IN TRANSITION, SYMBOL AND TECHNOLOGICAL LANDSCAPE

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**Resumo:** O vale do Tua, no norte de Portugal, está neste momento a passar por uma intensa transformação com a conclusão da construção da barragem de Foz-Tua. Como consequência, parte do vale e da centenária linha do Tua serão submergidos. Contudo, as ramificações completas deste empreendimento ainda não são conhecidas. Neste artigo não iremos fazer julgamentos sobre a barragem ou o encerramento da linha. Pretendemos sim apresentar as transformações tecnológicas do vale do Tua e interpretar esta região como paisagem simbólica e tecnológica, contribuindo para o debate sobre a compreensão da paisagem e sobre a problematização das fronteiras entre tecnologia e paisagem, muitas vezes consideradas realidades inconciliáveis.

**Palavras-chave:** Paisagem Tecnológica; Paisagem Simbólica; Vale do Tua; Linha do Tua; Barragem de Foz-Tua.

**Abstract:** The Tua Valley, in northern Portugal, is undergoing an intense transformation with the conclusion of the construction of the Foz-Tua dam. As a consequence, part of the valley and part of the centennial Tua railway will be flooded by the dam's lake. However the complete consequences of this undertaking are yet to be fully known and understood. In this paper we do not aim to judge the decision to build the dam or to close the railway line. Our goal is to display the technological evolution of the Tua Valley and question the interpretation of this region as both symbolic and technological landscape. We wish to contribute to the debate about understanding landscape, and discuss the frontier between technology and landscape, two realities that are often seen as incompatible and disagreeing.

**Keywords:** Technological Landscape; Symbolical Landscape; Tua Valley; Tua Railway; Foz-Tua Dam.

## INTRODUCTION

The Tua Valley, in northern Portugal, is going through a dramatic transformation with the construction of the Foz-Tua dam currently underway. As we write in May 2016, this work already is nearing completion. The reservoir will soon begin to fill and energy production is planned for early 2017, according to the dam's operator, Energias de Portugal (EDP)<sup>1</sup>.

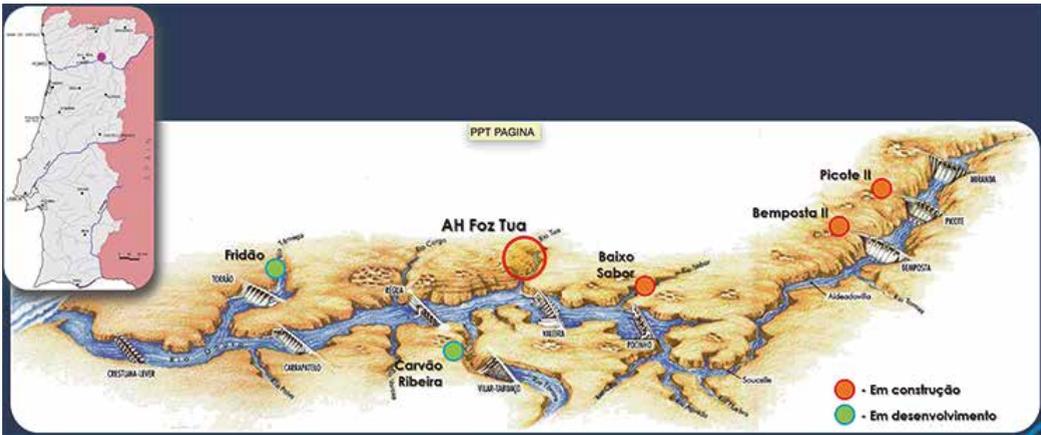
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<sup>1</sup> *Ecologistas pedem intervenção da UNESCO para impedir barragem do Tua.* «Económico», 22/05/2016. Available in <economico.sapo.pt/noticias/ecologistas-pedem-intervencao-da-unesco-para-impedir-barragem-do-tua\_250015.html>. [Visited on 25/05/2015].

Figure 1 – Location of Foz-Tua dam.



Source: COSTA, 2011.

The impact of this construction project, partially situated in a UNESCO World Heritage area, will undoubtedly be considerable, however the complete ramifications are yet to be fully understood. This paper emerges from a three-year project (2011-2013) that brought together historians, engineers, and designers from Portugal, Europe and North America to study the history and interpretation of the Tua railway line and its Valley, which would be flooded in the dam construction process. This collaborative and cross-disciplinary project itself is well suited to this special issue themed around *border crossing* and *connecting edges*. Facing the impending changes to the Tua Valley with the introduction of a large technical system, the dam, this group convened to contextualize the construction of yet another – the narrow gauge rail line, which would soon be submerged<sup>2</sup>. This group focused on the history of narrow gauge mountain tracks: the decision-making processes that brought them into being, their technical features and challenges, their past and present social, economic, geographical and geological contexts, their operation, subsequent closures, and also possible reuse and transformation into new forms as heritage rail and other forms of recreational transport<sup>3</sup>. In some respect, it was a historical project seeking to *shock* the new, with the old, to borrow a few words from historian of technology, David Edgerton<sup>4</sup>. As scholars and practitioners working together, our role was to gather and analyze while also seeking to preserve and foster discussion about the cultural value of both the industrial and natural heritage of the valley and its railway. This paper follows in that spirit. It is not our intention to pass judgment on the dam construction, or the fate of the railway line. It also not our intent to determine the impact the dam will have on the valley's landscape or whether it will have consequences on the Douro Valley's UNESCO classification as World Heritage site.

<sup>2</sup> For more on *large technical systems* see HUGHES, 1983 and VLEUTEN, 2006.

<sup>3</sup> McCANTS *et al.*, 2016.

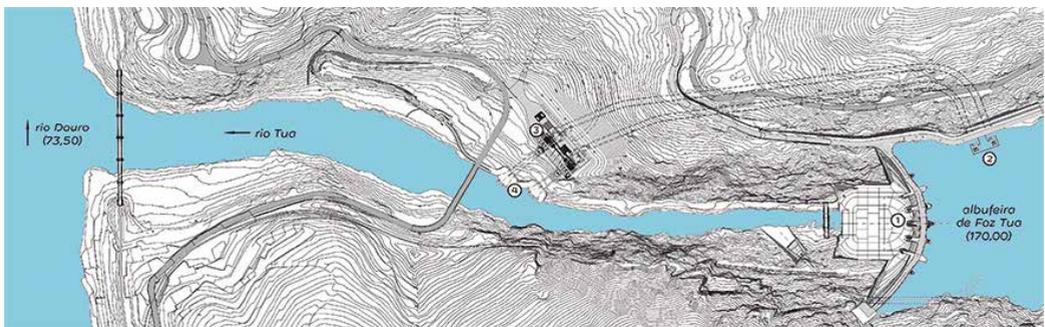
<sup>4</sup> EDGERTON, 2008.

Rather, we aim to present the technological transformation of the Tua Valley, and offer this case as a site to interrogate the interpretation of this region as symbolic and *technological landscape*<sup>5</sup>. Through this example, we wish to contribute to the ongoing conversation about the metaphors we use to understand landscape, and problematize the boundaries so often drawn between technology and landscape, as two irreconcilable and conflicting realities<sup>6</sup>. In closing, we will offer a comparative case of controversial landscape change with another large technical system, the Eurotunnel constructed in the 1990s in Kent, United Kingdom<sup>7</sup>.

## THE FOZ-TUA DAM CONSTRUCTION PROJECT, AND A CLASH OF SYMBOLS

In addition to the dam, itself over 100m in height, with a maximum threshold of 170m above the sea level, a power station was also constructed. This structure, designed by the Pritzker Award-winning architect Souto Moura, was meant to be partially obscured by a bunker beneath the cliffs that surround the river<sup>8</sup>. When the reservoir is complete, part of the river's shores and forest will be submerged, along with part of the metaphor-laden Tua railway<sup>9</sup>. While the full implications are still yet to be realized, this plan presented a smaller scale intervention than earlier proposed scenarios. Two other proposals were considered with higher walls, which would create a larger reservoir (maximum elevation of 180 m and 195 m, respectively) that would have submerged a wider area of the valley and a larger extension of the railway<sup>10</sup>.

**Figure 2** – Schematics of the dam and power station.



Source: EDP.

<sup>5</sup> ROLLINS, 1995: 496. MACEDO, 2009. SPERO, 2013.

<sup>6</sup> NYE, 1999. See LATOUR, 2004: 57-62 for a similar analysis of the «disastrous opposition» between human beings and their environment.

<sup>7</sup> DARIAN-SMITH, 1999.

<sup>8</sup> ALVES, 2012.

<sup>9</sup> EDP, 2016. PINTO, 2016.

<sup>10</sup> EDP, 2016.

Unsurprisingly, the decision to build the dam created a considerable controversy within Portuguese publics. In fact even the overall plan in which the Foz-Tua dam was envisaged (National Program for Dams of High Hydro-electrical Potential/*Programa Nacional de Barragens de Elevado Potencial Hidroelétrico*), approved in 2007<sup>11</sup>, was received with skepticism, to say the least. Its elaboration was considered hasty and based upon outdated information, even though it might be an important step for the future development of hydro-electrical production<sup>12</sup>.

However, even so-called *clean energy* production infrastructures are being contested for their impact on landscape (in addition, for the Foz-Tua case there were also doubts about the added energetic value of the dam). Indeed according to research by Delicado *et al.* on community perception of energy technologies, «there is a widespread opinion that renewable energy generation technologies (...) stand in conflict with landscape preservation and values.». They are thus perceived as «threats to collective identity, emotional connections to a particular location or scenic feature»<sup>13</sup>. This is particularly evident in the case of wind and solar farms<sup>14</sup>.

In addition to these issues about the construction of renewable energy systems, the Foz-Tua dam project would also bring with it the closure of the Tua line, the last Portuguese mountain narrow gauge track still in operation. However, in 2006 the Portuguese Railway Company (CP) had already anticipated the termination of this line<sup>15</sup>. The line between Foz-Tua and Mirandela was indeed closed in 2008 (the track between Mirandela and Bragança had been shut down 17 years before), after a few accidents with its LRVs (light rail vehicles) that secured passengers traffic between Mirandela and Foz-Tua. The decision to close the track also met with controversy. After all, the Tua line was a centennial railroad, inaugurated from Tua to Mirandela in 1887 (and to Bragança in 1906)<sup>16</sup>, and with this status came a very high-perceived value as cultural heritage. In addition, some sectors of Portuguese society and politics correlated the recent accidents on the Tua line with the decision to build the dam<sup>17</sup>.

Furthermore, despite cultivation of viticulture in this region, it was also publically argued that the Tua Valley was almost a *wild* region, in a natural and rough state. Indeed, as recent as the 1970s, well after the growth of the wine industry and railway in this region, the Portuguese writer Miguel Torga described the Tua Valley as a «virginal universe»<sup>18</sup>. However, since electricity was only slowly introduced in this region during the 1960s<sup>19</sup>, a

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<sup>11</sup> GOMES, 2016.

<sup>12</sup> FÉLIX, 2010: 101-102.

<sup>13</sup> DELICADO *et al.*, 2016: 85-86.

<sup>14</sup> DELICADO *et al.*, 2016: 91.

<sup>15</sup> AZEVEDO & SALGUEIRO, 2015: 472. *CP quer liderar ferrovia na Península Ibérica em 2010*. «Diário de Notícias», 27/03/2006. Available in <[www.dn.pt/arquivo/2006/interior/cp-quer-liderar-ferrovia-na-peninsula-iberica-em-2010-638134.html](http://www.dn.pt/arquivo/2006/interior/cp-quer-liderar-ferrovia-na-peninsula-iberica-em-2010-638134.html)>. [Visited on 26/05/2015].

<sup>16</sup> ALEGRIA, 1990.

<sup>17</sup> Linha do Tua: os acidentes e a barragem. «Esquerda.net», 27/12/2008. Available in <[www.esquerda.net/dossier/linha-do-tua-os-acidentes-e-barragem](http://www.esquerda.net/dossier/linha-do-tua-os-acidentes-e-barragem)>. [Visited on 26/05/2015].

<sup>18</sup> *Apud* LAGE & BEIRA, 2013: 2.

<sup>19</sup> VISEU, 2007: vol. 1, 118-125.

process that Torga could have witnessed firsthand, his characterization of a remote and *wild* place is not entirely unfounded. Unsurprisingly, nearly a century earlier, during the inauguration of the railway line in September 1887, descriptions of the valley in the popular press, *Diário de Notícias*, shared a similar sentiment. The reporter highlighted the impressive scenery of the Tua Valley – that surely had posed major difficulties to the builders of the line – but in particular he emphasized the right margin of the river, with its ravines, narrow passes, and huge and smooth granite rocks as evidence that humans had never set foot in such areas<sup>20</sup>. Pictures taken at the time of the inauguration of the railway in 1887 by Karl Emil Biel (figures 3 and 4) and even contemporary panoramic images (figure 5) that highlight the ruggedness of the landscape might also be interpreted to reaffirm the enduring (or even perceived *timeless*) wildness of the valley.

This notion of wilderness also serves as a powerful metaphor for what it means to be an inhabitant of these regions – a *transmontano*, a tough, fearless, survivor in a harsh land<sup>21</sup>. It was argued that the building of the dam would present serious damage to this spirit. In this process *place attachment*, an emotional and affective connection between an individual or a collectivity and a given area, also plays an important role; and it may account for the conflict towards technologies that will change «sites or spatial elements included in the affections and in both individual and collective memory»<sup>22,23</sup>. For the *transmontano*, or at least characterization of this group of people, the landscape may be considered not only a home but a social space, an expression of ideology, and more importantly one that is capable of defining a collective imagination<sup>24</sup>. Hence, the analysis of how the local populations perceive the new technological system will also be taken into consideration in this paper<sup>25</sup>.

The debate surrounding the dam decision-making process and the actual commencement of works in February 2011 only served to enhance the strength of the representation of the Tua Valley as an untouched wilderness<sup>26</sup>. The authenticity of this powerful symbol of untouched nature was placed into jeopardy with the construction of the dam, described as a *monster* by some popular press<sup>27,28</sup>. A 2016 news article in the Portuguese news magazine *Visão* also highlighted the condition of *raw nature* of the valley<sup>29</sup>. The reinforcement of this representation of the Tua Valley as a particularly untainted place in the popular imagination is by no means unique. Indeed, it is consistent with philosopher of science and technology, Bruno Latour's argument that «nature is a historically situated social representation», a

<sup>20</sup> Apud MARTINS *et al.*, 2015: 97.

<sup>21</sup> LAGE, 2015: 376. For the connection between landscape, territory, place and identity see CAROLINO & PINTO-CORREIA, 2011: 91-92 and 110-112.

<sup>22</sup> DEVINE-WRIGHT & HOWES, 2010.

<sup>23</sup> DELICADO *et al.*, 2016: 89 and 91.

<sup>24</sup> DARIAN-SMITH, 1999: 21.

<sup>25</sup> ESCOBAR GÓMEZ, 1995: 834.

<sup>26</sup> *Barragem do Tua representa investimento de 305 milhões de euros*. «Público», 18/02/2011. Available in <[www.publico.pt/economia/noticia/barragem-do-tua-representa-investimento-de-305-milhoes-de-euros-1480988](http://www.publico.pt/economia/noticia/barragem-do-tua-representa-investimento-de-305-milhoes-de-euros-1480988)>. [Visited on 26/05/2015].

<sup>27</sup> For a discussion of representation and its influence on reality see MOSCOVICI, 2005.

<sup>28</sup> PARAFITA, 2016.

<sup>29</sup> RUELA & MONTEIRO, 2016: 38-39.

social and cultural construction<sup>30</sup>. This often occurs when the observer travels away from regions where technology is more present and widespread. Literary scholar, Neil Rennie, describes this sort of travel as *regressive*. Here, the traveler encounters, «not a new land so much as a new location for old, nostalgic fictions about places lost in the distant past». These so-called *nostalgic fictions* are «now found on the distant present, found and confirmed, it seemed, in the form of exotic facts»<sup>31</sup>. This exoticism and rediscovery of the wilderness, especially in comparison to the more familiar Portuguese urban centers such as Lisbon or nearby Porto, was reflected in the romantic symbolism of the Tua Valley in the popular imagination. Although representations may be deformed perceptions of a particular reality, they can also take the place of that reality. Indeed, they are often more seductive than the real from which they were inspired<sup>32</sup>. Bruno Latour also identified this phenomenon while describing how *westerners* perceived *non-Western peoples* as living integrated with nature, while in fact there were multiple examples of «massive disharmony»<sup>33</sup>. Perhaps in the case of the Tua Valley landscape it is more romantic to understand this place as a *natural* region rather than a place fraught with all kinds of technological traces – the agricultural terraces, bridges, dykes, and in particular the decaying railway, especially in the face of yet another large and very controversial technological system.

**Figure 3** – The Tua Valley photographed by Karl Emil Biel, 1887.



Source: BEIRA, 2014: 14.

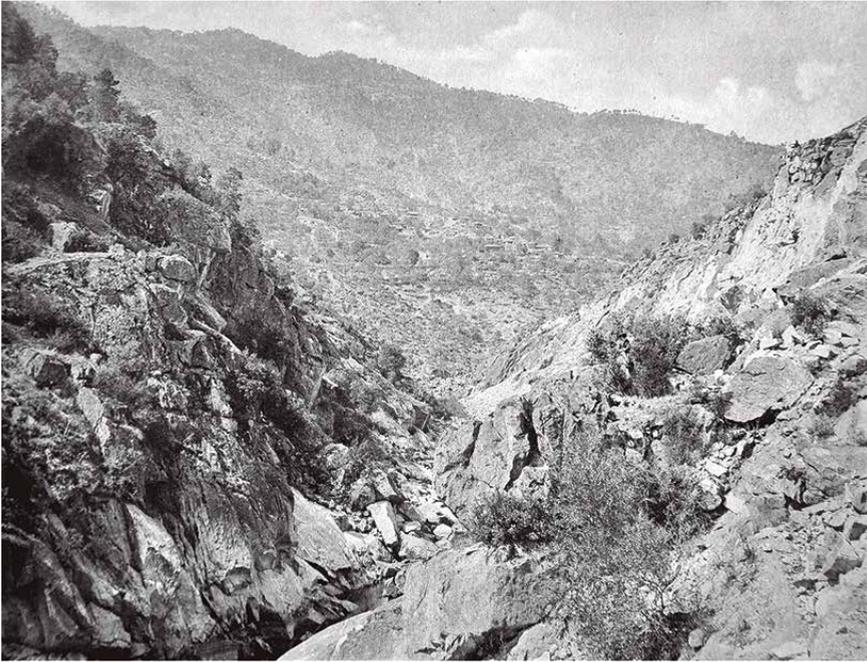
<sup>30</sup> LATOUR, 2004: 232 and 33-35.

<sup>31</sup> RENNIE, 1995.

<sup>32</sup> FERNANDES, 1998.

<sup>33</sup> LATOUR, 2004: 44.

**Figure 4** – Another aspect of the Tua Valley by Karl Emil Biel, 1887.



Source: BEIRA, 2014: 20.

**Figure 5** – Panoramic shot of the Tua Valley, as photographed by Nuno Beira 2015.



Source: © Nuno Beira (with permission).

## THE TUA VALLEY, A TECHNOLOGICAL LANDSCAPE

The characterization of an untouched wilderness facing a hulking technological menace is of course a powerful image that resonates far beyond this small region in Portugal, or for that matter this particular fragment of time. However, it also obscures a more nuanced human history of the valley, its inhabitants and their technological systems including agriculture and railway systems. It is this need to reconcile a longer history of human intervention within a changing landscape that urges us to find other tools for thinking about the valley more inclusively. With its stunning ridges and slopes, its climate, its terraces for vineyards, its railways, old donkey roads, new motorways, bridges, and the recent addition of the dam, the Tua Valley provides a useful and striking context to reflect upon ever-shifting concepts of technological progress, center and periphery, connectivity, what constitutes *traditional* or *high-tech* agricultural practices, and the complexity of the preserving and interpreting the past. To aid in this thought experiment, we turn to the concept of *technological landscape* as a process of change.

First, let us return to the notion of landscape itself. In J. B. Jackson's *Discovering the Vernacular Landscape* (1984), landscape is «a composition of man-made or man-modified spaces to serve as infrastructure or background for our collective existence»<sup>34</sup>. Historian of technology, David Nye builds upon Jackson's interpretation and highlights the concept of landscape «not as natural, but cultural». Within this framing, «it is not static, but part of an evolving set of relationships». Nye characterizes landscape as, «part of the infrastructure of existence (...) inseparable from the technologies that people have used to shape land and their vision»<sup>35</sup>. Hence, for Jackson and Nye technologies and landscape are not opposites, but rather subtly interwoven items. Nye emphasizes the role of landscape as «a process embedded in narrative, or time,» not only an object but also an action<sup>36</sup>. Literary scholar and art historian, W. J. T. Mitchell also highlights the dynamic aspect of landscape «not as an object to be seen or a text to be read, but as a process by which social and subjective identities are formed»<sup>37</sup>.

Building on Nye's *technologies of landscape*, we use the related, yet distinct concept, *technological landscape*<sup>38</sup>. Our use of this term is meant to encompass both the human and non-human actors of the valley together in a socialized relationship under Latour's methodological umbrella of the actor-network theory<sup>39</sup>; or within the Territorial Analysis theoretical paradigm that takes into consideration a structured array of different elements (physical, demographic, infrastructural, anthropological, cultural) in a determined Terri-

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<sup>34</sup> JACKSON, 1984.

<sup>35</sup> NYE, 1999: 3.

<sup>36</sup> NYE, 1999: 5-7.

<sup>37</sup> MITCHELL, 2002: 1.

<sup>38</sup> MACEDO, 2009. SPERO, 2013.

<sup>39</sup> For more discussion of actor-networks, non-human actors, the relevance of the seamless and interweaving relationships between human and non-human actors, and the need to socialize non-humans see: CALLON, 1986/1998, CALLON & LATOUR, 1992, LATOUR, 2004: 49-90, and PICKERING, 1993.

torial System, which is also influenced by its historical evolution and other external elements<sup>40</sup>.

In the case of the Tua Valley, we not only include the *wild* or *natural* features such as the ridges, the cliffs, and the river, but also railway, bridges, dykes, viaducts, agricultural structures, the dam under construction, and of course human and non-human beings into and integrated whole. Here, it is our intention to privilege neither the people, nor land, nor technologies in this discussion, but rather to blur the boundaries between them and treat these actors as parts of a dynamic and interconnected system. Yet, while this interconnected, or going one step farther, co-produced approach is certainly not new to scholars of science and technology, this more unified concept is still yet to take hold in the more popular understanding of science, technology and environment<sup>41</sup>.

If we observe the valley and its history outside of the binary assumption of nature and artifice – what else might we see? Let us return to the photographs taken by Biel in 1887. Indeed, when Biel's photographs are viewed together as a more complete collection portraying the region at the end of the 19<sup>th</sup> century, another view of the landscape comes into focus. This focus on photography as a tool for preservation and communication about the landscape also helps us interrogate this representation of the wild. It by no means diminishes the authenticity of the image of wilderness – rather it places it into context. Just as the words and sentiments employed in popular writing focused on one particular aspect of the valley, the camera and photographer also explicitly decided what would be captured within the frame and what should remain outside the scope of the composition.

In Biel's photographs of the newly laid track in 1887, evidence of the construction process is also apparent. The tunnels, viaducts, and the road itself required the use of dynamite to blast away a path in the valley's cliffs. The construction of the supporting walls for the first 21 km of track alone required 170,000 m<sup>3</sup> of rock. For example, in Figure 6, we can see not only the railroad and its bed, but also the rubble that was drilled from the ridges and discarded into the valley's slopes, along with a small dyke across the river. Figure 8 depicts yet another aspect of the impact of the drilling to make way for the railroad. Figure 7 portrays the Fragas Más complex including two tunnels and a viaduct between them. In this image there is also a considerable deposit of broken rock in the river. Finally, in Figure 9 we can compare the differences between the opposite sides of the valley: the left bank with the railway and the trundled rocks above the river slopes; and the right bank with its intact rocks and bushes.

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<sup>40</sup> ESCOBAR, 1995: 832.

<sup>41</sup> For more discussion of co-production see: JASANOFF, 2004 and JASANOFF, 2005.

**Figure 6** – The Tua line near Castanheiro, as photographed by Karl Emil Biel, 1887.



Source: BEIRA, 2014: 18.

Built between 1884 and 1887, this section of the railway leading to Mirandela included five tunnels, two viaducts and 118 supporting walls adjacent to the first 21 km of track along the narrowest part of the valley. Due to the challenging engineering circumstances, the Tua line became a working monument to Portuguese ingenuity<sup>42</sup>. Not only a method of transport, and symbol for national engineering achievement, the railroad was also symbol for the arrival of *progress* for one of the most underdeveloped provinces of Portugal<sup>43</sup>. In addition, the opening of the line brought yet another element to this valley now lined with tracks – the trains themselves. Beginning with different steam locomotives that operated until the 1970s along with the more recent additions of Dutch and Yugoslavian railcars and diesel engines, the apparent stillness of the Tua Valley was often punctuated by the roar of the locomotives engines and whistles and the rattling and clanking of the assorted wagons and carriages<sup>44</sup>.

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<sup>42</sup> MARTINS *et al.*, 2015: 96.

<sup>43</sup> LAGE, 2015: 373.

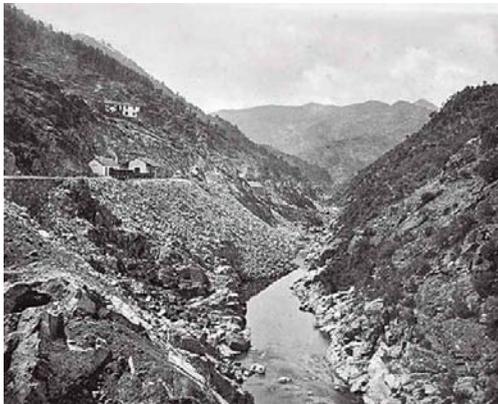
<sup>44</sup> PEREIRA, 2016.

**Figure 7** – The Tua line in Fragas Más, as photographed by Karl Emil Biel, 1887.



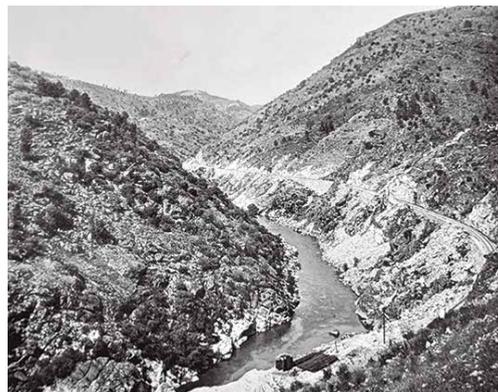
Source: BEIRA, 2014: 17.

**Figure 8** – The São Lourenço station, as photographed by Karl Emil Biel, 1887.



Source: BEIRA, 2014: 23.

**Figure 9** – A curve in the Tua line just outside São Lourenço station, as photographed by Karl Emil Biel, 1887.



Source: BEIRA, 2014: 24.

While the transformation of the valley with the railway construction might be the most comprehensively planned and dramatic over such a short time frame, other significant land shaping practices included agricultural systems, roads of various scales, bridges and dykes. Already by 1910 almost half of the Tua river basin area was being used for agricultural purposes. Uncultivated lands accounted for 38% of the total area whereas the remainder was occupied by forest. It is important to note that, «the distribution of the uncultivated areas is consistent with the areas of steep slopes and hilltops [the valley itself], but not exclusive»<sup>45</sup>. As a matter of fact terraces (*socalcos*) may be found widespread in the lower Tua Valley, specifically for the cultivation of vineyards and olive groves<sup>46</sup>. Throughout the remainder of the 20<sup>th</sup> century, the occupation of the territory proceeded at different rates, varying along with the socio-economic dynamics of the region. In 1990 we note a huge decrease in uncultivated areas (from 22% to just below 2%), and a high increase in the forest area that covered almost 54% of the total area. Cultivated areas also witnessed a slight decrease, as the forest reclaimed many previously cultivated areas. This trend of reforestation, mainly due to demographic factors like emigration and the aging of the population, continued into the beginning of the twenty-first century<sup>47</sup>.

Several bridges spanning the valley demonstrate a long history of construction in the region. The first bridge was the so-called *Ponte do Diabo* (*The Devil's Bridge*) connecting the two banks of the Tua near Abreiro. Although a precise date of construction is yet unknown, it was thought to be several hundred years old by the time it washed away in a flood in 1909. A modern cement bridge replaced this structure in the early 1940s. At the same time another similar bridge was also constructed near the mouth of the Tua River not far from the older railway bridge of the Douro line, inaugurated in 1883. More recently, new roads were also added, two near Brunheda, and two others in the vicinities of Vilarinho das Azenhas and Frechas.

Other man-made structures also changed the face of the Tua Valley and River, like for instance small weirs and dykes built along the river and even a small cable car in Amieiro in the right bank of the Tua that made the connection to the line (at the former Santa Luzia station) on the other shore.

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<sup>45</sup> VIEIRA *et al.*, 2013a: 114.

<sup>46</sup> VIEIRA *et al.*, 2013b: 132-133 and 140.

<sup>47</sup> VIEIRA *et al.*, 2013a: 112-121. For the evolution of land use in the Basque Country (Spain) and the former German Democratic Republic see, respectively, ESCOBAR GÓMEZ & HERRERA RUEDA, 1993: 527 and 529 and VOGELER, 1996.



Nye reminds us that, «human beings have repeatedly shaped the land to new uses and pleasures, and what appears to be natural to one generation often is the end result of a previous intervention»<sup>48</sup>. This naturalization of previous transformative processes created a not only accepted, but even unnoticeable feature aided by use and the passage of time. In this respect, German motorways which were praised by both foreign and domestic observers for the «natural way in which the Autobahn's twin concrete ribbons blended and flowed into the German countryside» and the human-made terraces carved into the steep slopes of the Douro and Tua Valleys which tend to fade into a kind of bucolic ideal in the popular imagination may be surprisingly similar<sup>49</sup>. Despite its origins – a product of explosives, men armed with pickaxes, and steel supporting a fleet of smoky and noisy machines – the railway began to be absorbed into the valley over time, gradually becoming associated with the countryside as a feature of its authenticity. This is clearly perceived in the novels and poems about the Tua Valley, in which the region is presented with the river and the line conflated as a single unit<sup>50</sup>. The lack of investment in maintenance the line also contributed to this representation. For years the route of the track remained unchanged and its infrastructure only suffered slight improvements. Steam locos operated exclusively in the line until the 1940s and from that date onwards until the mid-1970s they coexisted with diesel and petrol vehicles. Track and rolling stock kept an old and dated design that just added to incorporation of the track within the scenery.

We can argue that the same process of gradual *naturalization* occurred with not only the agricultural systems and railways, but also the previously constructed dams along the nearby Douro River. The oldest dam on the Douro was built in 1958, the most recent in 1985. There are eight dams in total; three along the international route flowing between Spain and Portugal (Miranda, Picoto, and Bemposta); three in the World Heritage Area of the Douro Wine Region (Pocinho, Valeira, and Régua); and two other in the outskirts of Porto (Carrapatelo, and Crestuma-Lever). UNESCO described the Douro Region, including these three dams, as «a cultural landscape of outstanding beauty that reflects its technological, social and economic evolution»<sup>51</sup>. Indeed, it is precisely the combination of natural aesthetic entangled with human technologies that underscores this particular category of value as world heritage.

The pattern of initially intense conflict followed by what we may call *naturalization* or integration into an accepted feature of the terrain is a common feature of «an historical landscape where nature lies in strange familiarity with technology»<sup>52</sup>. Unlike German *autobahns* in the 1930s, in which the implementation of these large technical systems took on an identity of not only *naturalness* through curvilinear design but also integrated regional identity, this was not the case for the construction of railways nor roads

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<sup>48</sup> NYE, 1999: 3.

<sup>49</sup> ROLLINS, 1995: 498.

<sup>50</sup> LAGE & BEIRA, 2013: 10 and 22. LAGE, 2015: 378.

<sup>51</sup> *Alto Douro Wine Region*. Available in <[whc.unesco.org/en/list/1046](http://whc.unesco.org/en/list/1046)>. [Visited on 28.5.2015]

<sup>52</sup> LAGE, 2015: 377.

elsewhere in Europe roads in the 19<sup>th</sup> and 20<sup>th</sup> centuries<sup>53</sup>. In the case of wind and solar farms, «evidence suggests that the landscape change is internalised (sic) by many residents after the construction stage»<sup>54</sup>. The construction of the Eurotunnel in Kent in the 1990s and its subsequent operation provides a useful comparison for the Tua Valley dam project now underway. This tunnel is also large technical system, an engineering feat, which can also be interpreted as a symbol of *progress* and of control of nature through technical-scientific rationality. However, at the same time it was also a focal point for controversy, since it threatened not only the geographical isolation of Britain (as it would connect to France), but also the *Englishness* of Kent's landscape<sup>55</sup>.

Kent was called the *Garden of England* and it was deemed a representation of British authenticity. In addition, the term *garden* aside from the nationalist sentiment carried metaphorical weight. In the British context it was equated with civilization in a utopic place of bucolic tranquility, rural idealism, innocence and leisure. However Kent was more than just rolling green hills spotted with mansions and weekend foxhunts. It was also home to 1,5 million inhabitants, a bustling passage point between England and France, which turned the county into one of the most cosmopolitan British regions. However, the representation of the countryside, despite its fantasy, still resonates in the popular imagination and is often employed to unite the Kentish in common causes and of course promote tourism in the region. Along with the impending tunnel construction came the feeling that the region was being violated and buried beneath tons of concrete, asphalt and steel. That bucolic representation of Kent added to the representation of the dire consequences the tunnel would bring. Contestation, demonstrations, and even confrontations with the authorities followed, despite this controversy, the tunnel was built and set into operation<sup>56</sup>.

Both the tunnel in Kent and the Tua dam, were (and still are) sites for contention. At these sites, two large technological systems confronted a terrain ripe with symbolic value steeped in not only concepts of *nature*, but also of regional identity. In Kent the connection to Europe would defy the *Englishness* of the county. In the Portuguese case, the dam might dispute the centennial traditional autonomy of the *transmontanos*, molded in the centennial saying «*Para lá do Marão mandam os que lá estão*»<sup>57</sup>. In both of these cases, the symbolic power of the place only grew stronger as a possible defense against the large construction projects.

Although both the tunnel and the dam could be interpreted with «a positive aesthetic value, as symbols of progress, modernity and development,»<sup>58</sup> this sentiment seems less obvious in a world already filled with a wide array of technological systems and the daily

<sup>53</sup> ROLLINS, 1995: 498 and 510. One may also wonder if this success is also influenced by the strength of the identity of the German automobile industry.

<sup>54</sup> DELICADO *et al.*, 2016: 89 and 91.

<sup>55</sup> DARIAN-SMITH, 1999: 2-8.

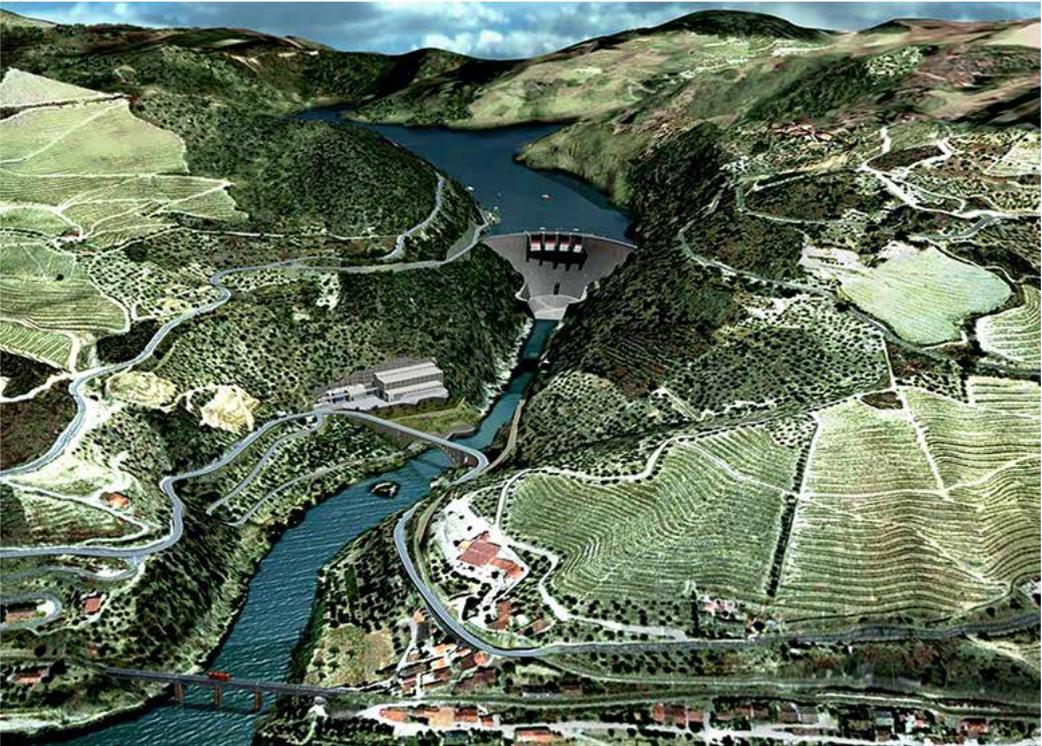
<sup>56</sup> DARIAN-SMITH, 1999: 41-52.

<sup>57</sup> There is no direct translation of this saying into English. Roughly it means: beyond the Marão range (that marks the western limit of the Province of Trás-os-Montes), the people who live there are the rulers.

<sup>58</sup> DELICADO *et al.*, 2016: 91.

conveniences they provide. These places are rich with uncertainty, symbolism and place attachment. The new large technological systems are deemed invaders, disruptors, and destroyers. One of the interviewees of *Visão's* news article confessed that, «it's a piece of me that lies here [in the valley],»<sup>59</sup> a piece that perhaps will be flooded along with the rest of the valley. While it is yet uncertain whether either the tunnel or dam would ever be *naturalized* or eventually embraced into the popular imagery of the landscape just as the agricultural terraces or railway line was, one piece is certain – that these projects have significant and lasting impact within these ecosystems – both in symbolic and physical character.

**Figure 12** – Artist's depiction of the Tua valley after the construction of the dam.



Source: COSTA, 2011.

These examples are important venues to think with, especially when facing a pressing need to reach between the too often separate worlds of academic analysis and civic engagement. How might we as scholars make our work relevant to multiple publics and offer new ways for people to question their assumptions about the technological world so frequently hidden within the mundane. Rather than being caught up in value judgments about a valley, a railroad, a dam, or a tunnel exclusively – we aim to engage the very cons-

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<sup>59</sup> RUELA & MONTEIRO, 2016: 40.

titution of these values themselves, and how they may change with time, audience and economic context. Apart from the interchanging binary between the *romanticization* and *demonization* of technological change, we may venture to instead see it as a continuous, contentious, and entangled process of history in the making<sup>60</sup>.

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