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Title: Thematic layers for *imagineRio*: Next Steps?

Keywords: Rio de Janeiro, *imagineRio*, HGIS, urban history

Summary:

The Historical GIS public platform *imagineRio* allows the city of Rio to be visualized as it existed and as it was imagined. Anchored in the Humanities, *imagineRio* allows urban change to be seen temporally and spatially through an infinitely customizable and authoritative digital map. Our first step was to bring visual imagery into spatial and historical contexts, and we sought out visual data—maps, plans, views, and aerials—to locate in their historical and spatial contexts. With the geolocation of imagery and the georeferencing of historical maps, spaces in the city can be seen in *imagineRio* mapped at a single moment in time, over time, and from multiple perspectives. Now we seek to offer ways for users to customize *imagineRio* so that they may visualize their own research, make their own thematic maps, and write or present more easily their findings. Through the design of thematic layers, we propose to build the tools that will enable users to project their own data over the deep spatial data already in *imagineRio*. Users will be able to create their own maps that illustrate their own research questions. We will design these thematic layers so that they can be easily manipulated by those who are not GIS specialists. This ability to see specialized research mapped over historical views of Rio will be an exciting contribution to the Digital Humanities, and we hope that it will make the use of GIS available to a broader public.

Introduction

imagineRio visualizes the city of Rio de Janeiro as it existed and as it was imagined, from the time of the city's founding in 1565 to the present. It is a bi-lingual (English & Portuguese) cultural and historical interactive public geospatial platform that uses maps, views of the city—sketches, watercolors, photographs—architectural plans, and aerial imagery to illustrate how the city did and did not change over time. Developed at Rice University for teaching and research in the fields of architecture and history, the site has become well-known in Rio de Janeiro, reaching nearly 14,000 visitors per month.⁴ In existence for a decade, *imagineRio* is a mature platform with engaged users in Rio de Janeiro, Brazil, the United States, and around the world. As we receive requests to share our data for a variety of projects, it now seems that our logical next step forward is to design and build workspaces that can harness the geographic data already in *imagineRio* for specific research projects, and to bring in new data collected by researchers and dedicated users.⁵

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⁴For the last thirty days as of September 19, 2025, there were 13.4k views and 1.96k visitors, see

<https://umami.axismaps.com/share/hbx5Uj7J/imagineRio>.

⁵*imagineRio* has received extensive press, documenting the history of the project. See, for example, the recent story by Alana Gandara, which speaks to our partnership with the Instituto Pereira Passos, a research institute in Rio, that began in 2023: “Plataforma imaginerio incluirá mapas do século 20 e dados temáticos: Trabalho conta com a colaboração do Instituto Pereira Passos (2023, May 13). Agência Brasil, <https://agenciabrasil.ebc.com.br/geral/noticia/2023-05/plataforma-imaginerio-incluir%C3%A1-mapas-do-s%C3%A9culo-20-e->

What is *imagineRio*?

imagineRio consists of an interactive digital map and an interactive image repository. The interactive map interface gives the user the ability to explore the changes in the city's urban fabric, as well as the historical maps and imagery that accompanied those changes. By using its time slider and orientation tools, a user can configure the digital base map, which is accurate to the year, such that spaces in the city can be seen at a particular moment in time, from different angles and orientations, and at multiple zoom levels. The georeferenced historical maps and urban plans, as well as the geolocated visual imagery, enable users to see how the city was mapped, planned, and represented by artists. The image repository contains all the iconography uploaded into *imagineRio*, of which a substantial part comes from the photographic collection of the Instituto Moreira Salles, one of Brazil's finest museums and one of our partners in Rio de Janeiro. A grant from the Getty Foundation funded the addition of 4,000 photographs created by major Brazilian photographers of the late nineteenth and early twentieth century into *imagineRio* from the Instituto Moreira Salles archives.⁶ Users may browse maps, plans, and views in the image repository both intuitively—as they encounter them in the interactive map interface—as well as more systematically by using tools for sorting and filtering by date, artist, and type of image. We use the IIIF (International Image Interoperability Framework), which means that we easily integrate the Mirador image viewer, which gives users an excellent, immersive experience. The deep zoom allows images to be seen in extraordinary detail.

Essentially, *imagineRio* presents users with an authoritative reference map that is enhanced by historical imagery, which permits the city to be understood in countless new ways. Enriching *imagineRio* is our bi-lingual (English and Portuguese) storytelling tool, *imagineRio Narratives*, which offers a platform where users can create their own histories by annotating our base map, writing their own text, and uploading their own images and videos. Published narratives are hosted in our gallery, and they available for users to share.⁷

The Problem

Frequently we are contacted by researchers who wish to build on the knowledge already available in *imagineRio*. For example, Professor Ana Utsch of the Federal University of Minas Gerais (UFMG) shared with us her project on print production and culture in nineteenth-century Rio. Printing was banned in colonial Brazil; the first printing press came in 1808 with the arrival of the

[dados-temáticos](#), as well as the many stories listed on the *imagineRio* website's Press Tab:

<https://imaginerio.org/en/press>. For a peer review of *imagineRio* see Luia Ferla, Review: *imagineRio*, *Reviews in Digital Humanities*, 5: 8 (2024), <https://doi.org/10.21428/3e88f64f.a8538626>. For research developed from *imagineRio*, see Alida C. Metcalf, Sean M. Smith, and S. Wright Kennedy, “‘A Mere Gutter!’ The Carioca Aqueduct and Water Delivery in Mid-Nineteenth-Century Rio de Janeiro.” *Urban History* 49:1 (2020), 1–27, <https://doi.org/10.1017/S096392682000084X>; Alida C. Metcalf and Sean M. Smith, “Mapping the Maracanã: Reconstructing the Route of Rio de Janeiro’s Second Major Aqueduct,” *e-perimetron* 13:1 (2018), 1–22, https://www.e-perimetron.org/Vol_13_1/Metcalf_Smith.pdf; Alida C. Metcalf, “Water and Social Space: Using georeferenced maps and geocoded images to enrich the history of Rio de Janeiro’s fountains,” *e-Perimetron* 9:3 (2014), 123–145, https://e-perimetron.org/Vol_9_3/Metcalf.pdf, as well as the many papers and presentations listed on *imagineRio* website’s Research tab: <https://imaginerio.org/en/research>.

⁶ Among other news stories about the Getty Grant, see “[imagineRio Digital Platform Reveals Centuries of Rio de Janeiro’s Urban Evolution](#),” *Getty / News & Stories*, December 2, 2021.

⁷ On the *imagineRio Narratives* platform, see Bruno Buccalon, David Heyman, and Alida C. Metcalf, “*imagineRio Narratives: A Storytelling Tool for Spatial History in Rio de Janeiro*, *Journal of Digital History*, 3:1 (2024), <https://doi.org/10.1515/JDH-2022-0005>.

royal court, which was fleeing Napoleon's invasion of Portugal. As a result, print production in Rio developed simultaneously with the expansion of a print culture. Two technical systems—one artisanal, rooted in the early printing tradition, and the other industrial, consolidated in the 19th-century—developed concurrently in Rio de Janeiro. These two traditions emerged and flourished alongside each other in the small spaces of a city rapidly evolving from a colonial to a national capital. The production, and influence, of newspapers, broadsides, and the novel quickly became a central feature of life in Rio.⁸

How did this rapid transformation take place spatially? Utsch's project seeks to document the sites where print technology, including typography, bookbinding, type casting, stationery, and printing itself, took place in the city. Utsch and her team have identified hundreds of professionals in the printing and publishing trades, and their database has more than 3,000 records and approximately 300 specific addresses. They wish to map their data so that they can analyze the temporal and spatial dynamics of the print sector. They are also interested in spatial networks, such as how print businesses and workers circulated through the city. They envision applying temporal filters to visualize transformations in urban print culture, as well spatial filters to see patterns of mobility and areas of the city where print businesses were concentrated. Adding to that are the locations of the broader literary culture, such as libraries, reading rooms, and schools. An exciting final project will be the construction of historical itineraries and thematic routes of graphic practices in the city, which will contribute to a fuller understanding of the connections between cultural heritage, graphic memory, and urban space in Rio de Janeiro.

To accomplish this, however, Professor Utsch's team must create their own HGIS, which would duplicate the years of work already invested in *imagineRio*. Offering *imagineRio* as their base reference map would allow them to focus on their specific research and unique perspectives. They become free to focus on four main objectives: (1) the spatialization of activity records; (2) the study of everyday practices in the printing sector; (3) the construction of a prosopography of book workers, and (4) producing attractive maps to share their research. In exchange, *imagineRio* could acquire thematic layers on print culture in Rio that can be explored by all users of the platform.

Professor Carlos Eduardo Coutinho da Costa of the Universidade Federal Rural de Rio de Janeiro (UFRRJ) has also reached out to us regarding his project titled the "Great Migration in Brazil."⁹ This is a study of the family trajectories of the formerly enslaved, and their descendants, who migrated from the countryside to the cities in Brazil in the first half of the 20th century. The first phase follows the paths of Black migrants from the Paraíba Valley, where the large coffee estates of the nineteenth century had collapsed following the Great Depression of the 1930s, to the city of Rio de Janeiro. Where did these migrants settle in the city? And what can we know about their lives, goals, and experiences? Costa's research aims to historically update the experience of the Great Migration in Brazil by geolocating migrants' residences. To date, the team has reconstructed 3,411

⁸ Utsch's project is *Documentar: fontes para a cultura gráfica*, funded by CNPq. On the unique development of print production and culture in Rio de Janeiro, see Ana Utsch, "Print Culture and Literature in 19th-Century Brazil," in *Oxford Research Encyclopedia of Literature*, <https://oxfordre.com/literature/display/10.1093/acrefore/9780190201098.001.0001/acrefore-9780190201098-e-1225>, accessed July 16, 2025, as well as Carlos Rizzini, *O livro, o jornal e a tipografia no Brasil, 1500–1822* (Rio de Janeiro: Livraria Kosmos, 1945); Nelson Werneck Sodré, *História da imprensa no Brasil* (Rio de Janeiro: Civilização Brasileira, 1966), and Laurence Hallewell, *Books in Brazil: A History of the Publishing Trade* (London: Scarecrow Press, 1982).

⁹ This project is currently funded by the Edital Humanidades e Universal, CNPq, and by two previous grants from FAPERJ, Bolsa Jovem Cientista Nossa Estado da FAPERJ.

trajectories of migrants from the Paraíba Valley to the city of Rio de Janeiro from a variety of primary sources. Using *QGIS*, the addresses of migrants have been plotted on a historical map georeferenced over the available base map.¹⁰

With access to *imagineRio*, however, the project would be able to utilize our temporally accurate roads layer, as well as our temporally and spatially accurate base map. The digitization method used in *imagineRio* means that features, such as the same road, are stable in *imagineRio* across time and space; they are not subject to the inherent weaknesses of georeferencing and rubber-sheeting a historic base map. We have many georeferenced historical maps in *imagineRio*, which Costa's team could easily and effectively use in *imagineRio*—rather than having to re-georeference the maps in *QGIS*, duplicating our own work. With a workspace where Costa's team could work over *imagineRio*'s layers, they would be able to focus on their specific research questions. Access to *imagineRio*'s authoritative reference map again allows the research to be built over a strong foundation, freeing up time for their specific research questions pertaining to where migrants arrived, what disputes and collaborations took place between migrant and residents in workspaces and places of residence. One big question that the research hopes to address, and that could be visualized once the project's thematic layers are entered into *imagineRio*, is whether Black migrants settled in the *favelas* (informal hillside communities), as traditional historiography has claimed, or if instead, as Costa's preliminary results show, they settled throughout the central and southern neighborhoods of the city.¹¹

We are aware that our platform needs to expand to contain user-generated spatial data, but also to include other types of content, such as text and videos, that contextualize work that is being done, or that could be, with *imagineRio*. For example, *imagineRio* has great potential for teaching, and not just at the university level. As we know from teaching with *imagineRio* at Rice University in Houston, Texas, students are intrigued when they can visualize a city in past time and write about it in new and creative ways using *imagineRio Narratives*.¹² But there is an even greater and more exciting opportunity in Brazil where *imagineRio* can be utilized at multiple educational levels: elementary, secondary, high school, and the university. We have long worked with Higor Ferreira, PhD, who is an historian, high school teacher, and TikTok influencer. He is interested in making the historical experience of Black people in Rio available to a much broader public. One such audience is Brazilian students. He sees *imagineRio* as offering creative and innovative ways to teach, but he has found that most teachers do not have the time to invest to create their own content

¹⁰ On Black migration from rural areas to the city of Rio de Janeiro, see Carlos Eduardo Coutinho da Costa, "Migrações negras no pós-abolição do sudeste cafeeiro (1888-1940)," *Topoi Revista de História*, 16(2015): 101-126, <https://www.scielo.br/j/topoi/a/jkQ7K3v9WhjBKKdMmvs4kkz/?lang=pt>, accessed July 21, 2025, and "The Great Migration in Brazil: Blacks Families and Households: Rio de Janeiro, (1888-1940)," in Elaine P. Rocha, ed., *Many Rivers to Cross: Black Migrations in Brazil and the Caribbean* (Wilmington, DE: Vernon Press, 2024, 73-90.

¹¹ Historians have based their understanding on the migration patterns of the formerly enslaved in the post-abolition period on newspaper stories that reflected an alarmist view that such migration would undermine the liberal, modernist goals of Rio's elites. José M. Carvalho, for example, notes that the exodus of former enslaved people from the coffee fazendas of the Paraíba Valley and their arrival in the city of Rio de Janeiro "swelled the ranks of the underemployed and unemployed," see *Os Bestializados: o Rio de Janeiro e a República que não foi* (São Paulo, Companhia das Letras, 1987), 16. Similarly, Nei Lopes points out that the ending of slavery built a reserve army of urban workers that would be exploited in the future industrialization of cities in Brazil, but that the immediate social consequences of this migration was residential segregation and the creation of favelas, see *O Negro no Rio de Janeiro e sua tradição musical: partido-alto, calango, chula e outras cantorias Rio de Janeiro*: Pallas, 1992), 3.

¹² See the narratives written by Rice students Bianca Shultz, Nicole Lhuillier, and Jesse van der Meulen in the *imagineRio Narratives Gallery*, <https://narratives.imaginerio.org/>.

using *imagineRio*. Thus, he seeks to create short, informative videos about Black history in the city that can be easily used in classrooms throughout Brazil.¹³ To do this easily and effectively, we need to expand our *imagineRio Narratives* tool to incorporate a teaching space, where videos, lesson plans, walking itineraries, and customized maps can be created and shared.

Not all the scholars and teachers who reach out to us have GIS experience. Without a trained GIS specialist available on their team, or as a consultant, it is extremely difficult to mount and maintain a Spatial History project. However, we think that we can address this too, by considering the needs of scholars who often have extensive datasets that have implicit geographic data (such as addresses) but that need the GIS to become explicit geographic data (i.e., with the adding of latitude and longitude coordinates). For example, Professor Flávio Gomes (Universidade Federal do Rio de Janeiro, UFRJ) has developed a series of databases that record information on where newly arrived enslaved Africans lived in Rio, where they were treated for disease, and where they died.¹⁴ Other scholars, such as Keila Grinberg (University of Pittsburgh & Universidade Federal do Estado do Rio de Janeiro, UNIRIO) and Mariana Muaze (UNIRIO) have compiled data from newspapers that reveal where enslaved individuals were bought and sold throughout the city.¹⁵ Daryle Williams (University of California, Riverside), has an extensive database of freed Africans living in Rio—these were individuals “liberated” from the slave trade, but who often lived lives similar to those of the enslaved.¹⁶ All of these datasets beg to be mapped, and in all cases, these historians have recorded addresses in their databases but they have not yet been able to assign geographic coordinates to them. With the right kinds of new workspaces in *imagineRio*—ones designed for users without GIS experience—new thematic layers on the Black Experience Rio de Janeiro can be created, as well as thematic maps and written narratives.

The New Workspaces

Geodata Editor

We envision designing a geodata editor, accessible to users who have been given permission to edit data. The editor will allow users to make changes, additions, and corrections to *imagineRio* data. The editor will offer advanced geographic editing tools, such as snapping, cutting, splitting, clipping, and assisted rectangles. Once a user has made any edits, their changes will be evaluated before these changes will be published in *imagineRio*.

¹³ Professor Dr. Higor Ferreira teaches at Colégio Pedro II in Rio de Janeiro and is a Post-doctoral fellow at the Fundação Oswaldo Cruz, FIOCRUZ. His TikTok platform, which has 63,400 followers and 1M Likes, is available at <https://www.tiktok.com/@questaodehistoria>.

¹⁴ See for example his published dataset “Africans Burials and Residences in Rio de Janeiro, 1874-1899,” *Journal of Slavery and Data Preservation* 2:1 (2021), <https://jsdp.enslaved.org/fullDataArticle/volume2-issue1-african-burials-rio/>.

¹⁵ See Grinberg’s and Muazes’ published dataset “A Year of Slavery: *Jornal do Commercio*, 1840,” *Journal of Slavery and Data Preservation* 2:1 (2021), <https://jsdp.enslaved.org/fullDataArticle/volume2-issue1-year-of-slavery-rio-1840/>.

¹⁶ See the two databases published by Williams “Free African Disappearances, Rio de Janeiro, 1835-1863, and Free Africans and Concessionaires, Rio de Janeiro, 1860,” both in *Journal of Slavery and Data Preservation* 2:1 (2021), <https://jsdp.enslaved.org/fullDataArticle/volume2-issue1-fab-disappearances/> and <https://jsdp.enslaved.org/fullDataArticle/volume2-issue1-fab-concessionaires-1860/>.

Thematic Layers

We envision designing a workflow such that users can create their own thematic maps of Rio. Researchers already have the ability to create an infinite number of historical maps of Rio de Janeiro in *imagineRio*, but with this new workflow, they will be able to view their own data in *imagineRio*. For example, using the examples from the researchers discussed above, new thematic layers can be created to map the history of printing in Rio, patterns of Black migration to Rio, or key places in the city for Black residents. Users will be able to upload their own datasets or use the geodata editor described above.

In the geodata editor, users will be able to create point, line, and polygon features. Using the additional style editor, which we will also create, users will be able to assign colors to attribute values of the features that they have created, thereby enabling categorical mapping. We believe this will satisfy 90% of thematic maps to be created by users. These thematic layers are private by default, and each user will decide how to use, share, or publish them, either in the *imagineRio* interface with a custom share URL, or added to a narrative. If a user desires, they may share their thematic layers publicly, so that others may view and use them.

Improvements to enhance storytelling in imagineRio Narratives

Currently, *imagineRio Narratives* is designed in a slide format, which privileges maps and images. In the current format, the narrative progresses as a slide show. This is ideal for teaching and for presentations, but it has limitations for longer and more complex writing. To address the need for users who want to write narratives that privilege text, we will create a second format. This new format, which will resemble the format of an article, will allow writers to easily insert maps, images, and videos to their text. This text-focused environment will be more suitable for scholars wanting to share the results of their research, for teachers wanting to assign written assignments to their students, or for writers drafting texts for traditional print publications.

Image Repository

We envision repurposing our image repository so that users that have been granted permission may add maps, views of the city, and urban plans to *imagineRio*. Once a contributor has uploaded an image, there will be tools that will allow them to record metadata on the image, as well as tools that will enable them to georeference or to geolocate it. We wish to explore if a new kind of imagery—digitized archival documents can be geolocated and connected to our georeferenced historical maps and geolocated historical views. This would make it possible to point to a precise spatial and temporal location—for example, the location of a square where an historical event took place—and allow the historical textual sources about that event to be easily at hand while a user explores the event in space and time. In the new image repository, we will include historical textual documents, provided that they are in a pdf, jpeg, or other suitable format. Historical documents can then be read in *imagineRio* in time and space. Footnotes hidden away in scholarly publications will come alive when they can be accessed in time and space.

These new additions to *imagineRio* will facilitate customizable user generated content, which we believe will greatly expand the range and depth of *imagineRio*.

The Address Locator

Ideally *imagineRio* would already have an historically accurate address locator, but the lack of funding and the complexity of coming up with one that is accurate for three and a half centuries has placed this on a back burner. However, as Costa's team geolocates addresses, particularly around the year 1933, for which a detailed census of the city exists, and which includes information on buildings on blocks, a preliminary address locator for the 1930s can be developed by his team in consultation with *imagineRio*. This first step can be the beginning of a historical address locator for the twentieth century. For the nineteenth century, a simple address locator was built from the Gotto Map of 1866.¹⁷ This address locator, updated or re-coded, would give us addresses for the nineteenth century. These two steps will dramatically benefit historians whose spatial research on the city of Rio de Janeiro typically includes street addresses.

Conclusion

Our goal is to make *imagineRio* an interactive public geospatial platform accessible to users who are not GIS specialists as well as to those who are. Any GIS is expensive to build, takes time, and requires extensive experience. By adding workspaces to *imagineRio*, we seek to democratize cartography by offering anyone the opportunity to create a map of Rio de Janeiro that illustrates their research, their interpretive arguments, and their contexts. Both the ability to use *imagineRio* as a way to research the history of spaces and places in the city and the ability to create individualized maps, is, we believe, an important contribution to geospatial studies in the Humanities. In this transition, *imagineRio* moves from being an authoritative reference map that can be consulted, to becoming an authoritative reference map that can be utilized. In becoming an intuitive platform for the creation of thematic maps, *imagineRio* will offer users the paints and brushes to use on their own maps to highlight their own data. This is an exciting step in the direction of more democratic cartography, for it will allow for unique views of Rio to emerge—as many as there are interested and motivated users.

References

Buccalon, B., D. Heyman, and A. Metcalf (2024). "imagineRio Narratives: A Storytelling Tool for Spatial History in Rio de Janeiro. *Journal of Digital History* 3 (1).
<https://doi.org/10.1515/JDH-2022-0005?locatt=label:JDHFULL>.

Carvalho, J. M. (1987) *Os Bestializados: o Rio de Janeiro e a República que não foi*. São Paulo: Companhia das Letras.

Costa, C. E. C. (2015). "Migrações negras no pós-abolição do sudeste cafeeiro (1888-1940)." *Topoi Revista de História* 16 (30): 101-126.
<https://www.scielo.br/j/topoi/a/jkQ7K3v9WhjBKKdMmvs4kkz/?lang=pt>,

Costa, C. E. C. (2024). "The Great Migration in Brazil: Blacks Families and Households: Rio de Janeiro, (1888-1940)." In E. P. Rocha (ed.), *Many Rivers to Cross: Black Migrations in Brazil and the Caribbean*. Wilmington, DE: Vernon Press, 73-90.

¹⁷ This address locator was built at Stanford University by Professor Zephyr Frank over a decade ago using the Gotto map which has addresses, see Edward Gotto, *Plan of the City of Rio de Janeiro: Brazil*. Robert J. Cook, 1871. Biblioteca Nacional (Brasil). <https://bdlb.bn.gov.br/acervo/handle/20.500.12156.3/35546>.

El-Dahdah, F., Metcalf, A., Heyman, D. and Burgi, S. (2021). “Situated Views of Rio de Janeiro.” *La Biennale di Venezia, Architecture*.
<https://www.labbiennale.org/en/architecture/2021/co-habitats/far%C3%A8s-el-dahdah-alida-metcalf-david-heyman-sergio-burgi>.

Ferla, L. (2024). Review: *imagineRio*. *Reviews in Digital Humanities*, 5 (8).
<https://doi.org/10.21428/3e88f64f.a8538626>.

Gandra, A. “Plataforma imaginerio incluirá mapas do século 20 e dados temáticos: Trabalho conta com a colaboração do Instituto Pereira Passos (2023, May 13). *Agência Brasil*.
<https://agenciabrasil.ebc.com.br/geral/noticia/2023-05/plataforma-imaginerio-incluir%C3%A1-mapas-do-s%C3%A9culo-20-e-dados-tem%C3%A1ticos>.

Gomes, F. (2021). “Africans Burials and Residences in Rio de Janeiro, 1874-1899.” *Journal of Slavery and Data Preservation* 2(1):6-8. <https://jsdp.enslaved.org/fullDataArticle/volume2-issue1-african-burials-rio/>.

Grinberg, K. and Muazes, M. (2021). “A Year of Slavery: *Jornal do Commercio*, 1840,” *Journal of Slavery and Data Preservation* 2(1): 9-12. <https://jsdp.enslaved.org/fullDataArticle/volume2-issue1-year-of-slavery-rio-1840/>.

Hallewell, L. (1982). *Books in Brazil: A History of the Publishing Trade*. London: Scarecrow Press.

El-Dahdah, F., A. Metcalf, and Axis Maps (2014). *imagineRio*. Rice University: Spatial Studies Lab.
<https://doi.org/10.25613/Y1A2-CM40>.

“imagineRio Digital Platform Reveals Centuries of Rio de Janeiro’s Urban Evolution.” (2021, December 2). *Getty / News & Stories*. <https://www.getty.edu/news/imaginerio-digital-platform-reveals-centuries-of-rio-de-janeiro-urban-evolution/>.

Lhuillier, N. (nd). “Café Culture in Turn-of-the-Century Rio de Janeiro. *imagineRio Narratives*.
<https://narratives.imaginerio.org/en/details/618abaf27aa17b004cadcaf3>.

Lopes, N. (1992). *O Negro no Rio de Janeiro e sua tradição musical: partido-alto, calango, chula e outras cantorias*. Rio de Janeiro: Pallas.

Metcalf, A. Smith, S. Kennedy, W. (2020). “‘A Mere Gutter!’ The Carioca Aqueduct and Water Delivery in Mid-Nineteenth-Century Rio de Janeiro.” *Urban History* 49 (1): 1-27.
<https://doi.org/10.1017/S096392682000084X>.

Metcalf, A. and Smith, S. (2018). “Mapping the Maracanã: Reconstructing the Route of Rio de Janeiro’s Second Major Aqueduct,” *e-perimetron* 13 (1): 1-22. https://www.e-perimetron.org/Vol_13_1/Metcalf_Smith.pdf,

Metcalf, A. (2014). “Water and Social Space: Using georeferenced maps and geocoded images to enrich the history of Rio de Janeiro’s fountains,” *e-Perimetron* 9 (3): 123-145. https://e-perimetron.org/Vol_9_3/Metcalf.pdf.

Meulen, J. (nd). “Carnival in Modern-Day Rio de Janeiro.” *imagineRio Narratives*.
<https://narratives.imaginerio.org/en/details/618acffc7aa17b004cadcaf7>.

Rizzini, C. (1945). *O livro, o jornal e a tipografia no Brasil, 1500–1822*. Rio de Janeiro: Livraria Kosmos.

Sodré, N. W. (1966). *História da imprensa no Brasil*. Rio de Janeiro: Civilização Brasileira.

Shultz, B. (nd). “Ciganos in Rio During the Time of the King.” *imagineRio Narratives*.
<https://narratives.imaginerio.org/en/details/63583e56ab12f8004ec15dff>.

Utsch, A. (2021, February 23). Print Culture and Literature in 19th-Century Brazil. *Oxford Research Encyclopedia of Literature*. Retrieved 28 Jul. 2025,
<https://oxfordre.com/literature/display/10.1093/acrefore/9780190201098.001.0001/acrefore-9780190201098-e-1225>.

Williams, D. (2021a). “Free African Disappearances, Rio de Janeiro, 1835-1863. *Journal of Slavery and Data Preservation* 2 (1): 17-24.
<https://jsdp.enslaved.org/fullDataArticle/volume2-issue1-fab-disappearances/>.

Williams, D. (2021b) “Free Africans and Concessionaires, Rio de Janeiro, 1860.” *Journal of Slavery and Data Preservation* 2 (1): 25-30.
<https://jsdp.enslaved.org/fullDataArticle/volume2-issue1-fab-concessionaires-1860/>.