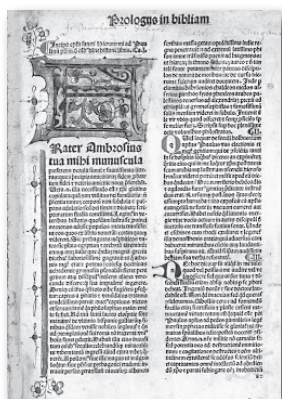


The AGU Digital Access Project: Digitizing and Sharing Rare Editions

Thomas W. DABBS
Wataru SASAKAWA
Naomi TONOOKA

The History and Objectives of the Project



The AGU Digital Access project was started as a digital humanities initiative in 2018 under the auspices of a generous grant from AOYA-MA VISION and in collaboration with the Folger Shakespeare Library in Washington, D.C., a world-class institution. The AGU Digital Access Project's primary goal was and still is to digitize select editions from Aoyama Gakuin's small, but significant religious rare book holdings and make these books viewable over the Internet through the Folger's website and on their state-of-the-art Miranda Digital Asset Platform.¹ These religious editions, primarily rare Bibles, have heretofore been little known beyond a small circle of in-

terested members of the Aoyama Gakuin community, but they are of high importance to the institution, particularly because they speak to the religious and education values that led to the foundation of Aoyama Gakuin in the 19th century.

The project was conceived of and has been co-directed by the authors of this research report, both of whom are professors in the Department of English and American Literature, School of Letters. Professor Naomi Tonooka, also of the Department of English and American Literature, has served as the project's Senior Advisor throughout, and during her term as university vice president she played a key role in the conception of the project and in helping to gain support and understanding for the project's mission. Throughout, we have been fortunate to find highly efficient part-time workers who have done

¹ A technical explanation of the Miranda platform can be found at <https://www.folger.edu/online-resources/digital-asset-platform>. The platform is named after the Shakespeare heroine in *The Tempest*, Miranda, who speaks the line "O brave new world, that has such people in it."

splendid work from the beginning of this project to the current time.²

Though the AOYAMA VISION grant expired at the end of FY2020, this project was sustained in FY2021 in part with institutional support from the host institute for this publication, the Aoyama Gakuin University Institute of the Humanities (青山学院大学文学部附置人文科学研究所). We were also supported in part by the Japan Society for the Promotion of Science, or JSPS. Both agencies helped us to continue with digital development and project outreach during a difficult period. The project's funding transition from AOYAMA VISION and partly to funding from the Institute of the Humanities in FY2021. For the reader to reach a full understanding of the research accomplishments that were made during FY2021 and the project's goals for the immediate future, it is necessary to start with an overall description of the history of the project and then examine the leading-edge technology being used, thus giving a full view of the challenges that we have faced and the accomplishments we have made.

It should be noted here that it was initially confusing to some why a Shakespeare library would be interested in displaying Aoyama Gakuin's religious holdings, and specifically rare Bibles. The answer to this question is immediately obvious to anyone who has undertaken the serious study of Shakespeare. The Shakespearean period is inextricably intermixed with the extraordinary and unsettling culture changes that took place during the English Reformation period, and, having kept a long-term eye toward the entirety of the English cultural period before, during, and after Shakespeare, and as such the Folger also holds major rare editions of early modern (16th and 17th century) religious print editions, including many early printed biblical works. Indeed scholars of the Reformation and early modern Christianity who are not specifically tied to Shakespeare research view the Folger as a top and sometimes primary destination for archival research in religious studies.



Along with the primary goal to share Aoyama Gakuin's religious holdings with the Folger and thus the world online, the project also planned from the beginning (1) to develop a website and (2) to hold yearly events. The AGU Digital Access Project website was formed in 2018 in both Japanese and English and has remained online with constant upgrades since that time.³ As more open-source

² For more information about the project team and its history, see: <https://agudigitalprojecten.blogspot.com/2018/10/project-team.html>.

³ The URL for the AGU Digital Access Project website, in Japanese is <https://agudigitalproject.blogspot.com>. The URL for the English version of the site is <https://agudigitalprojecten.blogspot.com>.



encoding becomes available we may be able to eventually to build an image viewer to display rare editions and other material from Aoyama Gakuin's holdings, but such an undertaking at this point remains beyond our reach. As for events, the project directors organized one pre-pandemic public event in October of 2019. It featured a public presentation by Professor Takami Matsuda of Keio University on the topic of digital development in the humanities. The event also featured a talk by Professor Emeritus Hiroko Sano of AGU on the history of Aoyama Gakuin's religious foundation and on the acquisition of the rare Bibles held by the AGU library.⁴ Along with each of these originally-stated objectives, the project has also sought ultimately to forward an operational model for how small collections may be digitized and staged on the Internet, even given the fact that small collections do not have the vast resources that major libraries and museums have in terms of funding and dedicated IT specialists.

The project endured a major setback, of course, due to the Covid-19 pandemic, but even so the project team has managed to make significant steps toward fulfilling its mission. Editions have been digitized and staged at the Folger and are currently available for viewing on the Miranda Digital Asset Platform. Also the AGU Digital Access Project website has been maintained and upgraded. Though it has been impossible to hold events on campus during this period, the project pivoted to become part of a podcast series hosted by Thomas Dabbs that was launched in the fall of 2020 and at this writing remains in continuation. Among a diverse list of speakers from a variety of backgrounds, the series also focuses on talks with digital humanities specialists in order to forward detailed descriptions of their own digital humanities projects and also features talks with experts in early modern religion. The podcast is entitled *Speaking of Shakespeare* and is in part funded primarily by the JSPS but also in part by funded by the Institute of the Humanities. The keyword *Shakespeare* in the title of course draws those many who are interested in Shakespeare but also those in cultural areas well beyond Shakespeare and thus increases the scope of reception among scholars and the general public.

⁴ For more information on this event, see the AGU Digital Access Project website page at: <https://agudigitalprojecten.blogspot.com/2019/04/events.html>

Technical Review: Digital Access and IIF Standards

Before reporting specifically on the FY2021 efforts of the AGU Digital Access Project, we must first describe the current state of digital access technology with regard to library science and specifically with regard to rare books and print collections. Without this description it will be difficult for a reader outside this project to understand precisely how it has continued to move forward, even during the pandemic period. In library science, curators of historically significant, rare, and thus valuable material have always been faced with two problems concerning public access to their holdings. The first involves the ability to provide on-site access to some or all of a given institution's holdings to approved researchers and members of the public without risking damage to material in the collection (or, indeed, theft of material). The second problem is that major libraries and museums are in places far away from where many people who wish to use or see these collections live and are thus limited by geography in their outreach efforts. From the beginnings of what quickly became widespread access to the Internet in the 1990's, major research institutions, libraries, and museums began to solve both of these problems in part by developing ways to make digital images of at least some of their various works and collections and make these images available for viewing on the Internet. Over the past 30 years the Internet technology and software built around such outreach efforts has improved exponentially in conjunction with large advancements in hardware capability. In library science and with regard to rare print material in special collections, a given library's effort to provide what is now termed *digital access* points to the effort, first to make and stage (or provide open online access to) sharable images of material, and second to make these images freely available for users to view and examine and share remotely on the Internet.

IIF Imaging

There have been and still are many software programs that have been used to display images on the Internet, but these programs are often not compatible with each other. Roughly a decade ago it became clear to web developers in library science and museum curation at major global institutions that a standard for making and displaying images had to be set to assure interoperability between image viewers across a vast range of websites and repositories. The *image viewer* (as opposed to just to a static image on the Internet) is software that allows viewing and manipulation of images on a web page (e.g. flipping through and zooming in on pages and images from a book). The current gold standard for image creation and image viewer display is the International Image Interoperability Framework, or IIF (pronounced "triple-eye-eff"). By meeting IIF-compliance standards, images are made interoperable across IIF-compliant image viewers, meaning that images or collections of

images can be shared and combined across web site image viewers with the same functionality. Rare books, for instance, to be IIIF compliant, are to be meticulously scanned or photographed page by page using high quality scanning technology, and as such producing high-resolution images that adapt freely to being reshaped and examined closely. Images of rare print material are now most commonly created as high-resolution Tag Image File Format (TIFF) or created as the most advanced and highly compressed version of the Joint Photographic Experts Group or JPEG, or JPEG 2000. To be compliant these images also must be created with no less than 600 Dots Per Inch or 600 DPI to be IIIF compliant. Images made in compliance with these standards can be zoomed in on for close inspection without distortion, and they are layered or built in such a way that they can be shared in their original format from one IIIF-compliant server to another. These images, when delivered through IIIF-compliant platforms, retain their original quality from site to site and, among other features, can be shared and captured from multiple sources with options for size and scale, for comparative viewing and alternative grouping, and for consistency in indexing and displaying bibliographic data. IIIF-compliant software works as displayed in the below diagram, which will be explained in detail by examining each step along the course shown here from the delivery of images to the viewing of images, beginning with an explanation of the function of IIIF-compliant APIs:

Delivery

Viewing

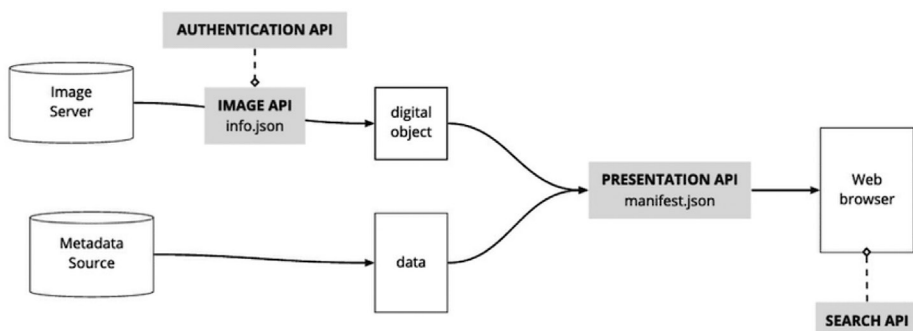


Image courtesy of International Image Interoperability Framework(IIIF) at <https://iiif.io/get-started/how-iiif-works/>

APIs and IIIF-Image Servers

API stands for Application Program Interface and is most simply put an interface that allows two (or more) computer software programs to exchange information. When a person uses a mobile phone application to check the train system in Tokyo for the best route from point A to point B, that person is using an API, a software that runs behind the scenes that allows other software programs to communicate with each other, after which the results are displayed on the user's mobile phone. The term *API* can also be used for the specifications for building an API (and indeed this usage can cause

confusion when trying to explain APIs to those who are not computer software programmers). IIIF compliance is a simple concept when it comes to the specification for making images through scanning or photography. However, IIIF compliance becomes far more complex when speaking about how to make a computer server holding images IIIF compliant though the course of images drawn from a server to a web browser. This compliance requires the building of APIs based on IIIF API specifications (which are also called APIs).

This said about APIs, once IIIF-compliant images are scanned and uploaded to a server, then IIIF-compliant APIs are inserted to communicated between computers on the path that images and other data cross between the Image Server and a web browser as shown in this image above:

Image Server → Image API (communicates fast and deep zoom capability for high resolution images) → the digital image (e.g., a single page or grouping of pages from rare books) → Presentation API (to define how images are framed in viewers → web browser (with IIIF-compliant viewers).

IIIF Viewers and Metadata

There are many IIIF-compliant IIIF image viewers and some that are purposed built for large collections. Here two examples are given, the Miranda platform, custom built by the Folger Libraries digital access team and Mirador, a popular open-source viewer freely available online. A IIIF-viewing platform, communicating as it does through APIs provide the users the ability to navigate easily through pages and be able to zoom in to those pages to examine print and images without distortion.

Also the platform is supplemented by the detailed placement of each image for search and navigation, and in the case of a printed edition, its full bibliographical description and location(s). These supplemental descriptions in programing language are the metadata, which is combined with the image and in whole or in part displayed on the web browser. As the above image shows, the metadata is communicated to the web browser with a IIIF-compliant “Presentation API” in a parallel path in this order:

Metadata source → dataset (e.g., rare book bibliographical information) → Presentation API (which merges metadata with images) → web browser.

The images, single or in a group (e.g., the individual pages of a full rare edition) are gathered into a



Manifest, or the list of images and metadata bundled into a script (say, JSON JavaScript) to be presented on a web browser. Other APIs can be and usually are added to increase the options and ease of usability. Important to this process would be a search API built into the web browser. Also IIIF-compliant manifests can be combined and mixed from various image servers.

Digital Beginnings: Collaborations with the Folger and within Aoyama Gakuin

It was beyond our capacity at AGU to build a IIIF-compliant platform with custom-built or even out-of-the box software programs that sort image requests and displays with metadata. Though with more resources such a platform could be built locally at Aoyama Gakuin, the size of the initial holdings we were focused on called to question why we would need to develop state-of-the-art software architecture for what would be a relatively small amount of content. In other words, why construct a ten-story building to house an operation that would only require one room? (In the future, however, should Aoyama Gakuin wish to present its much larger Japanese language holdings from a IIIF-compliant image viewer, the much more substantial size of the whole collection might merit the development of this type of software locally.) But the small number of rare book holdings in English or Western languages were what initially inspired the need for AGU to work in collaboration with IT specialists at a larger institution, in this case the Digital Access Team at the Folger, with their newly built and IIIF-compliant viewing platform, with their highly trained and dedicated staff, and with their experience in creating digital displays from their own vast collections.

In 2018, the agreement was sealed with the Folger for our team to produce IIIF-compliant TIFF images of full editions from our rare book holdings and place them on the Folger's server. The AOYAMA VISION grant provided funding among other things to hire part-time student workers to scan images from selected editions. Importantly, these workers are students in our School of Letters (文学部), who respect for the history of our rare holdings, who fully understand the value of old editions, and who undergo training in the Folger guidelines for handling delicate rare material.

The image scanning process also required a second collaboration with the Aoyama Gakuin Shiryō Center (青山学院資料センター) and the Shiryō Center office staff in charge of the care and curation of the rare material in their holdings. The staff at the center were enormously helpful, both in their complete



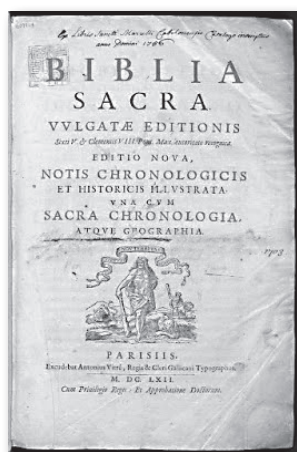
support for the project and their willingness to allow us a workspace and help us program and operate the high-end scanner that already had been in use by the Center staff for other projects and exhibitions.

Early Accomplishments

The project team began scanning on location in the Shiryō Center (located in the Majima Building, Shibuya Campus) in the second half of FY2018 through FY2019. However, our scanning efforts were abruptly ended by the Covid-19 pandemic in March of 2020, thus making the project unable to reach all the goals set for the final year of the AOYAMA VISION grant. Before the pandemic, however, project teams members scanned three full rare editions, and though this does not seem like much on the surface these three editions together required the making of over 1500 high resolution images that had to be meticulously cropped and indexed.

Editions

The first edition to be digitized was the *Biblia Latina* or *Bible Hieronymi* (1478) from the Aoyama Archive (on the first page). It is a fine example preserved from the limited number of extant books printed during the incunabula period of printed books in the second half of the 15th century.



This folio edition was printed in Venice in Latin, with double-column print and with 53 lines per column. The book has 454 leaves. The second edition was *Biblia Sacra* (1662), a Latin bible and a full 17th-century edition printed in Paris by Antonius Vitre and sanctioned by the king. The *Biblia Sacra* is an enormous print edition, 44 centimeters in size and over 500 pages (requiring 1,176 images to be scanned). It was printed in Latin and like many of the works of its time, has

imperfections in its pagination. The edition also includes maps. The third edition was John Milton's *The History of Britain* (1670). This history by the famous British poet is also a full edition. According to Milton scholar, Graham Parry, "Its origins are complicated and unclear. Milton



probably began writing it in 1647, just before the outbreak of the Second Civil War.” Parry also holds that, “the motivating principle behind the book may have been to assess the temper of the British people through the ages and to examine how they had responded to the challenges offered by political liberty at critical periods during their history.”⁵ With these accomplishments under the AOYAMA VISION grant, as mentioned above, the project team developed a dynamic website and staged a significant public event before the pandemic.

Setbacks and Adjustments

The project suffered some early setbacks due to unforeseen idiosyncrasies in the making of images. We have since adopted the use of a more user-friendly scanner, but our initial scanner was difficult to set to the non-standard sized editions from times long past. The sum result is that, in the making of high-definition TIFF images, it was necessary to scan beyond the borders of each edition. As such, each individual image had to be carefully cropped. For reasons that are still unclear, the images, after being cropped and saved, suddenly became much more enormous in size than they already were (in terms of megabytes), and far larger than necessary for IIIF compliance, and as a result they became extremely difficult to load and store. This outcome required another effort, page-by-page, or image-by-image, to reduce the image files to their original size. The cropping and resizing of images nearly tripled the amount of time that was estimated to digitize these editions.

Of course the most major setback to the initial project was the outbreak of Covid-19, leading either to the closure or partial closure of the university for the entirety of FY2020. It was impossible during this period to continue scanning future editions in the close quarters of the workroom at the Shiryō Center. Also the Folger staff had to reset their workflow while working from remote locations, so there was a delay in uploading the three editions that were becoming available to the Folger’s Miranda platform.

During FY 2020, however, the project team was able to finish indexing and preparing the metadata for *Biblia Latina* and then work with the Folger staff to stage to display the edition in its entirety. The edition was uploaded to the Folger’s Miranda platform and the edition is available for viewing either from the project website (in a non-compliant embed view) or on the Folger’s IIIF-compliant viewer.⁶ As mentioned above, in collaboration with a JSPS grant to conduct digital

⁵ “History of Britain, The”, in *The Milton Encyclopedia*, ed. by Thomas N. Corns (New Haven: Yale UP, 2012), pp. 151-52 (p. 151).

⁶ See the *Biblia Latina* page on the AGU Digital Access Project website that includes a view of the edition and a link to the edition on the Folger’s Miranda viewing platform at <https://agudigitalprojecten.blogspot.com/2019/01/biblia-latina-1478-aoyama-archive.html>.

humanities symposia, the *Speaking of Shakespeare* podcast was initiated in FY2020 to bring in experts in digital humanities and early modern religion and culture before, during, and after Shakespeare. This podcast series stands as a viable alternative to holding in-person events on campus at AGU.

FY 2021 Review of Research

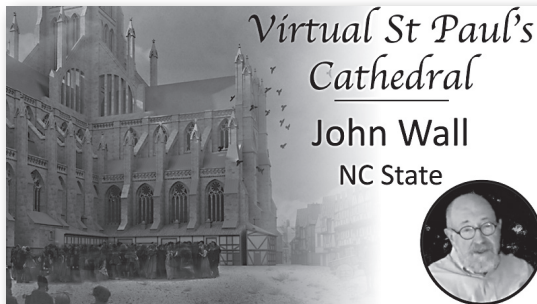
From April of 2021 until March of 2022, the AGU Digital Access Project came under the auspices of the Institute of the Humanities with help from JSPS funding. It was still not possible to move forward with the digitization of new editions because of the continuing pandemic. The project instead focused on finishing up and re-checking all prior work, on upgrading the AGU Digital Access Project website and on holding “events” in the form of podcasts featuring significant scholars in the fields of digital humanities and early modern culture.

The Institute of the Humanities grant funded a part-time worker to help finish the preparation for the two remaining editions digitized during the AOYAMA VISION period (FY 2018 to FY 2020). Each image from each edition had to be examined for quality control and correct indexing. Data records or page lists had to be constructed on Excel files with the attendant metadata. Also each edition was checked for problems with pagination and image quality. With this support the project team was able to work with Folger to stage the *Biblia Sacra* and Milton’s *The History of Britain* on Miranda.

Also with the help of the Institute of the Humanities funding and funding from the JSPS we were able to host 5 podcasts with speakers directly involved with major digital humanities projects with technical development objectives related to the AGU Digital Access Project:

- ◆ David McInnis, of the University of Melbourne and Director of *Lost Plays Database* (LPD: https://lostplays.folger.edu/Main_Page)
- ◆ Brett Greatley-Hirsh of Leeds University and Director of *Digital Renaissance Editions* (DRH: <https://digitalrenaissance.uvic.ca>)
- ◆ Heidi Craig of Texas A&M University and Director of the *World Shakespeare Bibliography* online (WSB: <https://www.worldshakesbib.org>)
- ◆ Janelle Jenstad of Victoria University and Director of the Map of Early Modern London online (MoEML: <https://mapoflondon.uvic.ca>)
- ◆ John Wall of N.C. State University and Director of the *Virtual St. Paul’s Project* (<https://vpcathedral.chass.ncsu.edu>)

These talks, several of which were by design scheduled with speakers directly connected with the



Folger, contribute greatly to our project specifically and generally to digital humanities research.⁷ In each case they describe cutting-edge digital development projects and point to how scholars and members of the interest public not involved with digital humanities development can interact with these resources for research or simply en-

joy using the site for personal edification.

These talks also help to increase public awareness of our own superb rare holdings along with our digital initiatives at Aoyama Gakuin University. It should be added that these perhaps less widely known digital project directors were brought in for talks in the context of such famous scholars as James Shapiro of Columbia University and Stephen Greenblatt of Harvard University, whose contributions to the series have helped to build national and international interest and, in turn, shine more light on the work of each guest in the series. All of these talks are available for viewing on YouTube with the search term, “Speaking of Shakespeare” or listened to as podcasts from a wide variety of podcast services.⁸

The Future of the AGU Digital Access Project

The AGU Digital Access Project has been fortunate enough to secure future funding, and it has become possible again to work on site at the Shiryō Center to digitize more rare books. With the help of additional FY2022 funding from the Institute of the Humanities and an FY2022/23 grant from AGU’s Information Media Center (情報メディアセンター), the project team is set to reengage with its original primary objective to add new rare editions to the list of editions that have already been



⁷ Sample talks from this series that pertain to the AGU Digital Access Project are available at the AGU Digital Access Project website at: <https://agudigitalprojecten.blogspot.com/2019/04/events.html>. All talks are in English.

⁸ *Speaking of Shakespeare* is on YouTube at <https://www.youtube.com/c/SpeakingofShakespeare> and on offer at multiple podcast services that can be accessed from Buzzsprout: <https://speakingofshakespeare.buzzsprout.com>.

digitized. By the time this article is published and again with the help of funding from the Institute of the Humanities project in FY2022, the project team will have digitized, among other editions, two duodecimo (very small) New Testaments printed in the 16th-century with copious illustrations. Both editions are held by the Aoyama Gakuin University Main Library (青山学院大学図書館本館). The first of these editions is the *Novum Testamentum*, printed in Paris by Franciscus Gryphius in 1539. This edition offers copious illustrations of stories and themes represented in the New Testament. The second small edition and next in line to be digitized is the *Testamenti Novi*, printed and published in Lyon by the firm of Sebastian Gryphius in 1564, the year of Shakespeare's birth. This edition also offers numerous illustrations representing the stories and themes of the New Testament. In both cases, the illustrations in these small editions are highly detailed but difficult to see with the naked



eye, so both editions are superb examples of the value of high-resolution digitization. Once scanned and staged a user can view these images in sharp detail (and much better than with the naked eye) to experience and study in these exquisite engravings the minute details of how New Testament writing was presented visually in the 16th century.

We will continue to maintain and upgrade the web site with updates as we progress. The collaborative events will continue, whether they be podcasts or, eventually, face-to-face symposia held on campus. FY2022 podcasts include major figures on digital development and religious history, including a talk with Laura Mandell, Director of the Center of Digital Humanities Research at Texas A&M University, and Alec Ryrie, Professor of the History of Christianity, Durham University.

Also as more *open-source* (or freely available) soft software is developed it may become more feasible, economically and in terms of time-costs, to build a IIIF-compliant viewer and mount it on the AGU web site in order to share with the world Aoyama Gakuin's own collections, gaining the ability to exhibit these holdings alongside similar holdings at other institutions. Such an effort would require staffing and resources beyond the scope of this smaller project and would ultimately require summoning the institutional will to take on such an ambitious digital development objective. Though our efforts did not move forward as quickly or as efficiently as was planned in 2018, the AGU Digital Access Project still stands as a fine work sample in digital development, collaboration, and global outreach. Rare holdings at Aoyama Gakuin that were inaccessible to so many people are now freely available for those from anywhere in the world who wish to study or simply just to view them online.