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# **CHANGE IN ACCESS AFTER DIGITIZATION: ETHNOGRAPHIC COLLECTIONS IN WIKIPEDIA**

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# CHANGE IN ACCESS AFTER DIGITIZATION: ETHNOGRAPHIC COLLECTIONS IN WIKIPEDIA

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## Abstract

The *raison d'être* of memory institutions revolves around collecting, preserving and giving access to heritage collections. Increasingly, access takes place in social networked markets characterized by communities of users that serve to select and rank content to facilitate reuse. Publication of heritage in such digital medium transforms patterns of consumption. We performed a quantitative analysis on the access to a museum collection and compared results before and after publication on Wikimedia. Analysis of the difference in access showed two main results: first, access to collections increased substantially online. From a selection of the most viewed objects, access grew from an average of 156,000 onsite visitors per year (or 15.5 million in a century) to over 1.5 million views online per year (or 7.9 million in five years). Second, we find a long tail in both mediums, where 8% of objects were exhibited onsite and 11% of available objects online were used in Wikipedia articles (representing 1% of the total collection). We further document differences in consumer preference for type of object, favouring 3D onsite and 2D online, as well as topic and language preference, favouring Wikipedia articles about geography and in English. Online publication is hence an important complement to onsite exhibitions to increase access to collections. Results shed light on online consumption of heritage content by consumers who may not necessarily visit heritage sites.

**JEL classification:** L31, D12, O35, N30, Z11

**Key words:** Heritage consumption, Museums, Digital heritage, Access, Exhibition history, Wikipedia

## 1. Introduction

Museums, as well as memory institutions in general, are charged with the collection and preservation of heritage collections to ensure access to present and future generations. This goal drives much of the decision making when allocating resources for the different organizational activities. The accent on how to ensure such accessibility and the quality of the engagement depend on the policy of the institution. Digitization has proven to be a key activity that supports the management and preservation of collections. It also increases access, as consumption broadens and deepens (Bakhshi and Throsby, 2012).

With the aim of increasing digital access to heritage by positioning collections where the consumers are, a number of heritage institutions, including 25 from the Netherlands, collaborate with the Wikimedia Foundation, the online repository that feeds Wikipedia articles. Dutch heritage institutions have published over half a million objects in Wikimedia, representing close to 2.4% of all Wikimedia content (Brinkerink, 2015). Launched in 2001, Wikipedia has been ranked among the ten most popular websites on the Internet. With more than 35 million articles written, Wikipedia receives about 17 million views per month, in all languages and including mobile access.<sup>1</sup> Wikipedia's considerable traffic signals its position as highly preferred information site for online consumption.

Consumption of heritage can be experienced as hedonic or utilitarian. Visiting museums is most generally associated with a hedonic consumption, or leisure time activity (Frey, 1998; Frey and Meier, 2006), while consumption of heritage content online, particularly within an encyclopaedic context, can be largely placed within a utilitarian dimension: seeking information. Wikipedia can be considered a utilitarian system since it is most oriented towards tasks performed within a work and education setting (Wu and Lu, 2013), independently of the concentration of heritage content available.

The consumption pattern of all cultural content, such as films, books or music, generally present a long tail where few products are extremely popular, while the majority of content remains obscure. The mechanics of selection and further popularization of the content has been attributed to quality information signals that help consumers make a choice, including rankings, prizes, recommendations and reviews (Clement et al., 2007; Chevalier and Mayzlin, 2006; Ginsburgh and Ours, 2003; Potts et al., 2008; Walls, 2010). Information to signal quality, as well as contextual information, is of essence when positioning digital heritage content in the crowded social networked environment online. This is because of the hedonic characteristics of heritage and of information, digital heritage being a mix of the two.

The consumption patterns of information on Wikipedia largely respond to an encyclopaedic use, which explains the drops during summer and winter holidays (Ratkiewicz et al., 2010b), as well as to critical events, such as a market

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<sup>1</sup> Views per month vary, the highest has been recorded at over 22 billion on September 2014 (<http://stats.wikimedia.org/EN/TablesPageViewsMonthlyCombined.htm>). For more on Wikipedia see <https://en.wikipedia.org/wiki/Wikipedia>. Wikipedia is one of the projects of Wikimedia, which include Wikibooks, Wikitionary, Wikinews, Wikiquote, Wikisource, Wikiversity, Wikivoyage and Commons. All Wikimedia projects, in all platforms, had 17.9 billion views on July 2015 (see report card at <http://reportcard.wmflabs.org/>).

crash, elections, earthquakes or the Oscars (Ratkiewicz et al. 2010a), but also annual celebrations such as the Ramadan and Christmas. For entertainment and biographical content, two of the most preferred topics, consumption remains otherwise stable (Spoerri, 2007b, Lehmann et al., 2014). A clear understanding of the consumption patterns of heritage content found in Wikipedia articles is missing.

This study provides unique insights on the consumption pattern and consumer preference in an online environment, which includes a much broader audience than onsite consumption, shedding light into a segment of the market that has remained obscure and challenging to understand. Results can support decision-making not only during the allocation of resources but also during the drawing of a digitization and publication strategy. The large number of consumers visiting the Wikipedia environment represents a portion of the large Internet information market potentially exploitable by heritage institutions. The limited presence of heritage materials is an opportunity loss, suggesting a challenge to understand the dynamics of the medium and adopt the platform. We illuminate the relationship between cultural consumption patterns online and onsite, by availing partly of new tools that enable analyses of consumer behaviour around the content provided by galleries, libraries, archives and museums (the so-called GLAMs).

In this paper, we focus on two specific questions: first, we explore the changes in consumption after digitization by comparing physical exhibition and publication in an open data environment. We analyze object mobility and visibility. Second, we try to explain the differences in preference of consumption by analyzing patterns of object selection. We find that the long tail that characterises onsite heritage consumption is also found in a digital environment but that preference has a different rationale. Where 3D objects are most popular in the physical exhibition hall, preference in the digital environment goes for 2D objects. This may be explained by the limitations in technology that constraint 3D manipulation. We further find a preference for quality environments including rich and diverse content (Wikipedia articles including multiple images from multiple sources). A disparity is found in preference for language where number of Wikipedia articles is higher in Indonesian while number of views is higher in English, suggesting further growth of information markets. We also find an exponential increase in consumption when moving into the digital realm, where the onsite environment is limited to a number of exhibits a year, the online environment allows unrestricted access 24/7 from across the (digital) globe representing an important complement to collection accessibility.

Results contribute to the empirical research on consumer behaviour and heritage consumption preference, particularly of hedonic products (content) available free of charge in the online market. We further contribute to the understanding of non-profit organizations, with focus on museums and on the Wikipedia environment. This paper is the first, to the best of our knowledge, to compare change in consumption preference of heritage content from an onsite to an online environment in an empirical framework using historic visitor data.

The remaining of the paper is organized as follows. We first define consumption (and use) of heritage, as found in the literature in section 2. We

then review the literature on the long tail and on consumption of hedonic products in section 3. In section 4 we review the literature on consumption of Wikipedia content across topics and languages. In section 5 we present the data, describe our method and present the quantitative analysis followed by a discussion in section 6. We end with conclusions in section 7.

## **2. Heritage consumption**

Consumption of museums onsite and online are fundamentally two different activities. Heritage collections have served to preserve and transfer information among generations, which are curated and presented onsite. Catalogues and research papers are further output originating from the exhibitions, which served to further disseminate information. Digital technology has provided new channels for content delivery to greater and broader audiences. Motivation for online heritage consumption has been linked to academic research, creative reuse, educational use, commemorative use, personal enjoyment, preservation, commercial use and other type of use (Borowiecki and Navarrete, 2015). Though motivation for viewing collections online has being found complementary to the onsite museum visit (Marty, 2007), the magnitude of the audience increase online points to a specific type of consumer: those with access to the Internet. Little else is known of online consumers of museum content who never visit museums onsite.

Visiting museums onsite has been associated with a number of socio-economic determinants, including greater personal capital (as level of education and art education of visitors and of visitors' parents), gender (female reporting higher number of visits), and distance to metropolitan areas (Ateca-Amestoy and Prieto-Rodriguez, 2013). The reasoning behind museum visits has been associated with willingness to pay (Frey and Meier, 2006), availability of substitute goods (Rouwendal and Botter, 2009), but also to fulfilling recreational activities (curiosity, spending free time) and satisfying an information need (learning something new, research) (Johnson and Thomas, 1998; Frey, 1998; Brida, et al., 2015).

Having hedonic or utilitarian motivation to visit museums does not have to be exclusive. Dual-purposed consumption has been identified in information systems that satisfy both an increase in productivity (utilitarian) while providing pleasure to consumers (hedonic) (Wu and Lu, 2013). Acceptance of new systems has further been linked to a combination of perceived usefulness and perceived ease of use, where the later weighs as stronger determinant (Van der Heijden, 2004). It can be thus expected that encyclopaedic articles that include rich content (e.g. images, sound) are more accessible and pleasant, in addition to being more complete (as illustrations serve as additional information).

Consumption is linked to the user's perception of value, making value, according to Throsby (2001:28), various and variable. Consumers can further add value to the option of becoming producers, option increasingly present in networked environments online. This can be referred to as *prosumption*, where the consumer supports the production process through contributing content and supporting the various activities (e.g. Amazon consumer reviews). Criticism has risen to the exploitation of free labour to benefit corporations, leading to an

alternative that highlights the open nature of production in the digital creative economy (e.g. open source software). This communal content creation process can be referred to as *produsage*, where the product is never completed but exists as continuous user-driven process (Bruns, 2013). Wikipedia is the exemplary case of an unfinished product that rates among the most consumed online. Consumption of heritage, hence, can be best referred to *use* of heritage content within the Wikipedia environment.

Comparing heritage consumption onsite and online has received much attention in the context of the music, film and book market (Vallbe, et al., 2015). Analysis has generally compared consumer choice of channel (e.g. legal or illegal, payment subscription) and carrier (e.g. CD, download, streaming). Only one analysis of film consumption identified a difference in type of content, where consumer preference for new releases remained both off and online, the greater consumption online represented titles not available offline (Bodo and Lakatos, 2012). This paper intends to fill this void by comparing the type of content being consumed in onsite and online environments.

### **3. Long tail and hedonic goods**

The so-called long tail has been used to refer to the growth of niche markets that expand beyond the traditional best sellers and include obscure products. Brynjolfsson et al. (2011) argue that the Internet supported a shift where traditionally 20% of the products generated 80% of the market to a long tail where a larger percentage of products are available to consumers. They argue that the long tail is made possible by a larger selection of products being made available online (which is not physically possible onsite) and by the availability of product information that facilitates selection of alternative products.

A study conducted by Peltier and Moreau (2012) showed that online sales present a long tail with lower head and a thicker tail than onsite sales, meaning that the best sellers onsite perform less well online while the low-seller books do better online (particularly the bottom 40%). However, top sellers onsite (99<sup>th</sup> quantile) present no difference and sales remain stable. The trend, which is first visible in the online market, increasingly can also be found in the onsite market, representing a shift of consumer behaviour: purchase decisions shift from best sellers to medium- or low-sellers. This is because the Internet facilitates distribution of content. "The long tail economy is thus based on sales strategies for niche content (old titles, specific segments, particular version), which previously had been largely ignored due to insufficient distribution level" (Benghozi and Benhamou, 2010:45).

Benghozi and Benhamou (2010) stress the role of the distribution channel to present information to facilitate (or hinder) selection and eventual consumption. Distributors need to update the information about the products to best fit the changing environment (what can be referred to as editorialization, or information curation) as well as to continuously improve the technology to allow selection of products. Selection is, according to Mackenzie Owen (2007), the key determinant in the market of information. From the supply side, producers select what to make available and how, while on the demand side, consumers select where to search and eventually what to consume. Consumers increasingly expect

rich environments that allow reuse, so that distributors that provide engagement are favoured.

Developing and improving rich engaging environments is costly. A research project that focused on audiovisual content identified excessively high costs related to the transcoding, storage, broadband, and legal fees required to provide content on-demand and one-on-one services. The popular content cannot cross subsidize the rest of the long tail so that government financing is required, argued Ongena et al. (2012). The authors characterized the audiovisual long tail based on the type of content and identified the head of the tail to contain live shows, followed by video-on-demand (including content on YouTube and DVD) and cultural heritage at the end of the tail. They state that the audiovisual long tail unceasingly grows as content ages and becomes part of a nation's cultural heritage.

Additional information remains key to increase use. A study on the selection pattern of information online found that consumers choose to click a query result more often when longer information is provided, whereas single URL results receive less clicks (Zhang and Kamps, 2010). Digital heritage collections, being cultural information goods, heavily rely on additional information that can take the form of branding, sampling, signalling, and alternative information markets to guide consumer choice (Clement et al., 2007). Consumption of products found in the long tail heavily relies on communities of critics and users that serve to share and to recommend information, so that as niche content becomes available within a community there is a greater chance of reuse. That is, web communities are influential in the distribution of consumption.

Potts et al. (2008) identified the choice of other consumers as determinant for production and consumption in the cultural industries. That is, "individual choices are dominated by information feedback over social networks rather than innate preferences and price signals" (p.170). This is, they argue, because of the novelty of content and technology that carry high uncertainty in the new market. In contrast, consumers with known preferences characterize mature markets. Potts et al., further propose the agent-network-enterprise model of analysis as key to understanding of social network markets, their dynamic values and role as innovation systems.

Empirical economic research has identified quality signals that support consumer choice. Quality indicators are often linked to rankings (e.g., Ginsburgh and Ours, 2003). In the case of books, reviews, prizes, bestseller lists and sample chapter publications have been identified to influence consumer choice (Ashworth et al., 2010). Sorensen (2007) found the New York Times bestseller list to slightly increase average book sales and Berger et al. (2010) found book reviews, both positive and negative, in the New York Times increased sales. Ponzo and Scoppa (2015) found that receiving the Strega Prize increased book sales. Clement et al. (2007) point to the key role of reviews, both positive and negative, and word-of-mouth to provide additional information on the book and thus reduce quality uncertainty. Chevalier and Mayzlin (2006) found word-of-mouth online to be influential in book sales at the main online bookstores. On the contrary, Walls (2010) found no relation between DVD sales of film content and

additional information signals (e.g. ranking lists) found in traditional film screenings. Rather, higher sales were directly related to the longevity of distribution.

Regarding quality of content, Clement et al. (2007) identify literary prizes to signal a highbrow content, which may be considered less attractive by lowbrow consumers. The same may be true online, though this is yet to be documented empirically. As museum websites and cultural portals (e.g. Europeana) reflect a highbrow profile, consumers seeking lowbrow content may prefer sites such as Wikipedia.

Though there is a substantial body of empirical research on the popularity, and long tail, of hedonic goods, little has been done on the heritage collections found in libraries, museums and archives. This is a particularly interesting case since consumption of heritage is generally provided at no cost for the consumer. We selected the Dutch NMVW with an ethnographic collection as case study to analyse heritage consumption in the market of information found online.

#### **4. Consumption patterns in Wikipedia**

Since its launch in 2001, Wikipedia has grown to become a key source of data online and feeds. The Wikipedia content, found in 35 million articles in close to 300 languages, is a rich source of data in the expanding Linked Open Data cloud. Projects like DBpedia or WikiData extract, structure and make the content available in a machine-readable format that facilitates reuse, such as Goggle's Knowledge Graph (Lehmann et al., 2015). The Wikimedia Foundation servers receive millions of requests daily to the Wikipedia content, accounting for 49.5% of requests, while the uploaded resources such as images and other multimedia resources receive 47% of requests, adding up to 96% of all traffic (Reinoso et al., 2012). Images, and multimedia, are an important part of the content delivered by Wikipedia.

An indicator of popularity to the Wikipedia site can be identified in the number of views, with more than 400 million unique visitors per month in May 2015.<sup>2</sup> In 2009, the average daily views to the English edition reached 108.5 million, accounting for 46.5% of all traffic (Reinoso et al., 2012). Article views generally present cycles, with lower traffic during the weekend and holiday periods and higher traffic during school exam periods, suggesting use within an educational setting particularly for pages like "biology" (Ratkiewicz et al., 2010b). Recent studies have tried to explain the consumption patterns of the various articles and languages. Lehmann et al. (2014) quantified the preference of producers reflected in the length of the article as well as the preference of consumers reflected in number of views. They focused on the biographical articles in the English Wikipedia, representing a popular topic on the largest edition, and found that biographies of historical figures, general history, places and culture were rated among the 500 most popular articles. They found most

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<sup>2</sup> For example, such as the Wikimedia Report Card (<https://outreach.wikimedia.org/wiki/GLAM/Resources/Tools>).

<sup>2</sup> <http://reportcard.wmflabs.org/>.



articles had stability in the reading pattern and that changes were related to a temporal event or due to an increase or decrease in the popularity of the person. Geography, history and politics are highly popular topics, which Spoerri (2007a) defines as prototypical encyclopaedia topics.<sup>3</sup> It can be expected that these topics contain images from heritage organizations as collections tend to document history, places and culture.

Reinoso et al. (2012) found differences in the behaviour per language, where views to Wikipedia pages in English correlated to the size of the articles, both being the largest in comparison with other languages. Whereas, Spanish Wikipedia has less articles but receives proportionately a much larger traffic and the highest rate of growth (edits to articles). Another study by Reinoso, Leon and Ortega-Valiente (2012) found differences in the type of content popularity of views and contributions per language. Articles about geography were most viewed among the German and French editions and most edits were found among German, French and Spanish editions. Articles about arts and humanities were most viewed in the Spanish and French edition while most edits were found in the French edition. Arts and entertainment articles were most viewed in the German, English and French editions while most edits were found in the Spanish edition. This suggests a different preference between the consumers and producers. It may also reflect a difference in the development of the Wikipedia editions in each language, though this has not been quantified.

Spoerri (2007b) identified the preference in topics based on views ranking to Wikipedia pages in English in the second part of 2006. He found the topic entertainment (including music, films, comics, performers, TV series, video games and books) to be the most popular topic within the top 100 Wikipedia pages viewed, followed by politics and history, geography and the arts. Surprisingly, no mention was made of annually recurring events such as Ramadan or Christmas, both accounting for an increase in traffic during June 2015 and December every year respectively. Ratkiewicz et al. (2010b) quantified popularity of content based on the number of hyperlinks found in an article. They found an increase in traffic to articles after their creation but found decay in the views thereafter. Popularity of page views has been found highly sensitive to *critical* events (Ratkiewicz, et al. 2010a) but also to the featuring of an article on the Wikipedia home page (Gyllstrom and Moens, 2012). Bursts on article views can be linked to “appropriately chosen queries on Google Trends, suggesting that these bursts are often driven by external events” (Ratkiewicz et al., 2010b:295). One such example is the beer poisoning taking place during a funeral in Mozambique in 2015.<sup>4</sup> Finding the *appropriate* query terms may be possible for articles related to critical events but can prove challenging when exploring the use of articles containing heritage collections content.

Number of page views, edits, users and collaborative rigor found in Wikipedia articles has been linked to the popularity and box success of films (Mayestyan, Yasseri and Kertesz, 2013). No research was found to date on the

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<sup>3</sup> Categories of Wikipedia pages generally include Entertainment, Politics, History, Geography, Sexuality, Science, Computers, Arts, Religion, Holidays, Current events, and Drugs as key topics (here in order of popularity as found by Spoerri, 2007b).

<sup>4</sup> [https://en.wikipedia.org/wiki/Mozambique\\_funeral\\_beer\\_poisoning](https://en.wikipedia.org/wiki/Mozambique_funeral_beer_poisoning).

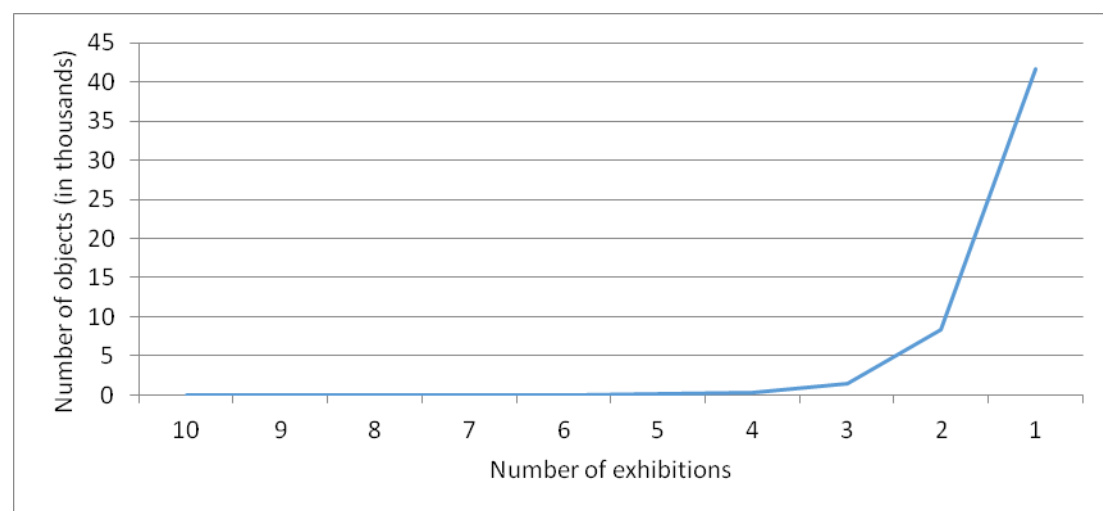
link between Wikipedia and heritage collections from galleries, libraries, archives and museums. We hope to contribute to this discussion by presenting our results on the use of Dutch ethnographic collections in the top seven Wikipedia languages.

## 5. Data and Analysis

### 5.1 Object accessibility

The Tropenmuseum is the ethnographic museum in Amsterdam that has recently joined two other ethnographic museums to form the *Nationaal Museum van Wereldculturen* (Dutch National Museum of World Cultures, or NMVW). Together they hold a collection of 600,000 objects.<sup>5</sup> The NMVW has a joint digital database, The Museum System (TMS), which serves to document activity around the objects, including exhibitions. A query was conducted in TMS to identify the objects that were exhibited more than once since 1927, the year when the museum opened in its current location. This resulted in a long tail (see Fig.1) where less than 2,000 objects were exhibited three times or more, 51,988 objects were exhibited at least once, and 547,700 objects were never exhibited.<sup>6</sup>

Figure 1. The long tail of physical exhibitions at the NMVW



<sup>5</sup> The Tropenmuseum has a collection of 369,000 pieces, of which 153,000 are part of the Material Culture (objects including visual collections like drawings, paintings and documents) and 216,000 are photographic material (including photographs, albums, slides and negatives). The Tropenmuseum joined the National Ethnographic Museum and the Africa Museum to form the NMVW in 2014. Together, they house 600,000 pieces, of which 367,000 are Material Culture and 230,000 are photographic material. The Tropenmuseum was further the first Dutch museum to collaborate with the Wikimedia Foundation in 2008.

<sup>6</sup> On a first view, object mobility may appear low at the Tropenmuseum. If we consider object mobility is driven by a wish to transfer knowledge, the Tropenmuseum has a unique international role facilitating knowledge transfer beyond the mere movement of objects. Museum staff have conducted numerous visits and training programs to support the use of best practice on collection management in Asia, Africa and the Americas. That is, a complete assessment of mobility ought to include a broader definition of the transfer of information.

Source: Own, database query on April 2015.

The collected data gives unique insights on the mobility of objects held in the collection by NMVW since 1920s. It is important to remember that we depend on data reported and kept in the institutional database during almost an entire century. There has been a lot of work done to document and digitize all information about the objects, though we find that the documentation practice has changed throughout the years. For instance, objects in the permanent exhibition hall have been documented as being in several exhibits, for periods lasting 6, 8, 14 or 23 years depending on the practice of the registrar. The NMVW holds 27 objects that have been in more than 6 temporary exhibitions, most of which are thus objects part of the permanent exhibit.<sup>7</sup>

In order to compare the long tail onsite and online, we selected a digital environment where collections were available for the general public, instead of the organizational website or related heritage portal. We selected Wikimedia as an alternative online environment because of its sustainable accessibility (15 year history) and potential future comparison with other collections. Data on access to objects is publically accessible and measured harmoniously across collections, which is not always the case when comparing institutional web statistics. The NMVW has published close to 50,000 objects in Wikimedia.<sup>8</sup> From the 27 objects exhibited more than six times, only nine were also published in Wikimedia. Those nine objects were included in 26 exhibits, were featured in 48 publications, and were included in 12 Wikipedia articles. These can be considered the most viewed objects physically. We selected the objects with Wikipedia articles in more than two languages, leaving a selection of four objects (see Figure 2 for thumbnails). We also selected one additional object due to its extreme popularity online, prison feet cuffs (object #5).

Figure 2. Top 5 most viewed objects onsite (thumbnails)

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<sup>7</sup> Querying the exhibited objects was preferred to objects on loan because of the interest to quantify the audience size. Objects on loan can be exhibited or displayed but can also be part of a research project, can be used as decoration, can be photographed, can be used for communication, can be restored, or can be in storage. Objects on loan to the office of the director do contribute to the increase in object visibility but visits are not quantified. The same is true for all other loan type activities. However, viewing the total loan activity shows a different pattern, where 28,003 objects were on loan more than once. Further, number of publications and access to the library were alternative collection access points not harmoniously quantified in the same time period.

<sup>8</sup> The Wikimedia Foundation began the GLAM-Wiki initiative (galleries, libraries, archives, museums with Wikipedia) to support the reuse of heritage collections within Wikipedia, the online encyclopaedia written by volunteers. There are currently over 194,000 images from heritage institutions available as open data in the Wikimedia repository (<http://en.wikipedia.org/wiki/Wikipedia:GLAM/About>). The NMVW selected objects to publish in Wikimedia based on a series of events: an exhibition (*Kunst van overleven*, 2009), a historical photo collections being digitized (East Indies and Indonesia, 2009) and a Wikimedia project (Wiki Africa, 2012).



Table 1. Overview of top popular objects onsite

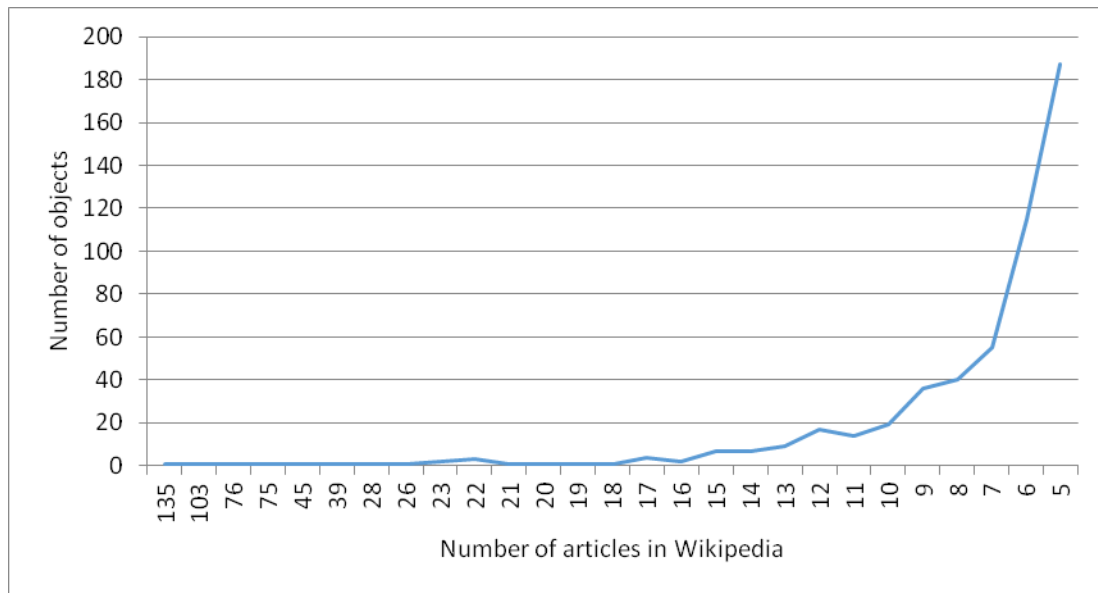
#	Main Wikipedia article	Type of object	Date of creation	Total # onsite exhibits	Total # Wiki articles	Total # Wiki languages
1	Kakawin Sutasoma	Gold piece	1295-1525	7	4	3
2	Pustaha	Wooden book	1852-1857	8	6	5
3	Singa	Magic horn	1852-1857	7	2	2
4	Gong	Hanging gong	1939	6	73	5
5	Slavery	Prison feet cuffs	1971	1	348	4

We then identified the most viewed objects online from a dataset kept by the Wikimedia Foundation covering the last five years. We used two tools developed by Magnus Manske for the Wikimedia Foundation. The *GLAMorous* tool counts the articles containing a certain image from the Commons category in all Wikimedia projects (e.g. Wikipedia, Wikibooks, Wikidata), and the *BaGLAMa2* tool counts the number of views in articles containing images in a Commons category.<sup>9</sup> Data is collected monthly, growing as Commons categories are added. The category *Images from the Tropenmuseum*<sup>10</sup> is among the longest datasets (started on March 2010) totalling 52 months, due to a few data collection gaps. From the close to 50,000 objects from the NMVW available in Wikimedia, 5,815 images are being used in at least one Wikipedia article and the most used object is present in 135 articles (see Fig. 2).

Figure 3. The long tail of digital articles in Wikipedia – NMVW collection

<sup>9</sup> The GLAMorous tools is available at <https://tools.wmflabs.org/glamtools/glamorous.php>, the BaGLAMa2 tool is available at <https://tools.wmflabs.org/glamtools/baglamma2/index.html>.

<sup>10</sup> The Tropenmuseum became the Dutch National Museum of World Culture on 1 April 2014. All data analysis involves the branch of the NMVW corresponding to the Tropenmuseum.



Source: own, GLAMorous tool query on April 2015.

Using the *GLAMorous* tool, we identified the objects that were used more than 23 times in Wikipedia, resulting in 17 objects. A query was then conducted to identify the presence of those objects in physical exhibitions resulting in 11 objects, as we were interested in measuring changes in access after digital publication. These 11 objects can be considered the most viewed objects online that were also seen onsite. From the most viewed objects online, we selected those that were found in Wikipedia articles in more than 2 languages resulting in a selection of 3 objects. We included two other objects due to their particular role in Wikipedia and therefore significance in our research, one being the only photograph available of a living bird now extinct, the Blue-faced rail, though the photograph was never exhibited (object #8), and a photograph of two men cutting a tree in Borneo, being one of the most popular NMVW images in the French Wikipedia representing history and geography (object #10). The description of top viewed objects online is presented in Table 2 with thumbnails in Figure 4.

Figure 4. Top 5 viewed objects online (thumbnails)



Table 2. Overview of top popular objects online

#	Main Wikipedia article	Type of object	Date of creation	Total # onsite	Total # Wiki art.	Total # Wiki lang.
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				exhibits		
6	Kris of Knaud	Photograph of Javanese Prince	1983	1	3	3
7	Women in Morocco	Photograph of Berber woman	1940-1960	1	7	5
8	Gymnocrex	Photograph of Blue-faced rail	1949	0	23	19
9	Piercing	Photograph of two Kenyan Dayaks	1920	1	12	8
10	History of Madagascar	Photograph of men cutting tree in Borneo	1900-1940	0	15	3

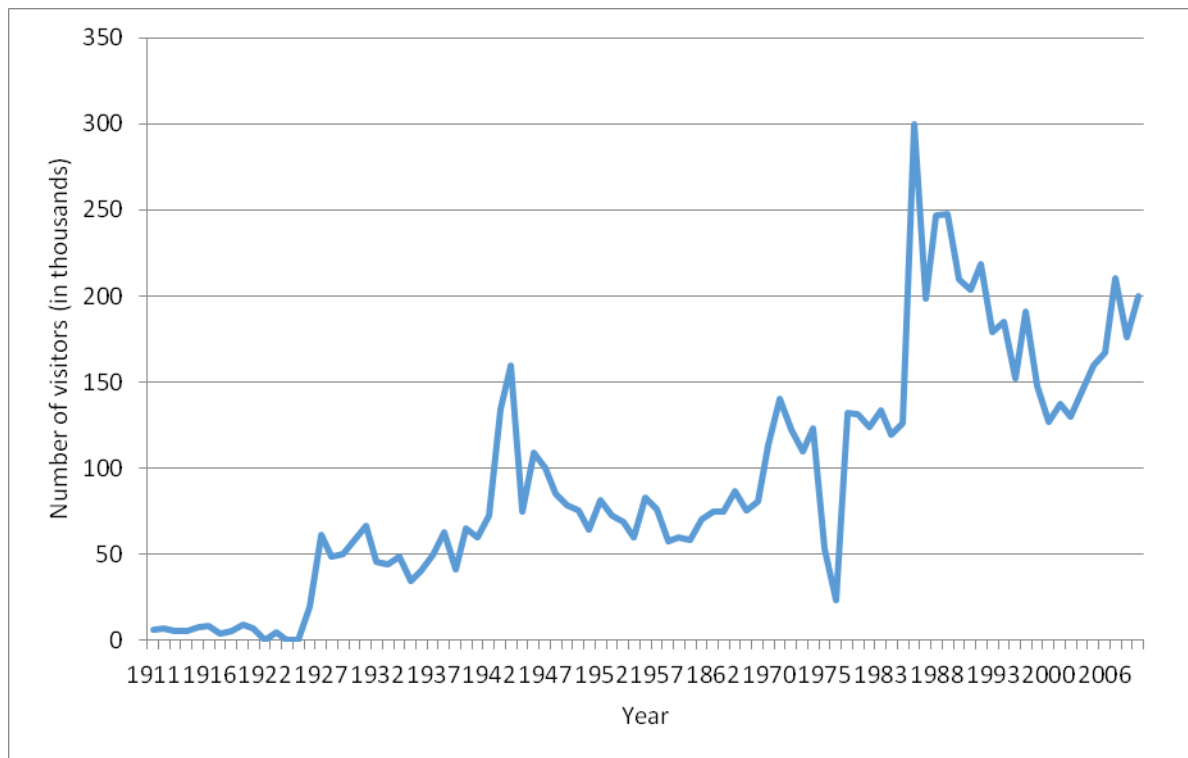
The final selection containing the 5 most viewed objects onsite (1-5) and online (6-10), from the 600,000 objects that were both exhibited onsite and were available online, is as follows: a gold engraving of Lord Sutasoma (object #1), an illuminated book known as Pustaka (#2), a decorated horn (#3), a hanging gong (#4), prison feet cuffs (#5), the photograph of a Javanese prince (#6), the photograph of a Berber woman (#7), a photograph of a Blue-face rail (gymnocrex) (#8), a photograph of two Kenyan Dayaks (#9), and a photograph of two men cutting a tree in Borneo (#10). All photographs are black and white. The objects selected represent five 3D objects and five 2D objects.

Using the *BaGLAMa2* tool, we gathered the data on numbers of views of articles containing the selected images in the most popular languages, these being English (EN), German (DE), French (FR), Indonesian (ID), Dutch (NL), Japanese (JA) and Spanish (SP). We then identified the articles on those languages containing the ten selected objects (see Table 1 and 2). Some of the articles contained several images, such as the Japanese Gamelan article containing 42 images, of which 14 were from the NMVW, or the French Berbers article containing 83 images, with only one image from the NMVW yet prominently located in the top right box (see Figure A.10 in annex). In total, we analyzed the views of 51 Wikipedia articles containing 95 objects from the NMVW (for an overview of all websites and objects followed see list C in annex).

## 5.2 Object visibility

We then reviewed the NMVW's archive to identify the number of people visiting the exhibits containing our selection of the most popular objects on view. We found two major visitor surveys that outlined the socioeconomic make-up of the visitor population in the 1950s, and the annual reports with visitor numbers. Figure 4 shows the visitor numbers from the NMVW from 1911 to 2010 based on the annual reports.

Figure 4. NMVW visitor numbers (1911-2010)



Source: own, Tropenmuseum annual reports.

From the graph, important events can be quickly identified in the museum's last 100-year history. First, the museum moved from Haarlem to open at its current location in Amsterdam in 1927 with a visible change in visitor numbers towards a general upright slope since. A peak can be found during the German occupation in 1944, to be followed by a drop after liberation in 1945, presumably as citizens were busy reconstructing the post-war country.<sup>11</sup> Gradually, visitor numbers grew to peak in 1971 with the *Orchids* exhibit. A significant drop is visible during 1976 when the museum was closed for renovation. The most popular year up to date was 1986, when the NMVW received 300,000 visitors for the exhibitions *Indigo* and *The Human Story*. A decline in visitor numbers reached its lowest in 2000 after which an upward slope can be observed. Accumulative, the NMVW has received 8.4 million visitors onsite during the last century.

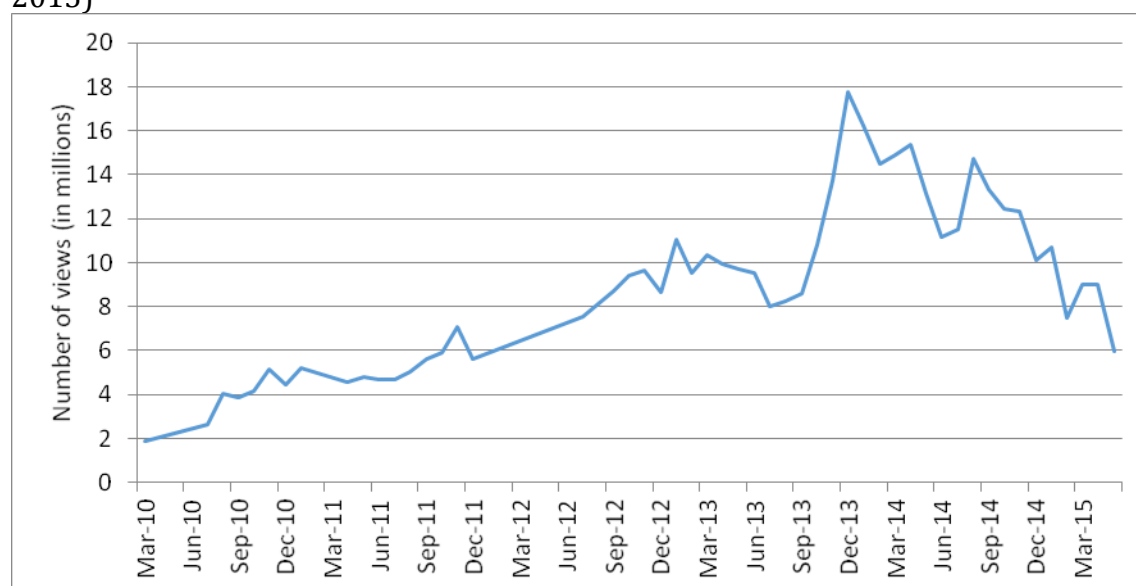
In comparison, we used the *BaGLAMa2* tool to identify the visitors online, represented by views of Wikipedia articles containing the NMVW collection. Figure 5 shows the number of views of all Wikipedia articles containing at least one image from the NMVW, starting since May 2010 (52 months). Accumulative, the NMVW has received 448.3 million visitors online in the past 5 years.<sup>12</sup>

<sup>11</sup> Data from the Statistics Netherland show that overall Dutch museum visits almost doubled after the Second World War, and after the Dutch Independence in 1952 museum visitor numbers more or less stabilized. The Tropenmuseum, together with the Rijksmuseum and the Stedelijkmuseum were the 3 most visited museums in Amsterdam, accounting for 85% of all visitors in 1950.

<sup>12</sup> In comparison, the Tropenmuseum collection website has received an average 50,000 page views per month in the last two years.



Figure 5. Wikipedia article views from category Images from the NMVW (March 2010-June 2015)



Source: *BaGLAMa2*.

The graph shows gaps in data collection from May 2010 until July 2012, after which data is collected monthly. Also, a general growing slope can be found with peak on December 2013, with 17.7 million views, followed by a downward slope. The reasoning behind the decline in visitor numbers on Wikipedia articles containing images from the NMVW may be related to the increase in mobile views, not captured by the *BaGLAMa2* tool, which can be observed in the general use of Wikipedia.<sup>13</sup> A similar declining trend can be seen in the English, German, Dutch, French and Spanish Wikipedia page views, as in most languages, though with an earlier peak on February 2013 to be followed by a downward slope. The downward slope observed in all languages, and in spite of the increase in mobile use, may also reflect Google's use of the Knowledge Graph, available on December 2012 in English, German, French and Spanish.<sup>14</sup> Since then, Google displays key information from Wikipedia into a box on the top right of the browser, presumably satisfying the user's questions who decreasingly clicks further into the Wikipedia article. The Indonesian Wikipedia does not present this trend, as Google's knowledge graph is not available in that language, and page views continue to increase instead.<sup>15</sup> The degree to which the downward slope is caused by the increase mobile use or by Google's Knowledge Graph is hard to quantify with the currently available dataset.

<sup>13</sup> The use of mobile allows for a more precise understanding of the sections viewed, as each section title can be clicked and expanded if desired. The Wikimedia Foundation is currently exploring tools to account for media view and for mobile access.

<sup>14</sup> See more on Google's Knowledge Graph on [https://en.wikipedia.org/wiki/Knowledge\\_Graph](https://en.wikipedia.org/wiki/Knowledge_Graph).

<sup>15</sup> For information on Wikipedia page views per language see [http://stats.wikimedia.org/EN/ReportCardTopWikis.htm#lang\\_fr](http://stats.wikimedia.org/EN/ReportCardTopWikis.htm#lang_fr).



Tables 3 and 4 show the overview of object visibility onsite and online of the selected sample (in the top 7 languages). Objects onsite received an average of 2,223 views per exhibit per year while objects online received 8,439 views per article per year.

Table 3. Object visibility onsite (100 years) and online (5 years) of top viewed objects onsite

#	Total # views onsite (exhibitions)	Total # exhibitions	Average views per exhibit	Total # views online (Wikipedia)	Total # Wikipedia articles	Average views per article
1	5020773	7	717253	116287	4	29072
2	5155688	8	644461	32353	6	5392
3	4984913	7	712130	24578	2	12289
4	152698	6	25450	589693	73	8078
5	0	1	0	1656051	348	4759

Source: Own, based on Tropenmuseum annual reports, *BaGLAMa2*.

Table 4. Object visibility onsite (100 years) and online (5 years) of top viewed objects online

#	Total # views onsite (exhibitions)	Total # exhibitions	Average views per exhibit	Total # views online (Wikipedia)	Total # Wikipedia articles	Average views per article
6	50850	1	50850	7965	3	2655
7	50850	1	50850	654984	7	93569
8	0	0	0	10991	23	478
9	50850	1	50850	2590326	12	215860
10	0	0	0	2288708	15	152581

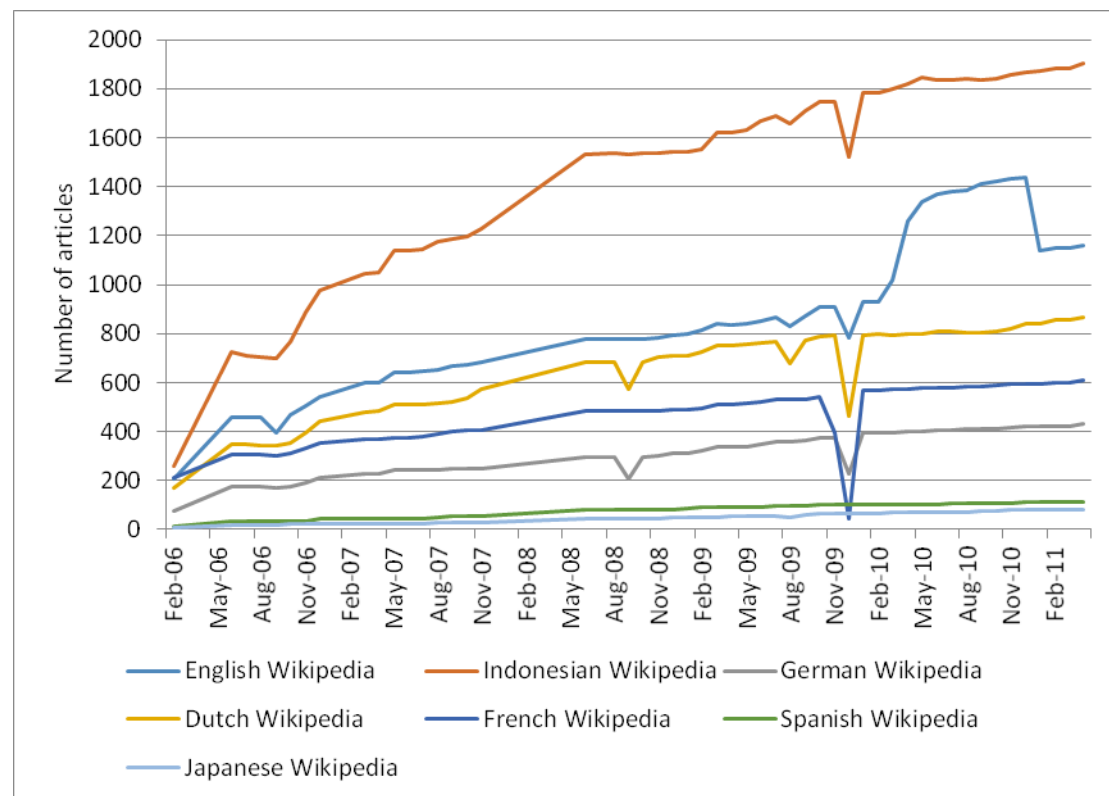
Source: Own, based on Tropenmuseum annual reports, *BaGLAMa2*.

### 5.3 Wikipedia context

Using the *BaGLAMa2* tool, we were able to identify the number of pages made containing Images from the NMVW and the number of views to each one of those pages for a period of 52 months (from May 2010 to June 2015). Figure 6 shows the number of pages made in the seven most popular languages (English, Indonesian, German, Dutch, French, Spanish and Japanese). From the graph, a general upright slope can be observed, with a technical gap in the dataset on selected months, including January 2014. The dramatic rise and drop observed on the English Wikipedia in March 2014 and at the start of 2015 respectively may reflect a change in the position of the images (e.g. added or removed from being used as navigation icon for a category) but this has not been identified. The general trend of views of the English version, excluding the 2014 peak, has an upward slope similar to the rest of the languages. As of June 2015, there were a total of 11,458 Wikipedia articles including Images of the NMVW, of which 5,187 (or 45%) are in the top seven languages where Indonesian is the most popular

Wikipedia language being edited (has more articles written), followed by English, Dutch, French, German, Spanish and Japanese.

Figure 6. Number of Wikipedia pages containing NMVW collection (top 7 languages)

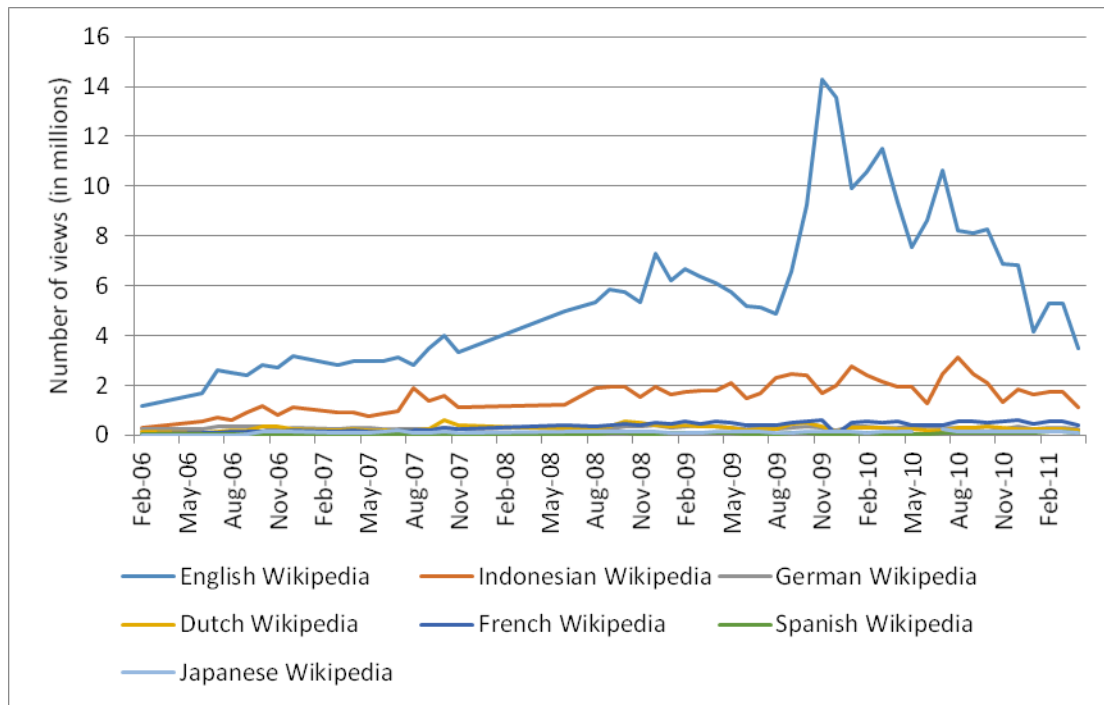


Source: BaGLAMa2.

Figure 7 shows the number of views per Wikipedia language in the same period. Noticeable is the visible preference towards the English Wikipedia articles, followed by Indonesian and all other languages. This may be explained by the size of the general English Wikipedia, being the largest edition (representing 51% views and 14% articles of the total Wikipedia), and by the prominent use of English in many countries across the globe. The peak on December 2013 may reflect a particular event, not identified in our dataset, as well as special features and programs, such as the collaboration with WikiAfrica.<sup>16</sup>

Figure 7. Wikipedia articles views containing NMVW collection (top 7 languages)

<sup>16</sup> [https://en.wikipedia.org/wiki/Wikipedia:WikiAfrica/Share\\_Your\\_Knowledge/Tropenmuseum](https://en.wikipedia.org/wiki/Wikipedia:WikiAfrica/Share_Your_Knowledge/Tropenmuseum).



Source: *BaGLAMa2*.

Data show a striking difference between the preference of editors, predominantly working at the Indonesian and English versions, and of readers, being significantly higher in English. Table 4 shows the use of Wikipedia in the top seven languages containing the NMVW collection. English remains by far the preferred version for global consumers.

Table 4. Wikipedia views and articles (total and NMVW) in June 2015

Language	Total articles (in millions)	% of total	NMVW articles	As % of NMVW	Total page views (in millions)	% of total	NMVW page views (in thousands)	As % of NMVW
English	4.9	14	1168	10	8266	51	4031947	62
German	1.8	5	431	4	1114	1	276339	4
Japanese	0.9	3	83	1	1326	8	120816	2
Spanish	1.1	3	115	1	1230	8	95850	1
French	1.6	5	614	5	776	5	413442	6
Dutch	1.8	5	866	8	190	1	211029	3
Indonesian	0.3	1	1910	17	115	1	928156	14
<b>Total</b>	<b>35.4</b>		<b>11458</b>		<b>16296</b>		<b>6517768</b>	

Source: adapted from <https://stats.wikimedia.org> and *BaGLAMa2*.

## 5.4 Correlates of object views

In order to understand the influencing factors increasing object views, we ran a simple linear regression with robust standard errors where object views was a function of the number and length of exhibits and online publication as well as of

characteristics found in Wikipedia articles, including language, number of images, and topic. We used the 95 objects from the NMVW found in 51 Wikipedia articles as data set, some objects being present in more than one article, totalling 140 observations. Table 5 shows the results. The first model is a simple OLS regression of total views (column 1) and average views per month (column 2). A second pair of models contains additionally type of object fixed effect (columns 3 and 4), so that objects in the same website in multiple languages or multiple NMVW objects in one single website were accounted for. The third model includes in addition type of object (2D, 3D, video and text) fixed effects (columns 5 and 6), in order to account for the unobservable fundamental differences across types of object.

Table 5. Object view as function of exhibits and inclusion in Wikipedia articles

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	OLS	OLS	OLS	OLS	OLS
VARIABLES	Total views	Average Views/mo	Total views	Average Views/mo	Total views	Average Views/mo
Total months online	4,279*** (1,559)		6,488*** (2,011)		9,642*** (2,222)	
Total images	25,138** (11,653)	1,071** (491.7)	23,120 (15,333)	1,052*** (344.1)	57,176*** (11,144)	2,937** (1,427)
NMVW images	-42,865** (20,486)	-1,718** (751.5)	-43,363 (31,325)	-1,810** (709.8)	-27,464** (12,601)	-2,037* (1,081)
Total months onsite	-26,625** (12,284)	-734.3** (369.5)	-5,546 (13,175)	-1,096 (820.3)	9,027 (25,325)	424.4 (480.2)
Crowdsourced	-227,302** (104,507)	-5,937* (3,050)	56,139 (34,910)	1,783 (1,699)	136,402** (63,355)	7,693* (4,454)
Language DE	405,883* (231,672)	22,881* (12,583)	255,539* (126,758)	23,956*** (2,242)	1.546e+06*** (401,085)	87,885** (41,917)
Language EN	607,538** (242,182)	24,551*** (9,102)	678,728* (360,164)	24,393*** (7,882)	1.646e+06*** (400,391)	73,626** (34,389)
Language ES	155,055 (243,188)	12,899 (11,283)	160,926 (141,747)	12,618*** (3,811)	1.556e+06*** (409,877)	76,551** (36,359)
Language FR	218,207 (324,295)	9,729 (12,411)	167,959 (280,788)	8,196 (8,931)	1.726e+06*** (426,058)	81,545** (38,751)
Language ID	491,018** (211,227)	19,058** (9,141)	548,627** (206,366)	19,250*** (4,132)	1.918e+06*** (482,599)	83,850** (40,023)
Language NL	421,684* (224,828)	18,678* (10,381)	349,274 (299,611)	17,135** (7,661)	1.796e+06*** (472,605)	80,811** (38,013)
Topic culture	24,894 (139,450)	-1,239 (5,328)	60,090 (110,084)	-1,283 (3,094)		
Topic geography	1.398e+06*** (387,462)	36,279*** (12,907)	1.219e+06** (429,342)	33,502*** (10,522)		
Topic history	229,137 (203,112)	1,265 (7,974)	-73,045 (185,234)	-3,403 (4,666)		
Topic sexuality	22,118	-4,987	46,804	-4,624		

	(182,646)	(7,601)	(129,582)	(3,436)		
Observations	140	140	131	131	131	131
R-squared	0.438	0.499	0.340	0.420	0.936	0.867
Type of object FE			Yes	Yes	Yes	Yes
Website FE					Yes	Yes

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Not surprisingly, the longer the object was on view online, the higher the coefficient for total views. The quality of the article appears to positively influence the number of views. We find that object view increases when more images are present in the article. We suggest that articles that have a larger number of images have had a longer time to develop and therefore have richer and more mature content, reflecting a higher quality. This is not the case, however, when there are many images from the NMVW museum as this results for most regressions in a significantly negative coefficient. The high number of images from one source may be linked to one editor preference for content rather than quality of the article and therefore works against the popularity of the article. Further, consumers tend to value diversity (Ranaivoson, 2012), perhaps as additional signal of a developed product, in this case to signal quality of the Wikipedia article. Onsite number of exhibitions is negatively related with the number of views. This may come as a surprise, but could be partly driven by the low variation and a high number of zeros in this explanatory variable. Furthermore, when we accounted for type of object, the negative coefficient disappears (though positive is not significant). This can be explained by the preference of 2D objects online, which have little visibility onsite as preference is given to 3D, and vice versa. Similarly, crowdsourcing is a variable that appears as significantly negative, until we account for object type, turning into a significant positive. All nine cases of crowdsourced images are of 3D objects, not surprising as 3D has higher prevalence onsite while lower presence online (thus the need for crowdsourcing efforts such as Wiki Loves Art).

Object view also responds to characteristics of the Wikipedia articles. English is, as expected, the strongest positive language variable, followed by Indonesian and Dutch. This is not surprising as English is the largest Wikipedia edition, the NMVW museum is located in the Netherlands and a large part of the NMVW collection originates from Indonesia. Another determinant is the topic of the article. We divided the articles analyzed based on topics defined by Spoerri (2007b) to include science (our baseline category), history, culture, sexuality and geography, the latter exhibiting the strongest correlation coefficient by far. All other topics resulted positive though not significant associations.

The results above presented are not without shortcomings. First of all, the manual intensity of data gathering required (in spite of the tools available to automate part of the process) prevented us from working with a larger sample, as this exercise included a first try at the methodology. Nevertheless, and even with the data gaps and with the small size sample, results are strongly consistent. Future analysis could include a larger data set as well as the collections of multiple institutions. Our sample further included a few objects

with exhibitions taking place at the moment of writing, for which onsite visitor numbers were not yet available. Still, given the wide longitudinal data collection period for visitors onsite, results are an indication of visibility for what have been the most popular objects in the last century. Further, the number of views online per object does not account for the positioning of the image within the article. From our sample, three objects are located at the top subject box, one object is located at the bottom category box (negligible), and other objects are located throughout the articles. We did not account for position as strong, mid or low visibility because we lacked the comparable evaluation data for the onsite exhibition, which present similar dynamics depending on object positioning. Nonetheless, the onsite comparison to the online environment gives a number of clues on the consumer preference for heritage online.

## 5.5 Use of Wikipedia

Using the *View history* tab in the Wikipedia pages, we were able to find the date when the images were placed in the article. Most objects were uploaded on November 2009 or July 2010 by Wikimedia volunteers. We also identified several images from the NMVW that once stood in the article but were taken out (see table C in annex for an overview of all tracked objects). Further qualitative research may want to follow these changes and position them within the language and cultural context.

We also found that objects were placed in the different language versions of the same article, such as the Blue-faced Rail or *Gymnocrex* found in English, Dutch, Japanese, and Spanish. Some objects were also found in considerably different type of articles within each language. For instance, the photograph of the two men from Kenya was found in articles about piercing in English, Spanish, French, Dutch and German but not Indonesian, which only positioned the image in an article about Dayaks, with translations in English, German and Dutch (no French or Spanish).

We ended up tracking the views of 51 articles containing a total of 95 images from NMVW. 50 were black and white photographs, 47 were objects and two were documents. Interesting to note is that three images found in the *Kris* articles were not made by museum staff but were made during a Wiki Loves Art event, where the museum invited the public to take photographs of the objects displayed to be later uploaded into the Wikimedia Commons, including one of the oldest in the collection dating from 1342 (these objects lacked an image otherwise). Another example of public co-creation is found in the photograph alteration of the prison feet cuffs, the background was manipulated and made transparent. The image has been relabelled though it still identifies the NMVW as source of the photograph. The *BaGLAMa2* is unable to document such changes and hence count number of views, though we were able to track visibility as the article contained another image of the NMVW. A photograph of a temple made by the NMVW (used in six articles) depicting a Borobudur temple showing an Indonesian outrigger boat, can also be found in 67 other pages in a version made by a Wikipedia user and uploaded two years earlier. Future research may want to identify multiple images of public places and their characteristics to better understand the dynamics in the Wikipedia environment, particularly in light of

the current discussions on the Freedom of Panorama and copyright of places in public view.

In the Wikipedia articles analyzed, we further identified works from three other Dutch heritage organizations, including a painting from the Rijksmuseum, a video from the Dutch Institute of Sound and Image, and a document from the National Archive. For a total overview of pages and tracked objects see Table C in annex.

## 6. Discussion

The long tail refers to the uneven popularity of goods in a given market, cultural and heritage content making the tail longer (Ongena et al., 2012). The content from the NMVW can benefit from tapping into niche markets in order to reach a wider audience. The online distribution channel has proven key to position the content into niche markets (Benghozi and Benhamou, 2010), which can clearly be confirmed when comparing the average monthly views to the NMVW collection in the last two years: 50,000 views at the museum website compared to over 11 million views at the various Wikipedia articles. The museum not only benefits from the infrastructure in place, which is being developed to grow mobile, but also from the community of users who keep the content updated, what Benghozi and Benhamou (2010) refer to as information curation, and who increase the chance of reuse (Zhang and Kamps, 2010). Clearly, all are benefits for the museum at a marginal cost. For heritage institutions it is to be expected that using existing social online networks to disseminate content is less costly than developing their own online environments, this in terms of the resources needed to develop and maintain the technical platform as well as the community of users, as proposed by Benghozi and Benhamou (2010) and by Ongena et al., (2012). Further, the Wikipedia environment offers multilingual layers of access to content where the same object may be used in similar articles in different languages. In turn, Wikipedia benefits from having a larger repository of images to illustrate articles and hence enrich their quality by increasing diversity, an important characteristic valued by consumers (Ranaivoson, 2012). Ideally, collaboration would involve more than *image dumping* but also include enrichment of articles by staff at heritage institutions. In this way, the museum would favour a *produsage* environment over a *prosumption* relation (Bruns, 2013).

When we analysed the access to the NMVW collection, from the perspective of object mobility, we found that over 90% of objects have not been exhibited in physical spaces while almost 2% of collections have been exhibited two to ten times. The highest number of exhibitions is ten. Object mobility in an online environment show a slight thicker and longer tail, where 12% of objects available in Wikimedia are being used in Wikipedia articles, where one object has been recorded to be in 135 different Wikipedia articles at one time. Whereas Brynjolfsson et al. (2011) found an onsite long tail where 20% of objects account for 80% of the market to become longer online, we find a similar trend though with a different relationship. The NMVW collections onsite present a more acute relationship: 10% of collections account for 100% of onsite activity (exhibitions) while 12% of collections are used online. It is important to note that the

collection available online accounts for only 1% of the physical collection. The expected longer and thicker online tail may grow as the entire collection of 600,000 objects is made available at the Wikimedia commons.

We also analyzed access to the collections from the perspective of object visibility. We found a significant increase in object views when collections were also made available with a CC-BY-SA license (Creative Commons license Attribution Share alike) in the Wikimedia repository. In the last century, 8.4 million people have visited the NMVW while 448,4 million people have visited Wikipedia pages containing images of the NMVW. That is an average of 94,500 visitors onsite per year increasing to 1.7 million visitors online per year. In comparison, the collection receives 600,000 annual views at the museum website. From the selected objects, the increase presented a different rate from 2,223 visitors per year onsite to 8,439 views per year online. A significant increase.

From the selection of most viewed objects onsite and online we can identify a clear difference in preference per object type: 3D is most popular in the onsite environment while the online environment prefers the use of 2D. This may be due to the strong tradition of exhibiting 3D objects in a physical setting (and using images as illustrations) and due to the limitations in the current available online technology to manipulate 3D content.<sup>17</sup> In contrast, images are the most viewed objects online.<sup>18</sup> It can be expected that acceptance and wide use of 3D digital imaging may still take some time.

In terms of the information signals to support selection of quality products, a striking difference is found between the onsite and the online environments. While experts (curators) select objects for physical exhibitions, it is the consumers (community of Wikipedia users) that select objects to be included in the Wikipedia articles. The object selection process by experts (curators, conservators and marketing staff in the museum) has been recently described by Lord and Piacente (2014) who identify a research or a market approach to exhibition design. Object selection by consumers in the online environment presents two distinct forms: first, objects can be selected to be incorporated in a Wikipedia article by editors (active selection). For editors, objects made available with descriptive metadata, such as the name of the person or the place, as well as images of higher resolution and originating from heritage institutions (expertise centres) form part of the information signals available. Second, object selection can result from article views by readers (passive selection). Consumers viewing the content (not editing) respond to the ranking mechanisms observed by Ginsburgh and Ours (2003), in the form of

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<sup>17</sup> Hologram technology may accelerate adoption of 3D imaging ([https://en.wikipedia.org/wiki/Hatsune\\_Miku](https://en.wikipedia.org/wiki/Hatsune_Miku)).

<sup>18</sup> Before 1980, the Tropenmuseum's photographic collection was not a part of the collection but of the reference library, and photographs were not valued as *real objects* but as illustration of objects and their use in context. Therefore, little is known of the photographs mobility and visibility before 2003, when the photo collection was registered in TMS (Beumer, 2008). Museums have worked with photographs since the late 1800s to illustrate 3D objects (e.g. paintings) yet it took many decades before photography was accepted as a medium in its own right. The first photography museum opened in the 1950s by the founder of Kodak ([https://en.wikipedia.org/wiki/George\\_Eastman\\_House](https://en.wikipedia.org/wiki/George_Eastman_House)).



featured images and articles, as well as to signals of quality, based on the length of the article and number of images from multiple sources. The high traffic to the Wikipedia site, in all languages across the globe, signal a general consumer preference based on the social recommendation network established by the Wikipedia community, as argued by Clement et al. (2007).

Consumer preference cannot be measured in terms of sales (price and quantity sold), as customary in empirical economic analysis, because heritage content in Wikipedia is available free of charge. For this, we have analysed the number of views to articles containing the NMVW collection. The expected school cycles are observed, with lower number of views during the summer and winter school recess, confirming results by Ratkiewicz et al. (2010b). We also find a discrepancy in the popularity of articles viewed, with a strong preference for the English version, and the articles edited, with a higher number of articles found in the Indonesian version. The disclosed difference in consumer activity (edits and views) is in line with the characterization of the overall Wikipedia traffic previously found by Reinoso et al. (2012).

## **7. Conclusions**

Heritage institutions are trusted with the collections of human memory and are in charge of ensuring its present and future access. Consumption of collections, however, present an unbalanced pattern of preference where a few objects are often viewed, while the majority of collections remain obscure; this has been referred to as the long tail. The Internet has provided a new platform to distribute content that promises to increase a more balanced access to collections.

We investigated the change in accessibility of collections after digitization of collections at the NMVW by looking at the mobility and visibility of objects onsite and online. We used data from exhibitions at the NMVW for the last century (onsite) and compared it to data from Wikimedia from the last five years (online). We found that object accessibility greatly increased when collections were published on the Wikimedia repository to be used in Wikipedia articles. Mobility grew from 10% of the collection being exhibited onsite to 12% of the collection being used in Wikipedia articles. Visibility grew exponentially from 94,500 visitors onsite per year to 1.7 million visitors online per year. We further took a sample of objects that were both exhibited onsite and were available online and selected the 5 most popular objects onsite and online. We found that visibility of those objects grew from an average of 2,000 views per exhibit per year to 8,000 views per Wikipedia article per year.

We also analyzed the changes in heritage consumption preference and found two distinct variants, perhaps due to the dynamics of object selection. From our sample of the ten most popular objects, we found that objects available for view at the museum exhibition halls were selected by experts (museum curators), presenting a strong preference for 3D objects. In contrast, object selection for Wikipedia articles was conducted by the Wikipedia community, presenting a strong preference for 2D objects. Consumption of Wikipedia articles further presented a preference for quality articles, including multiple images from different sources, about geography, and in the English language.

We can conclude that institutions interested in increasing accessibility to collections, by widening object mobility and visibility, benefit from publishing collections online in platforms such as Wikipedia. Museums can further benefit from active networked communities that keep content updated, advance technological development, and further support the greater access to collections, such as the one found in the Wikipedia community. In turn, Wikipedia benefits from a greater selection of images to enrich articles and hence gain greater popularity as a quality information source online.

Research in understanding digital heritage consumer preference is extremely limited. Future lines of research using the Wikipedia environment include a comparison between museum types (e.g. science, art, history), between heritage organizations (e.g. archives, libraries, museums), between object types (e.g. text, image, video), and between countries of origin (from collections and from viewers). Another line of research involves the analysis of costs related to participating in an open online environment, to identify the impact of the Wikipedian in Residence, for instance.

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### Images of objects in the Wikipedia articles (selected languages)

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**Toevorbek**

Ook is toevorbek een boek met gelamine recepten en toevorbeken. Een toevorbek [toevor**bek**] wordt ook wel een **wichelboek** [toevor**ch**wek] genoemd.

Een is bijvoorbeeld de Edda, de *Völsunga*, verschenen sprookjes-toevorbeken.

In pashaal staan geboden, sprokelen en magische formules, recepten en soms ook wachtoevorbeken genoemd. Het is een wichelboek met formules, recepten en wisschriften die worden toegevoegd door de eigen hand. De teksten in het wichelboek handhaven voor de kunst en het onderhoud van het leven (onder recepten van medicijnen), de kunst van het verrijken van het leven en de kunst van de wachtoevorbek. Het wichelboek is door de tijd heen veranderd en gewoonten.

In de middeleeuwen verschijnt er Europa vele groene, ze werden na de Tweede Wereldoorlog opnieuw gedrukt. Een voorbeeld is de *Stalut van Salomo*.

Toevorbeken kunnen ook als *Wachtoevorbek* voor (loze) sprookjes en sprookjes, waarbij de held of toevorbek een verhaal van toevorbek opvoert. Toevorbeken worden ook vaak beschreven als oude boeken, die de heide van de toevorbek hebben gekend van een oud of ver familielid. Ze bijvoorbeeld:

- Jan de toevorbek uit Vlaams-Brabant
- De toevorbek van Toevorbeken van Oost-Vlaanderen

Ook één van de verhalen in Het verhaal van Salomo en zijn broer (die vermeldingen uit Oud- en -en-nieuw) heeft als het "toevorbek".

**Abbeiden** [\[bewerken\]](#)

Toevorbek, gebakken door toevorbeken van de Tota Bata in Noord-Saksen, Nederland. Abbeiden worden voor vorkenrode, Latten, Toevorbeken.	Wichelboek met magische kalenders (beelden) voor het berekenen van gelijke en rechte dagen, Toevorbeken.	Handschrift op gelatte boordboek over toevorbeken, recepten en wachtoevorbeken, Toevorbeken.	Wichelboek met formules, recepten en wachtoevorbeken die worden toegevoegd door de toevorbek-geslacht, Toevorbeken.	Een pashaal met handomgange gewoontes boordboek met latten een toevorbek. Beschreven met latten schrift, Toevorbeken.	Handomgange gewoontes boordboek met latten schrift, Toevorbeken.	Wichelboek over een beschermmiddel tegen de boze geesten, Toevorbeken.

Wichelboek met formules, recepten en wachtoevorbeken (versierd met latten boord), Toevorbeken.

Balwees manuscript van 32 latten met aantekeningen over magie en wachtoevorbek van 32 latten. Figuren en geesten.

Lamshandschrift in het Javanees met aantekeningen over magie en afkeer van het leed.

Manuscript van 67 Javanees met aantekeningen over magie.

Wichelboek in Arabisch schrift met wachtoevorbeken voor het dagelijks leven.

**Zie ook** [\[bewerken\]](#)

- Egiptisch oudboek, het deel van de sprokelen was het voorzetten van de dode van middelbaar om te overleven en bescherming te bieden in het hiernamelijk.
- Toevorbek
- Toevorbek
- Toevorbek



## A.3 Pupuk German

Artikel Diskussion Lesen Bearbeiten Versionsgeschichte Suchen

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## Pupuk

**Pupuk** ist die Bezeichnung für einen medizinischen Zauberbrei, der von den Zauberpriestern (bei den Karo-Batak *Guru* genannt und bei den Toba-Batak: *Datu*) der Batak, einem Volk auf der indonesischen Insel Sumatra für rituelle Zwecke zubereitet und aufbewahrt wurde.<sup>[1]</sup>


Da im Volksglauben der Batak die Geister der Ahnen die Geschicke ihrer lebenden Verwandten entscheidend beeinflussen können, muss um deren Gunst in wiederkehrenden Zeremonien nachgefragt werden, damit sie Beistand erhalten. Wie auch bei anderen protomalaischen Stämmen, werden dazu Opfer erbracht und ausgekugelte Praktiken der Magie eingesetzt. Dieser wichtigen Aufgabe, den Kontakt zu den Seelen der Verstorbenen zu pflegen, kam der Zauberpriester nach. Zur Zeremonie gehörten dabei aufwändig geschnitzte, figurgeschmückte Zauberstäbe (*Tunggal panaluari*), das Zauber- und Orakelbuch (*Pustaha*) sowie der magische Solarkalender (*Porhalaan*), welcher half, die komplizierten astrologischen Zusammenhänge zu deuten.

Der eingesetzte Zauberbrei soll auch aus Menschenfleisch (dem Gehirn und anderen Körperteilen eines geraubten und ermordeten Menschen im Kindesalter) zubereitet worden sein,<sup>[2]</sup> um beim Zauberpriester die notwendigen magischen Kräfte für dessen Krankheitsbeschwörungen und Fruchtbarkeitsriten zu entfalten. Ähnlich verschiedenen Ethnien in Westneuguinea, kannten die Batak rituellen Kannibalismus. Ebenso wie diese waren sie von kriegerischer Natur und kultivierten Kämpfe zwischen den einzelnen Dörfern. Außerdem praktizierten sie die Kopfjagd.<sup>[3]</sup>


Bei den Toba-Batak (Name leitet sich vom gleichnamigen Tobasee ab) wurde Pupuk vornehmlich in den hohlen Hörnern von Wasserbüffeln, die mit einem Holzstöpsel verschlossen wurden, aufbewahrt. Wasserbüffelhörner (*naga barsarang*)<sup>[4]</sup> wurden üblicherweise auch bei den Mandailing-Batak verwendet. Die Hörner wurden mit den verschiedenartigsten Stöpseln verschlossen. Die meisten wiesen einen mächtigen Singa-Kopf auf, manche auch eine ganze Singa-Büste, auf deren Rücken - einer Prozession ähnlich - mehrere Menschen einem *datu* folgten.




Großes Pupuk-Behältnis <sup>67</sup>



Ein keramisches Perminaken <sup>67</sup>



Ein Zauberpriester der Batak mit überhängendem Schultersack und mit einem Zeremonienstab ausgerüstet, bringt Pupuk zum Einsatz <sup>67</sup>



Ein naga barsarang mit alinga-Kopf <sup>67</sup>

## A.4 Hanging gong English (box at bottom of article)

https://en.wikipedia.org/wiki/Gamelan

- Balinese and Javanese Gamelan
- 'Gender barung pelong' from the Gamelan orchestra built in 1926-27 by Pontjopangrawit, at the National Museum Australia, Canberra
- Listening to Balinese Gamelan: A Beginners' Guide from Connexions accessed 20/01/2012
- Gamelan in Bali, Indonesia
- A curated collection of Javanese and Balinese music – by John Noise Manis

Gamelan		[hide]										
<b>Theory</b>	Pelog · Slendro · Pathet · Cengkok · Seleh · Sekaran · Imbal & kotekan · Gatra · Colotomy (Gendhing structures) · Irama · Gamelan notation											
<b>Genres &amp; ensembles</b>	Gamelan angklung · Gamelan bebonangan · Gamelan beleganjur · Gamelan degung · Gamelan gadhon · Gamelan gambang · Gamelan gender wayang · Gamelan gong gede · Gamelan gong kebyar · Gamelan jegog · Gamelan joged bumbung · Gamelan munggang · Gamelan salendro · Gamelan sekaten · Gamelan selunding · Gamelan semar pegulingan · Gamelan siteran · Gamelan surakarta											
<b>Musicians</b>	Evan Ziporyn · Gamelan Sekar Jaya · Gamelan Son of Lion · I Nyoman Windha · K. P. H. Notopropo · List of U.S. gamelan ensembles · Michael Tenzer											
<b>Instruments</b>	<table> <tr> <td><b>Colotomic or phrase-making</b></td> <td>Kempyang · Ketuk · Kempul · Kenong · Gong</td> </tr> <tr> <td><b>Balungan or melody</b></td> <td>Saron peking · Saron panerus · Saron barung · Saron demung · Sientem · Sientho · Bonang barung · Bonang panerus · Bonang panembung</td> </tr> <tr> <td><b>Panerusan or elaborating</b></td> <td>Gender · Gender panerus · Gambang · Sitar · Celempung · Suling · Rebab</td> </tr> <tr> <td><b>Unpitched</b></td> <td>Kendang gending · Kendang ciblon · Kendang ketipung · Bedug · Kecek · Kemanak · Kepyak</td> </tr> <tr> <td><b>Vocals and clapping</b></td> <td>Gerongan · Sindenan · Pesinden · Alok · Senggakan · Keplik</td> </tr> </table>		<b>Colotomic or phrase-making</b>	Kempyang · Ketuk · Kempul · Kenong · Gong	<b>Balungan or melody</b>	Saron peking · Saron panerus · Saron barung · Saron demung · Sientem · Sientho · Bonang barung · Bonang panerus · Bonang panembung	<b>Panerusan or elaborating</b>	Gender · Gender panerus · Gambang · Sitar · Celempung · Suling · Rebab	<b>Unpitched</b>	Kendang gending · Kendang ciblon · Kendang ketipung · Bedug · Kecek · Kemanak · Kepyak	<b>Vocals and clapping</b>	Gerongan · Sindenan · Pesinden · Alok · Senggakan · Keplik
<b>Colotomic or phrase-making</b>	Kempyang · Ketuk · Kempul · Kenong · Gong											
<b>Balungan or melody</b>	Saron peking · Saron panerus · Saron barung · Saron demung · Sientem · Sientho · Bonang barung · Bonang panerus · Bonang panembung											
<b>Panerusan or elaborating</b>	Gender · Gender panerus · Gambang · Sitar · Celempung · Suling · Rebab											
<b>Unpitched</b>	Kendang gending · Kendang ciblon · Kendang ketipung · Bedug · Kecek · Kemanak · Kepyak											
<b>Vocals and clapping</b>	Gerongan · Sindenan · Pesinden · Alok · Senggakan · Keplik											

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## A.5 Slavery English (box on top of article)



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**Slavery**

From Wikipedia, the free encyclopedia

*"Slave" and "Slaves" redirect here. For a 1969 film, see [Slaves \(film\)](#). For other uses, see [Slave \(disambiguation\)](#).*



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**Slavery** is a legal or economic system in which principles of [property law](#) can apply to humans so that people can be treated as [property](#),<sup>[1]</sup> and can be owned, bought and sold accordingly, and cannot withdraw unilaterally from the arrangement. While a person is a slave, the owner is entitled to the slave's labour, without any [remuneration](#). The rights and protection of the slave may be regulated by laws and customs in a particular time and place, and a person may become a slave from the time of their capture, purchase or birth. Today, slavery is unlawful in all countries, but a person may still be described as a slave if he or she is forced to work for another person without an ability on their part to unilaterally terminate the arrangement. The present form of the slave trade is commonly referred to as [human trafficking](#).

Slavery existed before written history and in many [cultures](#).<sup>[2]</sup> It was once institutionally recognized by most societies, but has now been outlawed in [all countries](#),<sup>[3][4]</sup> the last being Mauritania in 2007. However, it continues through such practices as [debt bondage](#), [serfdom](#), [domestic servants](#) kept in captivity, [certain adoptions](#) in which children are forced to work as slaves, [child soldiers](#), [human trafficking](#) and [forced marriage](#).<sup>[5]</sup> Accordingly, there are still an estimated 20 million to 36 million slaves worldwide.<sup>[6][7][8]</sup>

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V · T · E

## A.6 Kris of Knaud English



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**Kris of Knaud**

From Wikipedia, the free encyclopedia

The **Kris of Knaud**, also known as the **Keris of Knaud** or **Knaud's Kris**, is the oldest known *kris* surviving in the world.<sup>[1]</sup> Given to Charles Knaud, a Dutch physician, by Paku Alam V in the 19th century, the kris is on display at the Tropenmuseum, Royal Tropical Institute, Amsterdam.

**Contents** [\[hide\]](#)

- [1 The history of the kris](#)
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**The history of the kris** [\[edit\]](#)

The kris bears the date of 1264 (which corresponds to 1342 AD) in its iron blade. Scientists suspect that due to its special features the kris is even older, but was decorated during the heyday of the [Majapahit](#) kingdom to celebrate an important event.<sup>[2]</sup> The kris bears scenes from the *Ramayana* on an unusual thin copper layer which partially covers it.

Charles Knaud (Batavia 1840 - Amsterdam 1897) was a Dutch physician and *dukun* (shaman) at the court of Yogyakarta. Knaud, who had studied *Javanese mysticism*, treated and cured the son of Paku Alam V (1878-1900), ruler of the hereditary *Pakualaman* principality in the *Sultanate of Yogyakarta*, of what the ruler believed to be "guna guna" (black magic). For saving his son's life, Paku Alam V, who was also a *freemason* at the Mataram lodge of Jogja,<sup>[3]</sup> granted him a prestigious heirloom, a kris.<sup>[4]</sup> It was the oldest kris in the prince's collection.<sup>[5]</sup>

From 1903, the kris was believed to be lost, but it remained in the possession of Knaud's family. Long after Knaud's death, during *World War II*, his family buried the Keris in their garden to protect it during the Japanese occupation. During the *Indonesian National Revolution*, they took it to the Netherlands, where it was safeguarded in the family's bank safe.<sup>[6]</sup>

In the 19th century, a plaster cast and a photograph of the kris were kept in the holdings of the Bataviaasch Museum of Arts and Archaeology. In 1920, N.J. Krom dedicated a full page to the kris in *Hindoe-Javaansche Kunst*. David van Duuren a curator with the Royal Tropical Institute happened to ask Knaud's descendant, Kurht Knaud, if he was aware of the rare kris that had once been in his family's possession and was surprised to discover it still was. Kurht Knaud loaned the keris to the Royal Tropical Institute, K.I.T., Amsterdam, where it has been displayed since February 2003.<sup>[6]</sup>




**Paku Alam VIII**, successor to Paku Alam V.

## A.7 Berbers French (box on top of article)





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✎ Editar enlaces

## Cuidados [editar]

Los primeros problemas médicos relacionados con este piercing, son durante la perforación misma y durante el periodo de cicatrización. Dependiendo de la localización del piercing, puede existir una gran pérdida de **sangre**, tanto durante el procedimiento de colocar la joya, como el periodo inicial de sanación. La medición del largo de la joya, es usualmente hecha por el portador en privado con su pene erecto, mientras que la perforación misma, es hecha en el pene flácido. El largo periodo de sanación, requiere que el usuario tenga una abstención sexual por un tiempo extenso, que puede ser entre seis semanas y seis meses.

Es posible que este piercing lesione o dañe los **dientes** y el **paladar** a quien le practique **sexo oral**.

Si este piercing es transuretral, puede desviar el flujo de la **orina**, obligando al portador a sentarse o tomar otras medidas durante la micción. El piercing dejará una **fistula**, que puede permanecer incluso si se retira la joya y se permite que el tejido sane.

## Historia y cultura [editar]

Este piercing es anterior al contacto entre los europeos y las tribus en (entre otras) las **Filipinas**<sup>?</sup> y **Borneo** (Etnia **dayak**). En algunas culturas, tener un ampallang puede ser un pre-requisito para el matrimonio. Según lo declarado por **Thomas Cavendish**, esta práctica en las Filipinas fue inventada por las mujeres, para prevenir la sodomía (La versión filipina incluía un agujón).<sup>?</sup>

En la sociedad contemporánea, se ha vuelto popular junto con otros piercing en los genitales, utilizados dentro de la comunidad **BDSM** gay, previo del establecimiento de la industria de las modificaciones corporales, a finales de la **década de 1980** y principios de la **década de 1990**. Debido a su legítimo origen **primitivo**, este piercing está intrínsecamente relacionado con el **movimiento primitivo moderno**.

De acuerdo a una **leyenda urbana**, debido a que este piercing penetra el **cuerpo cavernoso**, el portador puede morir por desangramiento. Esto no es verdad, aunque este piercing si debe penetrar el cuerpo cavernosos, y si puede sangrar más intensamente que otras perforaciones, tanto inicialmente como durante el primer periodo de sanación, el portador no se desangra hasta morir.



Doa hombres Dayak Kenyah, usando un ampallang en sus penes. Foto perteneciente a la colección de KITLV.

Wikimedia Commons alberga contenido multimedia sobre Ampallang.

- Piercing
- spadravys
- Príncipe Alberto (piercing genital)

## A.10 History of Madagascar French

Mavazakoon

Nederlands

Português

Pycckий

Ypallineasa

Varezo

Yorùbá

✎ Modificar los links

## antimokagalea

en primera instancia para los nativos "genéricos"; los primeros navegantes austronésicos son quienes traen la palabra para malgache sous le nom des **Ntalo** (de "tau-tau" "ses hommes premiers", "ses ancêtres", de "tau-homme" et "tau-tau", "premier", "origine", "début" en proto-Malayo-Polynésien (MP)<sup>[?]</sup>). Il est également probable que ces anciens se nommaient eux-mêmes les **Vahoaka** (de "va-waka" "peuple/ceux des canoës" ou "peuple de la mer", de "waka-canoë" à balancier) en proto-MP), terme signifiant simplement aujourd'hui le "peuple" en malgache.

Ce peuple original (vahoaka ntalo en malgache) austronésien que l'on peut appeler les "protomalgaches" (du grec protos - "premier") est à l'origine :

- de la langue malgache commune à toute l'île : une langue issue du **proto-austronésien**, appartenant à la branche **proto-malayo-polynésienne** (proto-MP) et à la sous-branche **proto-Sud-Est banto** (proto-SEB) qui partage des mêmes bases anciennes communes avec les langues **dayak** actuelles du groupe banto de **Borneo Sud** telles que le *mal'nyen*, *daun dayak*, *daun malang*, *daun wlu* et *paku* actuels<sup>[?]</sup>
- de tout le fonds culturel malgache commun à tous les austronésiens, en passant par la Nouvelle-Zélande : coutumes anciennes (comme celle d'ensevelir les défunts dans une pirogue au fond de la mer ou d'un lac), agriculture ancienne (la culture du taro-saonjo, de la banane, de la noix de coco et de la canne à sucre), l'architecture traditionnelle (maison végétale à base centrée sur pilotis), la musique (les instruments comme la conque marine *andohy*, le tambour de cérémonie *hazidrahy*, le xylophone *atratratana*, la flûte *sodina* ou encore la *valiha*) et la danse (notamment la "danse des oiseaux" que l'on retrouve à la fois au centre et dans le Sud)<sup>[?]</sup>.

Au tout début du peuplement appelée "période pelomalgache", les **Ntalo** se subdivisent, selon leurs choix de subsistance en deux grands groupes : les **Vazimba** (de "ba-va-yimba" "ceux de la forêt", de "yimba" "forêt" en proto Sud-Est banto, aujourd'hui *barimba* ou *orang rimba* en malais)<sup>[?]</sup> qui s'installent "comme leur nom l'indique" dans les forêts de l'intérieur et les **Vezo** (de "ba/va/be/ve-jau", "ceux de la côte" en proto-malayo-javanais, aujourd'hui *veju* en bugia et *bajau* en malais, bajo en javanais<sup>[?]</sup>) qui restent sur la côte Ouest.

Le qualificatif **Vazimba** désignait donc à l'origine les **Ntalo** chasseurs et/ou cueilleurs qui décidèrent de s'installer "dans la forêt", notamment dans les forêts des hauts plateaux centraux de la grande île et celles de la côte Est et Sud-Est<sup>[?]</sup>, tandis que les **Vezo** étaient les **Ntalo** pêcheurs qui restèrent sur les côtes de l'Ouest et du Sud (probablement les côtes du premier débarquement)<sup>[?]</sup>.

Quant à la cause de la venue de ces austronésiens, l'histoire de l'océan Indien du début du premier millénaire de notre ère est encore très mal connue. On peut seulement supposer que l'île de Madagascar joua un rôle important dans le commerce, notamment celui des **épices g** et du bois rare, entre l'**Asie du Sud-Est** et le **Moyen-Orient**, directement ou via les côtes africaines.

Un point fait encore débat parmi la communauté des chercheurs : le mot **vazimba** étant un qualificatif austronésien désignant les "habitants de la forêt" d'une manière générale (y compris les Austronésiens eux-mêmes qui s'installèrent dans les forêts), il n'est pas à exclure que d'autres **hominides** **vazimba** aborigènes -de type *homme de Florès* par exemple- aient habité dans les forêts de Madagascar des dizaines «voire des centaines» de milliers d'années avant l'arrivée des **vazimba** austronésiens. Quelque-uns ont peut-être encore existé à l'arrivée des **vahoaka** **ntalo** austronésiens au premier millénaire avant notre ère. Ceci pourrait expliquer le mythe des "petits hommes/sains primaires de la forêt" que les **vahoaka** **ntalo** austronésiens - ancêtre de la majorité des Malgaches actuels - auraient rencontré et assimilé (ou peut-être décimé) à leur arrivée. Les preuves irréfutables sous-tendant ce mythe manquent encore aujourd'hui. Seules l'archéologie et la génétique pourraient les apporter. Il n'est, enfin, pas à exclure non plus que le mythe des "vazimba-petits hommes/sains" ait été emmené par les Austronésiens à partir des îles de la Sonde où ils habitaient auparavant, auquel cas ce mythe pourrait effectivement concerner les hominides de type *Florès* ou *Négrito* (*orang asli* en malais). Ces derniers, de petite taille, ont en effet habité les forêts des îles de la Sonde bien avant l'arrivée des Austronésiens et y sont considérés comme étant les peuples aborigènes. On sait, par exemple, que le mythe de l'ogre "Trimo be -mangeur d'enfant" est un conte emmené par les Austronésiens et parle en fait du tigre (de "Tjirimu", "tigre" en proto-MP) qui habite les forêts des îles de la Sonde. Le mythe des "petits nains vazimba" pourrait avoir subi un voyage similaire.


### Les immigrations de la fin du premier millénaire et du début du second : naissance des clans néo-Vezo et néo-Vazimba (ca 700 - 1500)

modifier


modifier le code

Dès le milieu du premier millénaire jusqu'à 1500 environ, les **Vazimba** de l'intérieur autant que les **Vezo** des côtes accueillent de nouveaux clans immigrants, connus en malgache par les noms d'origine austronésienne *Vahiny* ou *Vazaha* ("va-hiny" "les visiteurs", "va-zaha" "ceux qui visitent/cherchent") : moyen-orientaux (Perses Shirazi, Arabes Omanites, Juifs originaux), afro-africains (Bantus) et orientaux (Indiens Gujarati, Malais, Javanais, Bugis) qui s'intégrèrent et s'accrurent à la société Vezo et Vazimba.


Le commerce des esclaves par les Malayo-javanais, les Perses Shirazi et les Arabes Omari à la fin du premier millénaire fut sans doute une des causes de ces nouvelles immigrations. On trouve en effet, d'une part, mention de la présence d'esclaves africains (*zanj* ou *zang*) offerts par des **Javanais** à la cour de **Chine** au début du **ix<sup>e</sup> siècle**, et de l'autre, Madagascar même commença à connaître une africanisation de sa population. Cette présence africaine dans l'île ne semble cependant devenir massive qu'à partir du **ix<sup>e</sup> siècle**, sous l'impulsion du commerce musulman arabo-pers.



Vazimba - "ceux de la forêt" en proto-banto du Sud-Est (ancienne langue austronésienne dont la branche moderne dite "banto oriental" regroupe le malgache et des langues parlées par des peuples Dayak du bord du fleuve Banto à Borneo (Kalamantan du Sud) : mal'nyen, daun dayak, daun malang, daun wlu et paku) (Photo Wikimedia : Dayak de Borneo)



Vezo - "Ceux des côtes" en proto-malayo javanais (Photo Wikimedia : Arman Maroonian - "Hommes sur pirogue à balancier en direction de la côte" huile sur toile, ca. 1908)



Village austronésien avec des sur pilotis (de "levu" "maisons" en proto-austronésien qui a donné en malgache an-dreny "à la maison") : tous les villages des ntalo vazimba et vezo de Madagascar étaient probablement similaires au premier millénaire. On retrouve d'ailleurs encore ce modèle aujourd'hui sur toutes les côtes de la grande île et dans les zones intérieures reculées (forêts, etc.)

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## Annex B. Full list of objects analyzed

Selected objects		Main article	Type of object	Date of creation	First uploaded	First article	in
Selected objects	1	Kakawin Sutasoma	Gold piece	1295-1525	Jul-10	Oct-10	
	2	Pustaha	Wooden book	1852-1857	Jul-10	Dec-10	
	3	Singa	Magic horn	1852-1857	Jul-10	Jan-11	
	4	Gong	Hanging gong	1939	Jul-10	Dec-11	
	5	Slavery	Prison feet cuffs	1971	Jul-12	Aug-12	
	6	Kris of Knaud	Photograph of Javanese Prince	1983	Nov-09	Mar-11	
	7	Women in Morocco	Photograph of Berber woman	1940-1960	Jul-12	Feb-13	
	8	Gymnocrex	Photograph of Blue-faced rail	1949	Nov-09	Dec-09	
	9	Piercing	Photograph of two Kenyan Dayaks	1920	Nov-09	Dec-09	
	10	History of Madagascar	Photograph of men cutting tree in Borneo	1900-1940	Nov-09	Oct-11	
Additional objects	11	Dayak people	photograph of house interior	1900-1930	Nov-09	Feb-10	
	12	Dayak people	photograph of Dayak	1920	Nov-09	Feb-15	
	13	Dayak people	photograph of longhouses	1894	Nov-09	Feb-15	
	14	Dayak people	photograph of Dayak performers	1898-1900	Nov-09	Feb-15	
	15	Dayak people	photograph of Dayak chief	1900-1940	Nov-09	Mar-10	
	16	Dayak people	photograph of Islamic Dayaks	1920	Nov-09	Feb-15	
	17	Dayak people	photograph of Dayak headhunters	1927	Nov-09	Mar-10	
	18	Dayak people	photograph of head of Dayaks in Borneo	1890-1920	Nov-09	Sep-11	
	19	Dayak people	photograph of child in front of grave	1900-1940	Nov-09	Aug-11	
	20	Principalities	photograph of Dutch governor and Sultan of Jakarta	1930-1940	Nov-09	Mar-11	
	21	Principalities	photograph of Islamic procession	1921-1926	Nov-09	Mar-11	
	22	Keris	photograph of man preparing pipe	1943	Nov-09	Feb-11	
	23	Keris	Oldest known kris	1342	Aug-09	Sep-09	
	24	Keris	kirs handle of god figure	1954	Aug-09	Oct-09	
	25	Keris	polychrome figure holding kris	1915	Jul-10	Nov-10	
	26	Keris	sitting Chinese figure	1915	Jul-10	Nov-10	
	27	Keris	Kris handle Garuda	1940	Jul-10	Nov-10	
	28	Keris	kris handle made of fossil	1940	Jul-10	Nov-10	
	29	Keris	kris handle with curved Garuda	1940	Jul-10	Nov-10	
	30	Keris	Kris with head of demon with diamond eyes	1883	Jul-10	Nov-10	
	31	Keris	kris handle curved	1940	Jul-10	Nov-10	
	32	Keris	Kris handle with flowers	1940	Jul-10	Nov-10	
	33	Keris	Kris Naga	1887	Jul-10	Nov-10	
	34	Keris	photograph of barong dancer	1910-1920	Nov-09	Jul-10	
	35	Keris	Kris handle with curved demon		Aug-09	Nov-10	
	36	Keris	Keris sheath	1924	Jul-10	Mar-14	
	37	Keris	photograph of kris dancers	1971	Nov-09	Feb-10	
	38	Keris	photograph of kris and kris holder	1910-1930	Nov-09	Nov-10	
	39	Keris	kris and scabbard	26-Feb-09	Apr-09	Sep-10	
	40	Slavery	Maroons art clay piece	1963	Sep-09	Oct-09	
	41	Slavery	neck cuff	1959	Sep-09	Oct-09	
	42	Slavery	slave stamp	1877	Sep-09	Oct-09	
	43	Slavery	slave release letter	1860	Sep-09	Oct-09	
	44	Slavery	video of emancipation in Paramaribo news	1963	Apr-11	Nov-11	
	45	Slavery	Dutch slavery emancipation law document	1862	Jan-14	Jan-14	
	46	History of Slavery	lithograph of slave funeral	1840-1850	Nov-09	Nov-09	
	47	History of Slavery	Jan Mostaert: Portrait of an African Man	1525-1530	Jul-09	Dec-12	
	48	History of Suriname	Dirk Valkenburg: plantation	1707	Apr-08	Feb-15	
	49	History of Suriname	photograph of Maroon woman	1946	Sep-09	Nov-09	
	50	History of Suriname	photograph of Brokopondo dam	1963	Sep-09	Nov-09	

51	Gamelan	Bonang	1928	Jul-10	Jul-14
52	Gamelan	Gender	1928	Jul-10	Jul-14
53	Gamelan	Gong	1928	Jul-10	Jul-14
54	Gamelan	Kendang	1928	Jul-10	Jul-14
55	Gamelan	Kenong	1928	Jul-10	Jul-14
56	Gamelan	Peking	1928	Jul-10	Jul-14
57	Gamelan	Saron	1928	Jul-10	Jul-14
58	Gamelan	Slenthem	1928	Jul-10	Jul-14
59	Gamelan	photograph of gamelan orchestra	1870-1891	Nov-09	Jan-01
60	Gamelan	photograph of young angluk players	1918	Nov-09	Jul-10
61	Gamelan	photograph of gamelan orchestra	1910-1930	Nov-09	Jul-10
62	Gamelan	photograph of rebab player	1945-1955	Nov-09	Jul-10
63	Gamelan	photograph of Balinese dancer Mario	1940	Nov-09	Jul-10
64	Gamelan	photograph of man playing ketuk	1966	Nov-09	Jul-10
65	Gamelan		1971	Nov-09	Jul-10
66	Gamelan	photograph of two Balinese dancers	1929	Dec-09	Jul-10
67	Gamelan	photograph of Balinese dancer with gold crown	1952	Nov-09	Jul-10
68	Gamelan	photograph of gamelan orchestra in Bali	1920-1921	Nov-09	Jul-10
69	Gamelan	photograph of gamelan orchestra and dancers	1952	Nov-09	Jul-10
70	Gamelan	photograph of gamelan orchestra and dancers	1952	Nov-09	Jul-10
71	Gamelan	photograph of gamelan orchestra and kebyar dance	1952	Nov-09	Jul-10
72	Gamelan	photograph of two gamelan players	1900-1940	Nov-09	Jul-10
73	Gamelan	photograph of gamelan orchestra	1949	Nov-09	Jul-10
74	Angklung	photograph of school children in angklung orchestra	1971	Nov-09	Mar-10
75	Book of spells	photograph of Batak datu with book of spells	1900-1940	Nov-09	Jul-10
76	Book of spells	Magic text in Balinese	1969	Jul-10	Apr-15
77	Book of spells	Book of spells decorated	1947	Jul-10	Apr-15
78	Book of spells	Book of spells with protection against angry spirits	1921	Jul-10	Apr-15
79	Book of spells	Priest book	2001	Jul-10	Apr-15
80	Book of spells	Priest book	2001	Jul-10	Apr-15
80	Book of spells	Book of spells with recipes used by priests	1921	Jul-10	Apr-15
82	Book of spells	Book with protection against black magic	1935	Jul-10	Apr-15
83	Book of spells	Book of spells with calendar for good and bad days	1892	Jul-10	Apr-15
84	Book of spells	Balinese manuscript about magic	1944	Jul-10	Apr-15
85	Book of spells	Text about magic in Javan	1938	Jul-10	Apr-15
86	Book of spells	Manuscript with 67 pages of magic text	1920	Jul-10	Apr-15
87	Book of spells	Spell book in Arabic to predict life	1931	Jul-10	Apr-15
88	Pustaka	photograph of datu house	1900-1930	Nov-09	Aug-11
89	Pustaka	photograph of Batak priest	1939	Nov-09	Aug-11
90	Pupuk	jar for magical potions	1921	Jul-10	Aug-11
91	Pupuk	medicine jar	1914	Jul-10	Jan-11
92	Berber jewelry	Necklace with 5 Fatima hands	1940-1960	Jul-10	Feb-15
93	Berber jewelry	Two silver pins	1900-1925	Jul-10	Feb-15
94	Berber jewelry	silver earring with corals	1971	Jul-10	Feb-15
95	Berber jewelry	silver anklet	1969	Jul-10	Feb-15
96	Madagascar	engraving of village	1893	Jul-10	Oct-11
97	Madagascar	lithograph of Dayak sarcophagus	1887	Jul-10	Oct-11
98	Madagascar	photograph of Borobudur temple relief	1960-1980	Nov-09	Jun-13