Virtual Ethnographic Collections
From informatization to knowledge collaboration

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Introduction

Before passing away at the beginning of 2016, the indigenous shaman Toninho Maxakali expressed a posthumous wish to his children. He wanted his personal objects to be entrusted to *Museu do Índio* (in what follows Museum of the Indian or the Museum) in Rio de Janeiro – far away from the small territorial islands located on the borders between the states of Minas Gerais and Bahia in Brazil, where his people are currently confined.

Toninho built a professional relationship with the Museum and had his reasons for expressing this wish. He acted as an indigenous researcher at the institution in 2010, within the framework of the Documentation Program for Indigenous Languages and Cultures (PROGDOC, in its acronym in Portuguese), and his research produced his second book, *Komayxop: cantos xamânticos Maxakali/Tikmu'un* (Komayxop: shamanic chants Maxakali/Tikmu'un) (Maxakali/Rosse 2011), with 808 pages and two CDs with the recordings of his performances. This book makes an unparalleled presentation of one of the subjects that interest South American indigenous peoples the most: music. Maxakali musical knowledge results from a repertoire of poetic, lexical and encyclopedic resources accumulated over a lifetime and passed through generations. Through shamanic chants, the Maxakali people establish a relationship with the world. Therefore, the heritage that Toninho had entrusted to the institution was as or more valuable than the personal objects addressed to the Museum after his death.

If Toninho's request contrasts with the descriptions of ethnographic museums as places of expression, reproduction or testimony of colonialism (see e.g., Stocking Jr. 1985; Clifford 1997; Sarr/Savoy 2018), the assembly of collections from donations from indigenous people themselves is no exception in the recent history of the Museum of the Indian. Toninho's personal objects were added to the weaving deposited by the natives Xyhcaprô Krahô, Jacalo Kuikuro and Julia Macuxi; to the featherwork donated by Talukumã Kalapalo and Arrula Waurá; the large pottery collection by Quitéria Pankararu; and the thousands of items recently produced by

indigenous researchers in each of the more than 62 PROGDOC (see below) projects since 2008. These collections add up to the countless others donated by specialists who dedicated their lives to the study of Brazilian indigenous cultures, such as Alfred Métraux, Carlos Everaldo Coimbra Jr, Catherine V., Charlotte Emmerich, Delvair Montagner, Denny Moore, Darrel A. Posey, Heloisa Alberto Torres, Júlio Cezar Melatti, Waud Hocking Kracke and others.

The absorption and production of these collections – which led the Museum to double the number of ethnographic pieces in the last 25 years – would not have been possible without the intense work of archive and museum management implemented since the late 1980s and, especially, from the mid-1990s, when the digitalization and informatization process began. This article, in fact, aims to historicize this process, meeting at least two demands. On the one hand, to make visible the actions that are part of the institutional mission and the hidden daily lives of cultural institutions. On the other hand, to present the mechanisms developed in a Global South country to face the scarcity of resources and meet the contemporary demands placed by the changes in information technology which aroused in the period considered here.

A Museum at the Service of Indigenous People

When the Museum of the Indian was opened in 1953, it aspired to stand out from the set of ethnographic museums worldwide. The institution was designed *avant la lettre* as a post-colonial museum. Its first ideologist, anthropologist Darcy Ribeiro, intended to promote a museum "against prejudice", designed to change the image that Brazilians had of the first inhabitants of the lands that, with the European colonization, gave rise to Brazil (Ribeiro 1953A, 1953B; Chagas 2007).

In this sense, the Museum of the Indian became the first institutional expression of a non-assimilationist perspective on Brazilian indigenous cultures that timidly gained space in this society since the beginning of the 20th century, due to the advent of a generation of anthropologists influenced by the German culturalism, whether by having carried out part of their studies in the USA with Franz Boas, or through direct contact with Curt Nimuendajú, a German living in Brazil who became one of the greatest – if not the greatest – anthropologists-indigenist of the first half of the 20th century (see, e.g., Stocking JR. 1966; Williams JR. 1996; Welper 2002; Schröder 2012).

The Museum originates from the Study Section of the Indian Protection Service (SPI, in its acronym in Portuguese), created in 1942; and its collection is linked

to the history of secular indigenism in Brazil.[1] Today, the ethnographic collection of objects comprises 20.523 pieces relating to 186 indigenous peoples – all items are accessible in the database, with 55% of the pieces having high resolution photo records in up to four positions.[2] The Museum's additional collections include 20.310 bibliographic works, 195.737 textual documents (795.602 pages), 519 original drawings, 87 watercolor prints, 14.766 35mm photographic negatives, 4.066 6x6cm photographic negatives, and 3.432 enlarged photographs, besides 23 35mm cinematograph films, a 16mm one and about 300 sound documents – everything has already been digitalized, including the cover and summary of all publications.[3] These documents present primordial pieces for the recent history of Brazilian indigenous peoples, especially regarding the demarcation of indigenous lands carried out in the country since the late 1970s.

Since the Museum's institutional mission means that this collection must be necessarily conceived in the perspective of its appropriation by the indigenous peoples living in Brazil today, the issue that arises from its informatization, therefore, is: how to put it at the service of these peoples? Or to put it another way: how to work with the collection so that it is appropriate as an instrument of political support, of identity decolonization, of promoting differentiated education, of territorial defense, among other rights acknowledged to the country's native peoples, especially with the 1988 Federal Constitution?

In the next sections, we will examine how this institutional mission reflects itself in the informatization process, approaching it from physical management to digital infrastructure, going through data architecture and the continuous improvements of the Museum's automation policy.

1 Since the beginning of colonial times, the Church, Settlers, and the State disputed the formulation of Brazil's indigenous policies. This situation only changed after the Republic's advent (1889), when militaries carrying out this political transition created the first laic national indigenists service in the country, the SPI (in 1910), thus reformulating these policies. Departing from the growing influence of anthropologists and indigenists in this Service, preserving the indigenous conditions and traditional cultures became a new idea to conceive the future of these Peoples.

2 There is a total of 105 collections of artifacts, the first ones were assembled in 1942 – eleven years before the Museum was opened – and the last ones date from 2020.

3 All the ethnographical records were fully digitalized up to 2007. The same happened to the textual and audiovisual historical archives up to 2017.

The Collections

For presentation purposes, we will divide the Museum of the Indian documentation between the *historical collection*, assembled by the institution until 1996, and the *contemporary collection*, assembled from 1996, when the digitization processes began. This division also expresses the rise of *born-digital documents*, which can be seen from the introduction of recorders, cameras and non-analog videos, and the progressive informatization of the administrative management process of Brazilian public institutions. In order to address this issue, we will focus mainly, but not exclusively, on solutions related to the management of the ethnographic collection, once its presence defines the nature of the institution in question.

A Brief History of the Management of the Historical Collection

Before discussing the digitization processes carried out at the Museum, it is necessary to briefly clarify the situation of the historical collection until the 1990s. Two milestones are important here. In 1978, the Museum left its former headquarters and moved to its current site. The move aggravated the inadequacy concerning the characteristics of the physical space in relation to the institutional demands. Due to constituent electrical, hydraulic and architectural problems the new headquarters did not meet the minimum requirements to shelter the collections. With the move, there was also the fragmentation of the archives between other memory institutions, such as the National Archives and the Brazilian Cinematheque.

From the beginning of the 1990s – and this is our second milestone – these two problems began to be tackled. The current headquarters were modernized, resulting in the creation of eight technical reserves – three of which were meant for the ethnographic collection – divided according to the ethnographic materials and the characteristic functions of the objects, besides proper spaces for the archives and the library.[4]

It is worth noting that, throughout this process, local solutions were sought to overcome Brazil's structural limitations on providing specific items for the preservation of historical collections, such as furniture, materials for packaging, chemicals for restoration, etc. The country has always lived a huge shortage of companies that produce supplies for memory institutions. The physical modernization was followed by the qualification of the institution's technical staff – all technicians with a higher education degree took postgraduate courses during this time. Therefore,

4 The ethnographic collection is grouped into the following categories: feather ornaments; ornaments made of eclectic materials; ceramics, cords and fabrics; weapons; ritual, magical and playful objects; ethnobotany; weaving.

Fig. 1: A visit by a representative from the Huni Kuin people/Acre state, to the Berta G. Ribeiro Technical Reserve (ritual, magical and playful objects, weapons and braids)

Museum of the Indian, 2015. Photo: George Magaraia

the collection was progressively reunified and the ethnographic pieces were placed in the new reserves according to their state of conservation, undergoing preventive and/ or curative restorations.

The choice to manage the ethnographic collection in typological reserves – given the extreme limitation of space of the institution's headquarters and the need to mirror the thematic organization of the collection in the physical space – posed extra logistical challenges, as grouping the pieces by categories undid the documentary sets linked to the contexts of collecting. Documentation and informatization, besides being seen as the culmination of a policy that included the physical recovery of spaces, were also necessary to have agility in management.

OrtoDocs – A System for Libraries Informatization

The first informatization action at the Museum of the Indian happened with the introduction of the OrtoDocs software in 1996. Developed in Brazil and adopted by branches of the National Library and the Getúlio Vargas Foundation, the software promised integration between institutions – a desire the Museum of the Indian had since the early days of the internet development in Brazil. For the more than 20.000 items in the institution's library, OrtoDocs enabled the unified management

of its main activities: cataloging, asset control, bibliographic research, data import and export, and report generation.[5]

When facing a lack of choices for a specific software for the computerized management of the ethnographic collection available in Brazil – with local technical assistance –, the Museum chose to adapt the OrtoDocs descriptive cards to digitalize its artifact collection records, creating its first virtual database. At that time, the institution housed about 11.000 items. The heritage list, from which the first information to be digitized was extracted, had eight entry fields and subfields (date of entry, registration number, method of acquisition, description, material/technique, geographical and ethnographic origin, name and address, and collector, donor, seller and observations). With the creation of the electronic index card, seven other fields were added: state of conservation, dimension, raw material, type of object, category, manufacturing technique and function.

Vocabulary Control

The innovation that guaranteed more sustainability to this process was the introduction of a *descriptive vocabulary* control, the essence of the indexing processes and thus a key tool necessary for the retrieval of digitalized information. At the turn of the 1990s, while standards for management of bibliographic and archival collections – Universal Decimal Classification/UDC and General International Standard for Archival Description/ISAD (G), respectively – were consolidated, the same did not happen in the museological field, let alone in the ethnographic one. Therefore, it was necessary to set description standards in Portuguese that could be adopted by institutions – allowing a future integration of collections and research mechanisms.

The Museum started to develop indexing tools based on this observation. The work started with Berta Ribeiro, an employee of the institution until 1985, who later worked there as an associate researcher (from 1987 on). Ribeiro would study the ethnographic collection of the Museum of the Indian and the National Museum of Brazil for creating the main reference work in this field to this day: the *Dicionário do Artesanato Indígena* (Dictionary of Indigenous Craftwork, 1988).[6] Based on a typological-functional criterion, the Dictionary introduced nine taxonomic categories

5 From the beginning, the system was conceived for the Microsoft Windows environment in Client – Server architecture. It adopted cataloging according to the AACR2 standard, in the Usmarc format, facilitating the exchange of bibliographic records, which in turn were registered in the Z39.50 standard.

6 The project began in 1985, during the Carlos Araújo de Moreira Neto administration in the Museum of the Indian, while Ribeiro was the head of the Museology Sector. The conclusion of the project "Nomenclatura das Coleções Etnográficas" (Nomenclature of Ethnographic

describing the manufacturing techniques, functions and materials used for the elaboration of the objects of each native people from Brazil.[7] Ribeiro thus consolidated her own experience in the area (see Ribeiro 1957), and proposed a fundamental innovation by unlinking the taxonomic classification from evolutionary theories – a signature of the field since the turn of the 19th to the 20th century, still present in neo-evolutionist publications from the mid-20th century, such as the *Handbook of South American Indians* (e.g., Steward 1946; see also Ribeiro 1994 for a historicization of the discussion).

To continue this process, the Museum published the List of the names of indigenous peoples in Brazil (*Boletim do Museu do Índio*, No. 8, 1998), which lists 2.732 terms in the bibliographic and archival documentation, identifying those that should preferably be used, thus constituting a second key tool for the processes of disambiguating searches on digital databases. In 2001, the institution's library started a project to develop a controlled vocabulary of indigenous toponyms to be used in the databases. After preparing a guide to standardize the entering of geographical names, which resulted in about 1.100 entries, the Museum's databases were standardized.

These efforts were complemented in the mid-1990s with the thematic index of the SPI's textual archive, as well as with the arrangement and description of the textual documents of the Museum's permanent archive (Rondinelli 1995, 1997) and the collections of the Rondon Commission (especially photographic and film documents), contextualizing and recovering the origin of the documentation (Lasmar 2008). Ten years after the beginning of the digitization process, the institution published the "Thesaurus of Indian Material Culture in Brazil" (*Tesauro de Cultura Material dos Índios no Brasil*, Motta 2006), which reorganized and updated the classification proposal of the Dictionary of Indigenous Craftwork, facilitating the communication process between the different collections – which represented an improvement in the standardization of the terms of classification of ethnographic objects, allowing better information retrieval.

Relational Milestones With Indigenous Peoples

In the 2000s, the Museum of the Indian, by stabilizing the conditions for the preservation of its collections and archives, and increasing its management control through digitalization, expanded and intensified the partnership with indigenous

Collections) received funding from Fundação Pró-Memória, Ministry of Culture (see Ribeiro 1988: 11).

7 The dictionary also has illustrations for each object type, drawn by the designer, anthropologist and architect Hamilton Botelho Malhano, then an employee of the National Museum.

peoples. This process was leveraged by a set of political and administrative measures based on the National Indian Foundation (FUNAI, in its acronym in Portuguese) four Multiannual Action Plans (PPA, in its acronym in Portuguese) for the 2000-2004 quadrennium; one refers to the operation of the Museum of the Indian, the other three to the development of activities related to the protection and promotion of Indigenous cultural heritage.[8] This institutional redefinition was sealed by Decrees of the Presidency of FUNAI, creating the institutional environment for several partnerships to be observed during that decade.[9]

The first great partnership with an indigenous people took place through an agreement in 2000 between the Wajãpi and the Museum, whose objective was to document, publish and technically support the public recognition of this people's heritage. The works were coordinated by Prof. Dr. Dominique Tilkin Gallois, resulting in a qualified collection and an exhibit inaugurated in 2001, "Time and Space in the Amazon: the Wajãpis" ("Tempo e Espaço no Amazonas: os Wajãpi"). The collection comprised 314 pieces, produced and qualified by the Wajãpi. This process also led to the publication of two catalogs, one of which (Gallois et al. 2002) subsidized the register of the wajãpi graphic patterns into national (National Historical and Artistic Heritage Institute) and international (UNESCO) instances (see also Gallois 2002b; 2012).

The dossier "Indigenous Peoples of the South of Bahia" (Coqueiro, *Povos Indígenas do Sul da Bahia*, 2002), a reference work that retrieves the documentation on the territories occupied by those peoples in Northeast Brazil, was published in 2002.[10] The dossier is presented as a fundamental political piece to support the political demands of the first peoples affected by the arrival of Europeans. The work was the result of three years developing a controlled vocabulary to support the process of indexing the SPI documentation.[11]

In 2003, the National Registry of Indigenous Cultural Heritage software was published (Registro Nacional do Patrimônio Cultural Indígena), which consisted of "customizing" the database of the Museum of the Indian for the National Inventory

8 Operation of the Museum of the Indian, Preservation of Indigenous Cultural Heritage, Dissemination of Indigenous Heritage, and Editing and Distribution of Material Produced by Indigenous Societies.

9 FUNAI Decrees No. 693/PRES/2000 and No. 385/PRES/2001.

10 This work, used by indigenous leaders in one of the longest land disputes in Brazil, the resumption of the Caramuru Paraguaçu Indigenous Land, in Bahia state, was planned for the event "500 years of the discovery of Brazil", when the Museum also held a set of actions in partnership with the Pataxó people, such as putting up an exhibit, and training in management and museological techniques for the indigenous people responsible for managing the Coroa Vermelha Museum.

11 A specific vocabulary of indigenous policy was built later, and is currently in the process of validation.

of Cultural References (INRC, in its acronym in Portuguese), of the National Historical and Artistic Heritage Institute – IPHAN. Through controlled vocabularies, this IT solution added the information produced from bibliographic or field research to the different museum collections.

Still in 2003, the project to value and register indigenous languages and cultures in Brazil began, with the support from UNESCO and under the coordination of Prof. Dra. Bruna Franchetto. The following year, a CD-ROM was released containing a *Basic Vocabulary of Indigenous Languages in Brazil* for 10 peoples, including the record of the last fluent speaker of the Umutina language. As a result of these partnerships, in 2004, the Museum was elected the Brazilian representative to receive computer equipment and programs under the DOBES Program (Dokumentation Bedrohter Sprachen/ Documentation of Endangered Languages) by the Volkswagen Foundation. Three years later, in 2007, the agreement with the Max Planck Institute for Psycholinguistics resulted in a fundamental step towards the development of the institution's IT expertise, and in sharing collections previously housed exclusively in Europe with indigenous people that would be interested.[12]

Still in 2007, the first Term of Agreement was reached with an indigenous association, the Organization of the Amazonas Parintintin Indigenous People (OPIPAM, in its acronym in Portuguese), aimed to technically deal with, digitize and return to the Parintintin people more than 67 hours of recordings about their history, rituals, myths and others, in addition to more than one thousand visual records, produced by Prof. Dr. Waud Hocking Kracke, deposited at the University of Illinois, Chicago, USA. At the same time, the Museum formed a second partnership focused on exhibits, this time with the Karipuna, Galibi Marworno, Gali'na and Palikur peoples, located in the Oiapoque region, under the coordination of Prof. Dr. Lux Boelitz Vidal. One of the results was the long-term exhibit "The presence of the Invisible" ("A presença do Invisível"), organized from an ethnographic collection composed of 245 pieces produced and qualified by those peoples, in addition to films, photos and two catalogs.

PHL – Personal Home Library – Library Automation Software

During the course of the projects listed above, the adaptation of OrtoDocs for the management of the ethnographic collection showed numerous downsides, mainly because it was not written in open code – thus limiting customization – and because it required expensive maintenance, which came to represent an obstacle to

12 The Museum received the LAT (Language Archiving Technology) and ELAN (annotation tool for audio and video recordings) programs, the former for management, the latter for linguistic notation, with remote support from the Max Planck Institute of Psycholinguistics.

the objectives of the Museum. Therefore, the idea was to create a database capable of both absorbing the demands that arose in the process of production and qualification of ethnographic collections and other documents, and offering indigenous people easier mechanisms to search and interact with their collections.

The solution found in 2007 was the introduction of the Personal Home Library software, PHL. Also designed for library management, PHL has taken the museum to a second process of adapting software for the purposes of managing its ethnographic database. However, this time, it used a more flexible and customizable solution.[13] The Museum was also interested in the possibility of using the software offline, in a free mono user function, for its application in indigenous villages.

Eighteen fields were added to the electronic descriptive card used in the PHL, allowing it to absorb more qualified information, as well as introducing fields that better described the management processes. Concerning the qualification of the collection, in order to value the producer and/ or artist and the identification of the object made by the indigenous people, diverse fields were introduced, referring to the *craftsperson* (responsible for making the object), *ethnic terminology* (name of the item in its native language), *year of manufacturing*, *village of origin*, and fields related to the function, divided between two thematic descriptors, primary and secondary (in which the Thesaurus terminology was applied).

Solutions were also proposed for two fundamental problems: the existence of ensembles made of more than one component and the relation between the descriptive card and the digital images related to the objects. In the first case, the following fields were created: *number of components* and *offprint*, the latter used to describe any accessory parts. In the second case, images started to be associated with the item through an HTML code, which also became a field for filling in the database.

Regarding the history of the collection and its management, the "collection" field was divided into *donor* and *collector*, to make clear the difference between the act of collecting and the act of donating. The following items were also introduced: *period of the collection's creation*, *administrative history*, *holding institution* (to control loans), *interventions* (dealing with the item's conservation history), and to identify *the modality of entrance* to the collection. Finally, to relate the items to the bibliographic collection, the field *bibliographic references* was introduced.

13 PHL was developed with client/server technology, using the XML IsisScript language, interpreted by the WWWisis/Bireme database server, available for all operating systems (Linux, FreeBSD, Windows, HP-UX, etc.). The registration standard used by PHL is based on the UNISIST/UNESCO format, much simpler than the Anglo-American formats (MARC, USMARC, UKMARC, UNIMARC, MARC21, etc.). At that time, it was already clear that the tools available for data conversion were making technical processing, personnel and maintenance costs cheaper. Thus, it was possible to adopt the simplest UNESCO format and invest in personnel for the elaboration of the data and metadata standard.

PROGDOC – The Documentation Program for Indigenous Languages and Cultures

The PHL allowed a crucial expansion of the Museum's collection management, bringing about an increase in its partnerships with indigenous peoples. Therefore, beginning in 2008, the Museum established the Documentation Program for Indigenous Languages and Cultures (PROGDOC), an initiative aimed at transforming the experiences described above into a sustainable policy for sharing, producing and qualifying collections, publications and exhibits, in which the indigenous peoples would be the main protagonists.

Fig. 2: Museum of the Indian PROGDOC Projects between 2008 and 2019

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In partnership with UNESCO, the PROGDOC was developed in two stages (2008-2015 and 2015-present day) and placed the institution in a different position in relation to ethnographic museums all over the world. In the very first decade of the 21st century, 100 years after the so-called Museum Era (see Stocking JR. 1966; Shelton 2006), the Museum of the Indian started to expand the number of items and the quality of the descriptions of its collection (see Förster 2008 on contemporary collecting), in an effort whose objective was to actualize the role of ethnographic museums for indigenous populations, expanding the Museum's con-

cerns from collection management to the development of public policies aimed at those populations.

With the scientific coordination of Profs. Drs. Bruna Franchetto (2008-present day), Elsje Lagrou (2008-2015) and Carlos Fausto (2015-present day), PROGDOC is a project with impressive results. The Program's 62 projects involved 147 indigenous villages in Brazil and in border countries of the Brazilian Amazon, resulting in the indirect reach of more than 83.000 individuals; the biggest highlight being the contribution to the training of 218 indigenous researchers and 117 non-indigenous researchers. In this broad context, the project works through workshops in which the masters and/ or members of the communities pass on knowledge that is recorded by indigenous researchers, trained in linguistic and anthropological documentation techniques.

From these meetings, collections were produced mainly made up of *born-digital* documents – accurately 106.821 video, audio and photo files, with some file storage areas expected to be processed soon. Nevertheless, 2.612 physical objects were also collected, referring to 20 different ethnicities (in a universe of more than 6.000 objects produced for different purposes). This led to an increase in the demands for technical processing. In addition to hiring specialized personnel, the Museum had to invest heavily in the development of its digital infrastructure, both for data processing and the production of digital collections.

Digital Infrastructure Suited to Indigenous Requirements

As we have seen, the Museum's informatization process began in 1996, with a Novell NetWare operating system with 16 computers. In 1998, the network migrated to Microsoft Small Business, in the Windows environment. The biggest increment occurred from 2015 onwards. Given the growing demand of digital processing, interaction with users and safe virtual environment for data storage, the Museum of the Indian remodeled its computer network in 2015, investing in physical rewiring – now fiber-optic –, in the Wi-Fi network, and above all in the acquisition of virtual and physical servers aiming at the implementation of secure backup procedures through a Data Center and virtual storage.[14] As a result of an investment

14 Some precise information, which may interest other IT specialists: a network with structured cabling (10/100/1000 Mbps) was installed, with POE switches in the annexes, fiber switches to integrate storage areas with physical servers, a high-speed dedicated 100 Mbps internet link (download and upload), supporting 100 simultaneous VPN users for safe remote work with and access to the Museum's file structure, Wi-Fi networks for employees and visitors, five HP DL360 physical production servers, with 256GB RAM and 45 more virtual servers. The Museum's Data Processing Center in its headquarters has its critical data mirrored in the external data center service provider. The collection received in the projects is now processed

of 1.5 million dollars, made in 2015, a great part of the Museum's virtual collection is protected in the event of a disaster – such as fires or any other accident.

A second field of investment, between 2008 and 2019, as we have said, was the assembling of new collections. The Museum purchased four production scanners, a planetary scanner, 65 notebooks, 40 photo cameras, 30 video cameras, 19 sound recorders, 10 microphones, besides four audiovisual editing stations, among other equipment.

The development in data processing and in the production of *born-digital* documents have enabled the PROGDOC projects to achieve impressive results and reach specialized and non-specialized audiences in indigenous cultures. Over the past ten years, 65 bibliographic works have been published, among them books, catalogs and educational material, including texts by indigenous authors; not to mention the Project Newsletters and websites aimed to disseminate the results of the project. In addition, to expand the target audience for the results, 40 short and medium-length films were produced and 61 ethnographic exhibits and photo exhibits were held, conceived and assembled at the Museum of the Indian and in different places across the country, with the participation of indigenous researchers and members of their communities.

However, the most significant result was indigenous peoples' increased trust in the institution. A project that stands out in this sense was the one carried out among the Yek'wana people and coordinated by researcher Majoí Gongora between 2017 and 2020. The project started from a paradoxical situation. While the Yek'wana chants are about to disappear in Brazil due to the weakening of its transmission from experienced experts to young people, the documentation of this knowledge for the benefit of the young faces strong cultural resistance, since recording the chants might potentially harm the original owner of this knowledge (the person who had his/her voice recorded). This means that, while the recording would be a potential preservation tool, it can also be a potentially harmful tool to the last holders of this knowledge, if the files fall into wrong hands. The solution found in the Ye'kwana project, proposed by Ye'kwana representatives, was to create a collection for the exclusive benefit of a limited number of members of this people. The Museum became a steward for encrypting the data and making it available only when authorized by the indigenous people. The digital structure set up for data processing proved itself as a fundamental tool to offer a highly specialized and culturally adapted service for this group.

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and stored in temporary storages and, once validated, are sent to permanent storage, daily copied via software in an LTO 6 tape library. The body of backup tapes – weekly, monthly and yearly – are then stored on safe-like devices in the Data Center.

Virtual Multimedia Library

With the purchase of equipment and software in 2015, it was possible to expand the digitalization of the paper-based collections, and install the Virtual Multimedia Library, a tool to support research in the digital environment, allowing faster access to the information present in more than one and half million pages of documents on indigenism and anthropology made in Brazil since the 19th century.[15] This body of work possibly represents one of the biggest collections on the state acting upon the life of the indigenous peoples of Brazil, made available on the internet and preserved through the backup system already described. For an idea of its importance, it might suffice to say that the database had about 16.000-page views monthly in the first months after its launch.

The documentation of the Permanent and Intermediate Archives of the Museum of the Indian is also digitized, available only for internal consultation, awaiting the definition of the rules for its technical processing. And it is worth mentioning the digitization of the library's books, limited to the cover, summary, introductions and presentations, colophon and catalog data. With this option, it was possible to give access to the entire collection, ensuring something fundamental: indexing the content of publications in digital search engines like Google.[16]

The Limits

With the exponential increase in the production of physical and digital collections as well as in data processing, the set of solutions adopted until then, although quite complete, began to prove insufficient in some ways. Firstly, there was a wider limitation. The Museum had arrived at individual solutions to the informatics problems of each of its documentary types (objects, papers, books, etc.), but these solutions were not integrated in a single research and management system. Secondly, there were also specific problems with the daily use of these tools. In the PHL database, for example, even though the work of technicians and curators was guided by a controlled vocabulary, the database operated as free form-filling, leading to typing

15 Thus, experts and indigenous people have remote access to 210.190 pages of SPI documents which totals 795.602 pages already digitized – and another 585.412 pages yet to be uploaded. The documentation is certified by the "Memory of the World UNESCO Brazil/2008" Program, and also comprises 415.231 pages of rare works, books, periodicals, dissertations and theses.

16 All the museum documentation projects are submitted to the previous consent of indigenous people. The referred improvement in researchability was meant to increase the representation of indigenous knowledge on the web. This publicity does not reach encrypted culture-sensitive information, such as the ones mentioned in the Ye'kwana project.

errors. Thirdly, there have been profound changes in the design and use of the internet. Information began to move on the World Wide Web mainly through social networks, assigning individual and institutional websites and portals to the background. If PHL already had the shortcoming of not allowing database content to be found by conventional search engines because it did not index its entries with individual electronic identifiers, it also did not allow the integration of entries with social networks and content platforms. Additionally, it was not possible to refer to an object in a post on social media, which now account for the overwhelming majority of information flow on the internet. This caused both users and the institution itself to face limitations, since the institution had become a social media user for disseminating information, but could not link the database entries to its social media accounts.

In addition, the resources used to make the collection accessible to indigenous people had not reached the desired level. For example, the solution adopted in PROGDOC was to create individual websites to broadcast its results. However, these websites were no longer responsible for the main way of interacting with users, especially because they do not allow the use of the Museum's content beyond what is programmed to be consumed externally. The Museum wanted more. It wanted its collection to be virtually curated by indigenous people from anywhere in the country. Hence, it was necessary to act in two ways: to integrate the various platforms for collection management and to create interaction tools.

Reach Out: The Museological Collection Cataloging and Dissemination Platform – Tainacan, and the Multimedia Dictionary of Indigenous Languages – Japiim

In 2018, the Museum started to develop the migration of PHL data to the Tainacan platform, selected by the Brazilian Museum Institute (IBRAM, in its acronym in Portuguese)[17] as a reference tool for increasing the digitization processes of Brazilian collections. The Museum became a partner of Tainacan, since the existence of a highly-digitized collection according to consistent standards allowed the rapid implementation and development of this tool in the institution. The processes started in 2018 are still under development and can only be treated here as work in process. We will therefore focus on the general orientation of the actions.

Firstly, it was necessary to continue refining the mechanisms for controlled collection management, which was accomplished by incorporating the references

17 Available in: https://www.museus.gov.br/acervos-online, accessed in December 15th, 2020.

for vocabulary control in the form of indexers for automatic filling of fields – eliminating the possibility of typos or errors by technicians. Thus, it was necessary, in the first place, to rework the PHL data to be included in the new platform. This was done through the application of tools available in the Open Refine software in an *.xml* file containing an export from the PHL database to solve filling-in problems.[18] It also allowed the development of correct indexers for the version of Tainacan as applied in the Museum. In this way, a virtual version of the *Dicionário do Artesanato Indígena* was directly included into Tainacan. Therefore, technical descriptions of artifacts are followed by images and texts in the dictionary, and, in reverse, a search for the dictionary terms allows to find pieces that correspond to a certain technique, function or material.

A second area developed was the possibility of correlating external content to Tainacan entries, allowing to relate image, sound and video files and textual documents from other platforms – such as the videos on the Museum's YouTube account – to the entries of each object. Thirdly, due to the architecture of the new database, it is intended that the ethnographic content digitized by the Museum becomes "visible", that is, accessible from conventional internet search engines, improving the representation of indigenous knowledge on the web. Finally, the electronic index card of objects now also has a free field to host information from the processes for qualifying objects and collections built up more and more intensely with the indigenous people.

Next to Tainacan, the most recent platform developed by the Museum is the Japiim Portal, Multimedia Dictionaries of Indigenous Languages of the Indigenous Language Documentation Project (a branch of the PROGDOC). This platform – still in the process of approval – aims to absorb the content developed in the linguistic documentation projects carried out at the Museum, allowing users to hear the sound articulations of the different lexical entries and to fill in information regarding phonetics, gloss, word classes, examples of use, translation into Portuguese and semantic field. It also allows users to include audiovisual files as examples of use. In addition, the application has keyboards for the alphabets used for spelling in each indigenous language, presents editing resources for collaborative work and offers a search mode for consultation. It is equipped with responsive tools that favor the program's adaptation to the screen format of the device used for its visualization, be it a cell phone, a tablet or a desktop.

18 In this process, the PHL was preserved as a historical document and a backup in case of need.

Final Considerations: Convergence of Technologies

Ethnographic collections have recently been described as a "shared" or "participatory heritage" (see Roued-Cunliffe, H./ Copeland, A. 2017; Scholz 2018). This exerts an important impact on thinking about them in their contemporary situation: Their management can only be done taking into account the several communities that are related through these collections. The main consequence of this statement for the case analyzed here was to manage and treat the content of the collections and the form of its virtual representations in an encompassing relationship; that is, to consider simultaneously management and accessibility, knowledge and power relations. All collection treatment was done to consolidate this principle with the budget and the State guidelines and goals – considering that in the early 2000s the objective was that anthropologists and linguists were an indispensable part of the inventory processes of indigenous cultures and languages, while from 2015 on the idea was that the indigenous people themselves would take on this role.[19]

Therefore, all production carried out under these projects until 2015 was systematized and delivered in the form of dossiers to partner communities. The linguistic documentation and technical management methodology implemented by the Museum served as a reference and was mirrored by UNESCO in some of its technical cooperation agreements (UNESCO 2015).

This policy was put to the test in 2020 when due to the SARS-COVID-19 pandemic activities were paralyzed all over the world, severely affecting the schedule of the Museum of the Indian, including the suspension of several projects such as the countless field works set to be carried out among border populations and peoples of recent contact – since indigenous peoples are, in many cases, under greater risk than non-indigenous populations.

Despite the interruption, the activities of the documentation projects of indigenous languages and cultures were able to proceed remotely, supported by the digital data management infrastructure that we have discussed in this article. Dozens of reports, images, audio records and other digital documents were processed, and it was possible to complete, among other products, seven multimedia dictionaries for the Jampiim platform. The interest and dedication of indigenous researchers and members of indigenous communities to develop research activities, even in

19 See the goals and initiatives of the 2016-2019 quadrennial PPA: *Goal: 03ZL* – Develop 40 projects aimed at training indigenous researchers in research and documentation of languages, cultures and the assembly of their peoples' collections. *Initiatives: 04IX* – Technical-scientific cooperation agreement with academic institutions to train indigenous researchers in order to qualify them for the handling of cultural property registration tools; and *04IY* – Assembly of contemporary ethnographic collections defined by indigenous peoples as a relevant tool to the preservation of their cultures.

such an adverse context, demonstrate the success of the methodology adopted by the Museum for documenting and preserving indigenous languages, cultures and collections.

It shows that the interest of indigenous researchers to continue on-going activities is not restricted to a fascination caused by access to modern technological resources – photo and video cameras, computers etc. – but is above all due to the fact that these resources allow mnemonic technologies based on different traditions to meet. Knowledge acquired in digital registration of linguistic and cultural contents empowers young people and invigorates communities, exemplified by the recent revitalization of Kuikuro chants: After adopting a registration policy exclusively for their benefit, young people started listening to their grandparents' repertoire on smartphones while surfing social networks and posted photos and videos of rituals. They soon started to produce themselves new versions of the Kuikuro chants for their generation (see Franchetto 2007; Fausto/ Franchetto 2008; Fausto 2016). So, less than about a *transference of technology*, we are talking here about a *convergence of technologies*. As in the Maxakali case, with which we have opened this paper, the museum's interest resides in fostering processes in which indigenous groups can connect their traditional technologies of memory to the Museum's techniques and technologies of cultural record, storage and publicization. As an essential part of these processes, digitization proved to be more effective and sustainable when it opens space for a humanized use of the digital resources. Or, in other words, when the management of information is understood as inseparable from the social processes that lie at the origins of the documents.

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