Making an Edition in an App

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Introduction

The massive increase in the use of mobile devices over the last years, with over half of all accesses to the internet now coming from mobile devices ("Mobile Vs. Desktop Internet Usage" 2020), presents a challenge and an opportunity to textual scholars. It has long been suggested that digital technologies may help scholarly editors find new audiences for their work: work which has traditionally lain on library shelves with only the occasional visitor (cf. P. M. W. Robinson 2009). In this paper we describe an attempt to plan, make and distribute an edition -- the CantApp, presenting in its first iteration the *General Prologue* of Geoffrey Chaucer's *Canterbury Tales* -- designed specifically for mobile device use (Chaucer 2020). We reflect on the difficulties we faced, the initial reception of the app, and draw conclusions which might be useful for other scholarly projects.

The conception of the app

The initiative for the CantApp came from a University College London English Department Christmas party in December 2011 when Mari Volkosh, one of Richard North's students, observed to him that an app on tablets or other portable screens might be a better way for readers to encounter Chaucer's works than the paperback Riverside edition which students still lug around with them as a bulky blue cube, or, if still in hardback, like a laptop from the 1980s. Originally, as a BA student, Volkosh had wanted an ebook that was not restricted to the formats then available, one with an easily accessible glossary that could appear at a click without obstructing the text, along with extensive notes also to appear with a click on the text, on the same page as the text being read. The Kindle ebook had a glossary but to her mind glossed words at the end of lines with a formatting in no way clear, with notes which could not be click-accessed and with numbers which simply indicated notes at the end of the ebook. Volkosh, having found that most other Chaucer ebooks, even those said to be 'annotated', had this impractical format, also said that she disliked levering the Riverside back and forth, believed that few paper publications were annotated in a practical way and knew that students would find an app extremely useful. North worked on the plan with her and a few months later enlisted help from Claire Pascolini-Campbell, an alumna and former doctoral student with whom he started work on some notes for a sample. Later they were joined by Vicky Symons, a colleague and former PhD student of North's.

Whenever time allowed, this team worked on the design, pitching the idea initially to Pearson Ltd (since taken over by Taylor and Francis) in November 2012. By now Volkosh had

drafted a specification. Some of the visual features of Mari's design -- notably, the appearance of the buttons at the top of the screen – survived the app's many revisions all the way into today's published version.

Creating the App; developing the partnership

Richard North first approached Peter Robinson about what became the app on 2 July 2012. Robinson and North had known each other for nearly thirty years, as both had been doctoral students in Old Norse during the 1980s, and the approach was, initially, a simple enquiry about the image rights for the Hengwrt Chaucer for the proposed Pearson publication. Robinson briefly joined North as part of the Pearson proposal. This proposal was rejected in late January 2013, and Robinson suggested to North approaching Cambridge University Press, with whom Robinson had had a long working relationship, with the same proposal. However, in the course of discussions about this approach to CUP, Robinson had an idea, which he put forward in an email to North on 6 February 2013. Instead of CUP (who would require a good deal of convincing), Robinson proposed that Scholarly Digital Editions, the company he had set up to carry forward the publications of the *Canterbury Tales* after CUP withdrew its publishing support, might take on the development and publication of the CantApp (Robinson 2013). A key factor in Robinson's proposal was that his son James had just made an app for crowdsourcing information on phone signals. This app had already achieved considerable success and looked set to become the foundation of a new company he had founded with fellow students from his university days, Open Signal (www.opensignal.com). James explained to his father, who had considerable programming experience, how the app could be made; Robinson thought that he could manage it.

Our ideas about the app evolved over the next few months. By now the project team had widened. Barbara Bordalejo had joined North, Robinson, Volkosh, Pascolini-Campbell and Symons, and she had taken on the charge of preparing a new edited text as part of the expanded app. Whereas the original Pearson proposal had envisaged presenting the whole *Tales*, we now decided to focus on just one part of the *Tales*: eventually, the *General Prologue* as a first publication. In an email on 15 February 2013, Robinson first suggested to North what, in time, would become a central part of the app: that it should include a reading of at least some lines of Chaucer's text.

The reference to inclusion of a reading of part of the text was important for another reason. In proposing this, Robinson knew a high-profile person who could provide this reading and who could then give the project extra visibility, much as TouchPress had used well-known actors (Fiona Shaw, Patrick Stewart, and others; e.g. ("The Waste Land" 2011)) to lend gravitas to its series of publications. This person was the independent Chaucer scholar and Python Terry Jones, whom Robinson and Bordalejo had known for many years. In the event, Jones was unsure of his ability to read Middle English convincingly. However, he was extremely interested in what

we proposed, as he was in anything to do with Chaucer, and became part of the discussions about the evolving app. As well as his interest and general support, he offered his "minimal translation" of the General Prologue for use in the app, and also committed to contribute a short video to the app. A key event was dinner at the Red Lion in Highgate on 28 May 2013 where the entire team, including Jones but excluding Bordalejo, met. In this period, we agreed to give the project its first public outing, in the form of a proposal by the entire project team for a joint presentation at the 2014 New Chaucer Society conference, to be held in Reykjavik, Iceland (Peter Robinson, Bordalejo, and North 2014; see the discussion in Kelly 2015.)

By the end of May 2013, most of the major components of the app were in place, at least in concept. However, in those months there was another development, which in time came to transform how the app was developed and what it offered. That winter term Robinson was teaching an honours course in Medieval English at the University of Saskatchewan. As part of this course, Robinson set the students an oral exam, in which each student was asked to:

"prepare and read aloud a passage of your choice, in **the original language**, in as close to the original pronunciation as you can manage, with all the meaning you can put into it. You will also be asked to explain particular words in the passage"

On 15th April 2013, Robinson had the students present their passage. The third student to present was Lina Gibbings. She chose lines 497 to 508 of the Knight's Tale (lines A. 1355-66 in the Riverside numbering; (Gibbings 2020). On 23rd April, Robinson wrote to North:

"And -- one out of left field. I had my students prepare and read aloud some Middle English last week. This attached is what one of them made of Knights Tale 497 ff. The pronunciation is imperfect, but there really is something here."

North agreed this recording showed great promise. Thus began the most significant episode in the development of this app. At Robinson's urging, Gibbings enrolled in the MA program in the Department of English, with the aim of preparing a performance of the whole General Prologue, commencing in September 2013. With considerable assistance from a pedagogical innovation grant from the Gwenna Moss centre at the University of Saskatchewan, and in partnership with other scholars at the university (especially Professors Brent Nelson and Michael Cichon) Robinson and Gibbings conceived a series of performances, each imagined as a re-creation of a hypothetical "first performance" by the author at a specific and historically plausible time and place. For the *General Prologue* we imagined the first performance (the "world première") as having taken place at Sheen Palace on the Thames, in front of King Richard and his Queen Anne of Bohemia, on 6th June 1389 (see the discussion in the app for the rationale behind this choice, and Robinson and Gibbings 2015). On 9 April 2015 we presented this re-enactment at the Greystone Theater at the university, with Gibbings as Chaucer, Robinson as Edmond Stafford, Kyle Dase (another student in that same class) and Megan Wall as Richard and Anne. With the great ingenuity of the technical team at the University's EMAP group, the whole event was live-streamed and was prefaced by a live discussion of the Tales between Terry Jones and Barbara Bordalejo, beamed in from Jones' house in London. Over the next year, Gibbings and

Robinson cooperated on four more live "historically-based performances", including two more segments of the *Canterbury Tales* ("Medieval Performances," Robinson et al. 2016). In the course of these performances, the team's understanding of the significance of Gibbings' recreation of the *General Prologue* to the app changed radically. As noted above, there was no performance component in the original proposal to Pearson, and the initial suggestion was to have only a few lines read. However, as Robinson and Gibbings worked over several years to develop her performances, Robinson's understanding of what is meant by "the text of the Canterbury Tales" changed. Robinson and Gibbings are currently preparing an article for publication explaining this change; what follows is a summary. For years, and in accordance with the views of a consensus of modern scholars, Robinson had thought that the oldest text of the *Canterbury Tales* is to be located in the marks on multiple manuscripts of the *Tales*, and particularly in certain manuscripts which appear particularly close to Chaucer cf. (Tatlock, 1935). From the comparison of these manuscripts we might hypothesize, with reasonable certainty, what was in Chaucer's fair copy: or, at least, the copy left behind him at his death. Robinson first conceived of Gibbings' performances as a way to test a hypothesis: that the text as presented in the Hengwrt manuscript could serve as an excellent guide to metre and to how the text should be spoken. That is, the text comes first, the performance second. But as Robinson and Gibbings worked on the text, they came to see this as exactly the wrong way around. The *Canterbury Tales*, in its most original and richest form, is the performances (actual and imagined) given by Chaucer in the period from 1385 to 1400. The manuscripts we have preserve traces of those performances, and are vital for that reason. Gibbings' reconstruction of how Chaucer might have performed his creation is closer to those first performances than any printed text can be. Here is as near to the "original text" as we can get.

One need not subscribe to this theory to see how rapt the audience was to hear Gibbings' voice when we demonstrated the prototype to them at the Reykjavik New Chaucer Society conference in 2014. Accordingly, the app was designed so that the first thing the audience sees is the first page of the Hengwrt manuscript, with a large "Play" button, with blinking arrows pointing at it. When pressed, Gibbings' performance starts playing.
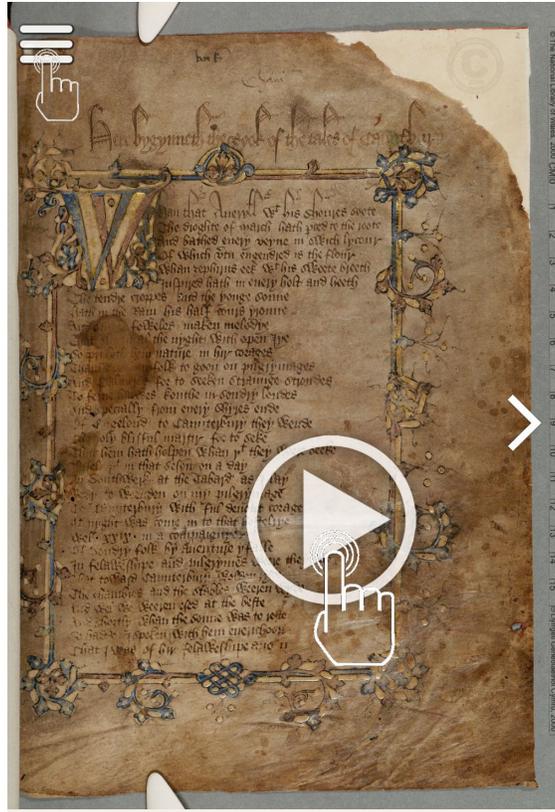
Figure 1. Opening screen of the app, showing the large "play" button.

The performance

When Gibbings was invited to join the project by Dr. Robinson, she had little idea how much it would alter her career trajectory. At the time she was a shy presence in Dr. Robinson's class, happy to be there but intimidated by the language of the texts. Her eye was towards an education degree. She certainly did not expect to be doing a PhD in Medieval Studies one day.

As mentioned above, when she came to present her ten lines from the *Canterbury* Tales, her pronunciation was imperfect. She chose the ten lines from the "Knight's Tale" because they seemed to fit what she, as a drama student, recognized as "grotesque." That is, they enabled her to present each line in a distinctive, exaggerated manner. Therefore, though she could not pronounce the words properly, she could use the images within Chaucer's words to convey their meaning clearly through physicality and emotive vocal presentation.

She was able to apply many of the same techniques when it came time to produce the recording for the app. By then, she had learned proper pronunciation and had spent more than a year inhabiting the mind of Chaucer's characters through her performance of the "General Prologue." Regardless, the recording presented new challenges. Specifically, she needed to

create a performance of the text with an audience in mind that she had not yet experienced: one not present.

Her first audience had been Robinson, a life-long Chaucerian with an ear for Chaucer's language. It did not much matter to him that she didn't know the pronunciation, she knew he was looking for conviction so that was what she provided. The next audience, for the "world première", was also physically present but did not know the language as well. The focus of her performance was clarity, and so that was what she aimed for with that performance. The audience for the audio performance included on the app would be a mix of newcomers and experts. They would not be present and might be using her performance for any number of reasons: education, pedagogy, or just simple enjoyment. In any case, her performance could not make use of physicality to convey meaning, and a translation would be available anyway. What would be her focus then? It might sound simplistic, but her focus ultimately became: "Just make it sound nice."

As scholars of Chaucer have always known, there is a music to his writing. His consistent iambic pentameter and rhyme scheme are obvious examples, but after months of memorization and recitation (often in her car), a few cherished moments emerged that are not obviously impressive. Consider during the Shipman's portrait. In the line "If that he fought and hadde the hyer hond,/ by watre he sent hem home to every lond" (401-2), the elision between "watre" and "he" is so smooth it makes the line sound almost like flowing water. Other instances presented personal choices. These two lines in the Miller's Portrait are an example:

> And therto brood, as thogh it weere a spaade
> Upon the cop right of his nose he hadde
> a werte, . . . (556-8).

As a general rule, she never pronounced the end "e" on "hadde," as it generally elided better if not pronounced. "Hadde" is a very common word in the text, but until this point it had never ended a line. Further, as can be seen, it is intended here to rhyme with "spaade," from the previous line. Ultimately, for the sake of rhyming consistency, we chose to keep the "e," but not without some debate. Reading these three lines out loud while using the final "e" on "hadde" leads awkwardly into the next line, as you can hear in the reading. However, if the final "e" on "hadde" is not sounded, the rhyming sound may yet be retained through the intial "a" in the next line offers the same sound. Try it for yourself.

A great benefit of the process however was that the process could be stopped and started as needed to discuss pronunciation and delivery. Though Gibbings had a great deal of fun with the language and characterization in her vocal performance, it was important that she not allow the actor in her to overshadow the words themselves. Having Robinson nearby to stop the recording when necessary helped prevent this.

There is certainly nothing wrong with offering an interpretation of the characters in Chaucer's "Prologue," and Gibbings certainly infused some of her own. However, Chaucer's writing more often than not provides the characterization. It is important then to listen to the

words out loud and let the language itself guide the voice. For instance, though Gibbings offered no long pause between the Wife of Bath's portrait and the Parson's portrait, the tonal shift is clear and immediate. The final line of the Wife of Bath's portrait is mischievous, with a staccato-like sound. The opening two lines of the Parson's portrait however are slow, quiet and sincere.

Gibbings could have insisted on these ideas by adding a more mischievous sound to her voice in the former line and infused strong sincerity in the latter two. But to do so would have overwhelmed the poetry. Instead, she simply read the lines and the proper sounds emerged naturally. This does not mean that she did no work in preparation. Memorization of the text ensured that she was less focused on the words and more focused on the sound, which allowed her to recite the text freely and with more energy. And every line in the prologue had lived in her head for a year, constantly being recited in faster and slower paces, with shifting emphasis on certain words until she was satisfied she had found the best sound for each line. But everything she did returned to her primary focus: "just make it sound nice." To do that, she gave herself a mantra: "speak the words and stay the hell out of the way!" She offers that advice to future performers with one final piece of advice: "have fun!"

As early as 2014, and in time for the first presentation of the app at the Reykjavik New Chaucer Society conference, the single most distinctive feature of the app was added. As Gibbings performs Chaucer's text, the line of the manuscript she is performing is marked with a white box, and a "whiteboard" appears above the manuscript view, giving Bordalejo's text and Jones' translation of the line (Figure 1). The reader can switch the view from the manuscript to Bordalejo's text or Jones' translation, by pressing the menu button at the top left and then selecting either the text or translation icons (Figure 2).
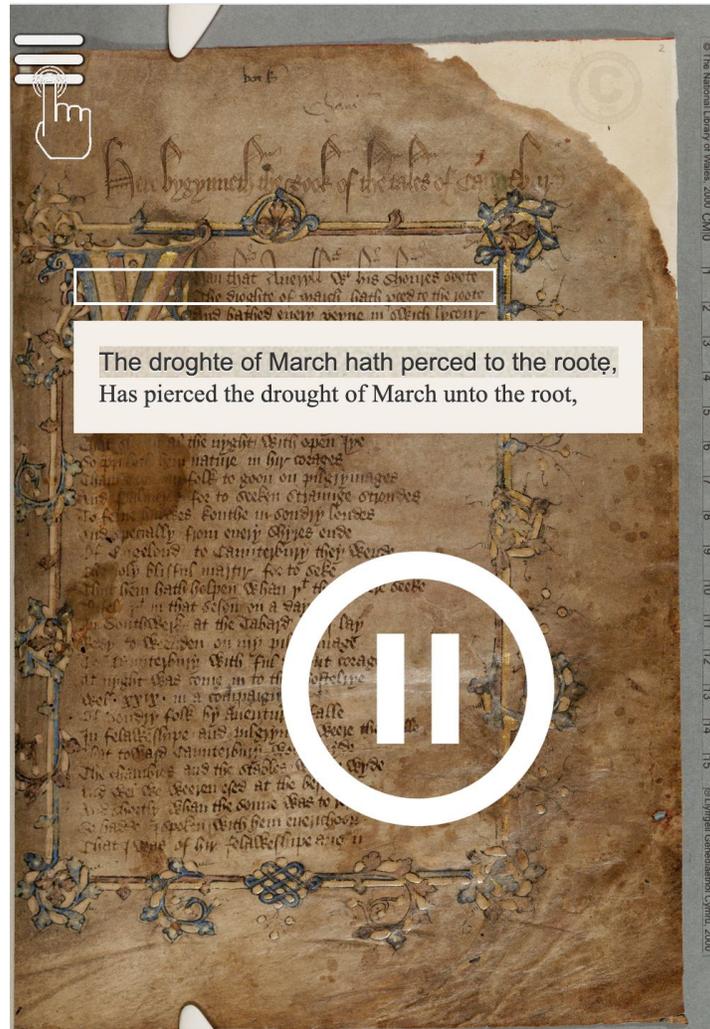
Figure 2. The beginning of Gibbings' audio performance, with the "whiteboard" moving over the manuscript image line by line, synchronized with Gibbings' reading.
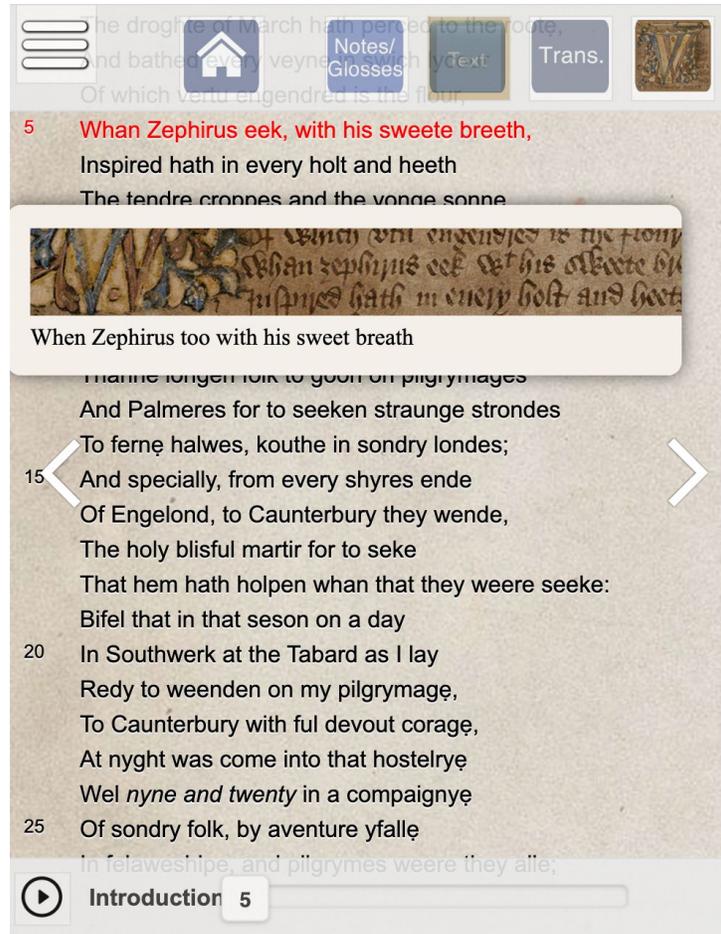
Figure 3. Gibbing's performance of line 5 shown over Bordalejo's text, with that line marked red in the text, and the moving whiteboard containing the manuscript line and Jones' translation.

The translation

During the meeting at the Red Lion on 28 May, Jones offered his "minimal translation" of the *General Prologue* for inclusion in the app. This translation had been used in an audio book (Jones 2015). That night, Jones found his translation on his computer. Over the next few days, he revised this, making some "adjustments" (email of 29 May 2013), and sent the team his translation on 31 May, slightly revised: "I had to rewrite some things because I found some things I translated wrongly." (email 31 May 2013). Jones had originally made the translation as an aid to his own understanding of the *General Prologue*. Accordingly, he described it as "minimal": it has no aim higher than to help readers understand Chaucer's text, and not as any kind of substitute for the text. This made it ideal for our app, which offered other ways of accessing Chaucer's text: as edition, as manuscript, as performance, and now by a minimal translation.

The translation and the performance are presented and synchronized in the same way as are the manuscript image and edited text, as shown in Figure 4. Now, instead of the Hengwrt manuscript or the edited text the display changes to show Jones' translation. The moving box is keyed to the translation, and the line of the translation being read turns red:
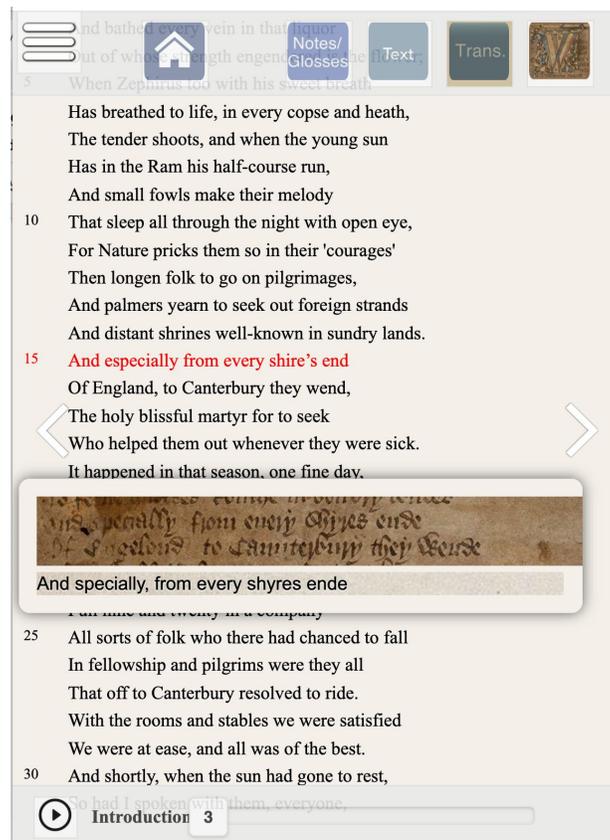

Figure 4. Gibbing's performance of line 15 shown over Jone's translation, with that line marked red in the text, and the moving whiteboard containing the manuscript line and Bordalejo's text.

The glossary and notes

How to make Chaucer come alive? was the question, given the obvious difficulty in conveying his meaning to moderns across an interval of six or more hundred years. North remembers his student days in the early 1980s, when he read Chaucer's works in the (F.N.) Robinson edition (Chaucer 1948). Each page had two long columns of text, given the width of the page, just as in the Riverside successor to F. N. Robinson's edition (no relation) which is standard in many places now. The columns seemed to go endlessly downwards, so long they were. Flipping between the page and Robinson's glossary at the rear of the tome scarcely made the process easier, for his glossary was by no means as detailed as one would have expected from a

dictionary worth the name. Chaucer for this reason became distinctly uncongenial, even to a student hoping to take his study of the Middle Ages further. When North first saw the Riverside at the end of the 1980s he could see why there was now a glossary and sometimes even limited notes at the foot of each page, besides the updated explanatory and textual notes at the back (Chaucer and Benson 2008). Riverside was more friendly than Robinson: no doubt of that. Now a new Robinson would have to become friendlier than Riverside, if the app was going to work. In the decade before North got a job teaching Chaucer in a university, much had happened with language change in the Anglosphere on one hand, and with English lang. and lit. teaching in schools on the other, to make Chaucer's English seem more alien than ever. Chaucer's vocabulary had become ever less part of the modern inheritance, even while his *Canterbury Tales* were fast disappearing from the syllabus in schools. And yet the various texts of Chaucer that began to appear on the internet a decade or more later all seemed to be lodged in the past, either following the book format or making Chaucer's text unreadable with superscript cues for glosses or even interleaving modern English translation with the original text. Mari Volkosh had been right about the need to present Chaucer's text in a more contemporary way. The question for an editor was how to make that happen.

North had edited medieval texts before and had no doubt that the time-honoured methods of putting together notes and glossary would work the same for Chaucer as they had for poems in Old English and Old Norse. That is, an editor will move slowly and repeatedly through his or her text, stopping to explain words which are of interest or present linguistic and contextual difficulty. Moreover, Bordalejo was in the process of producing transcriptions of Chaucer's text with the latest palaeographical techniques and knowledge. With Chaucer the weight of any editing enterprise is settled on his language. Although in its mixture of French and Germanic vocabulary, Chaucer's language is effectively the blueprint for ours and could even, at a stretch, be called representative of the earliest stage of 'Early Modern English', most young readers find it often hard to understand what he says. A gloss for each word which poses problems, then, and ideally the same gloss wherever the word recurs; this was the first task on hand. The second was to create notes clarifying literary and historical context. These could not only refer to more modern studies than the printed books, but could also, given the app's electronic format, update references with periodic rewrites, in theory indefinitely. An emerging question was whether the new notes created should try to compete with those of the Riverside and other modern scholarly editions of Chaucer. The answer to that question was always going to be "no". Despite the fact that Bordalejo is producing the most reliable text yet for Chaucer's *Canterbury Tales*, the specialised books would have to remain standard for scholarly research and reference, doubtless for teaching at higher undergraduate levels too. For the general public and schools, however, and for basic levels of university English literature teaching, our app would serve Chaucer better than the books.

While the sample produced for Pearson had been based on part of the *Miller's Tale*, we agreed that the app would present the *General Prologue*. From here in the Tabard to

Canterbury's cathedral door a road was now open for the work of a lifetime, if not for North and his team, then for others. At the beginning of April 2015 Bordalejo sent her Hengwrt text and North, Pascolini-Campbell and Symons began to share out sections between them for glosses and notes. The aim was to support claims in the notes with quick references to primary and secondary texts which could then, at a click, carry the reader to the full entry in the bibliography. All this work was no more than a start. Late in 2019 North, Robinson and Bordalejo started work on sections of an introduction to Chaucer's life and to the circumstances of the *Canterbury Tales*. The notes and glosses are all keyed, line by line, to Gibbings' performance. A reader of the app can now start with the sound of Chaucer's 'April with his shoures soote', hearing this and the following text read by Gibbings while admiring the Hengwrt facsimile in which a frame moves over each manuscript line as Gibbings reads it, together with a mini whiteboard below in which the same line may be read in Bordalejo's edition and Jones's translation. In devices with a screen dimensions of greater than 1024 width by 768 pixels (typically desktop computers and tablets), the text, notes and glossary all appear in separate panels, with the display co-ordinated to the movement of the whiteboard, itself following Gibbings' reading, as in Figure 5. We note that the suggestion, in this view, that the glosses and notes come from books (thus the curving frame and gutter, suggestive of book pages) was part of Volkosh's original design.
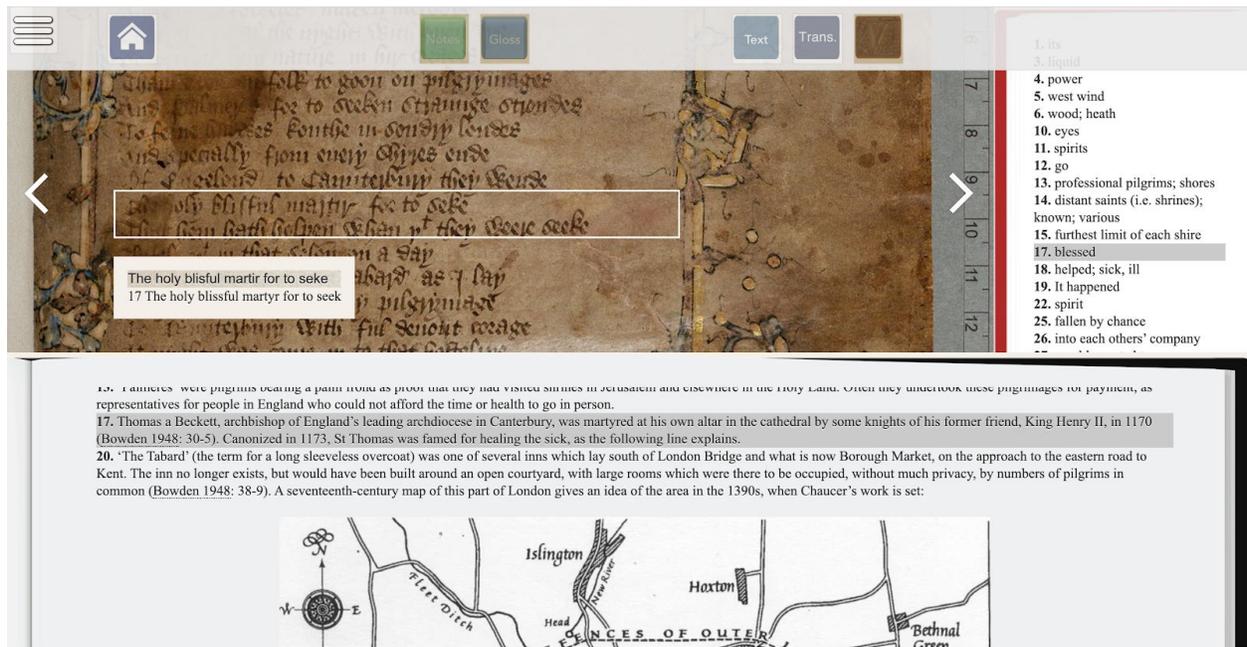

Figure 5. "Widescreen" view of the app, showing the highlighting of line 17 in the manuscript (the white frame on the line), the text and translation of the line given in the moving whiteboard below, and the highlighting of the reference to line 17 in the notes and glossary panels, below and to the right.

In devices with lower resolution -- most mobile phones -- the three panels of Figure 5 are reduced to a single panel, as in Figure 6. Here the notes and glossary panels are combined into one continuous text. Instead of the frame moving across the manuscript (or text, or translation) a header is placed at the top of the screen. This header contains the image of the current line being read, followed by the text and translation of this line, as supplied by Bordalejo and Jones. The manuscript image, text and translation in this header are keyed to Gibbings' reading, with the text of the related glossary and notes items highlighted below.

Figure 6. "Narrow screen" view of the app, with the header showing line 17 in the manuscript, in the text and translation, and the highlighting of the references to line 17 in the notes and glossary for that line, below.

Taken together, the synchronization of the notes and glossary in the app with Gibbings' performance, the manuscript images and the text and translation, support a manuscript-, text- and performance-based experience of the *Canterbury Tales* in which Chaucer does come alive.

The text

The opportunity to create a reader's text for an edition is momentous for a textual scholar. Not only can a reader's edition reach more people than any scholarly edition would, but also it represents the chance of approaching the text from a vastly different perspective. As an exercise, Bordalejo began editing the text for the reader's edition and a potential scholarly edition simultaneously. This presented the perfect occasion to reflect on what a reader's edition ought to do and what it might achieve by being presented in a mobile app.

Although every teacher in the team intended to use the CantApp in their classes, it was immediately obvious that anyone would be able to download it. The text should be prepared not with a strictly academic audience in mind, but for everyone who might want to read the *Canterbury Tales* in Middle English but did not have the recourse of having anyone to explain its context to them. With this in mind, Bordalejo put aside her obsessive fastidiousness with recording details and set out to produce a text that could be read by anyone with minimal training but a serious interest in reading Chaucer's work.

The main goal was to build a text that did not call itself into question, that is, exactly the opposite of what Bordalejo advocates for a scholarly edition. The text had to make sense even at the expense of not emphasizing the most crucial aspects of the textual tradition. In practical terms, this meant to choose readings that make the best literary sense ahead of those representing archetypal, contested readings, Chaucer's spelling practices, or places of variation of particular interest to textual scholars.

The initial work was going to focus only on the *General Prologue* and Bordalejo, drawing from years of research on the textual tradition of the *Canterbury Tales,* and following most modern editors of the text, chose National Library of Wales, Peniarth 392d (Hengwrt; Hg) as the manuscript upon which to base her edition. Hengwrt presents relatively consistent spellings that might, if this is indeed the oldest witness to the text and written under Chaucer's supervision, reflect spellings contemporary with the moment of composition of the *Tales* or even Chaucer's own system and dialectal preferences. In the app the edition is described as follows:

> All punctuation in this edition has been modernized. The convention of
> capitalizing the beginning of every line is retained throughout.
> This text follows the spellings of the Hengwrt manuscript (Hg). Hg is
> likely to be the oldest extant manuscript of the *Tales*, and its spellings
> might follow Chaucer's usage.
> The Hg spelling has not been preserved in the following instances:
> a. Thorn has been regularized to th.
> b. [the Tironian note] has been expanded to and.
> c. The use of u/v and i/j has been modernized.
> d. When a word, in rhyme position, ends "o minim minim macron," this
> has been transcribed as "oun." This follows the preference of the scribe to

spell out, at the end of the line, "oun" in words such as conditioun, alternating with ‘ou macron."

e. The names of the pilgrims have been capitalized, i.e., they are treated as proper nouns.

f. The punctuation has been modernized and it is intended to help the reader's comprehension of the text.

g. Further exceptions and other changes deemed worthy of mention are recorded in individual notes. (Chaucer 2020)

With every one of these changes, Bordalejo sought to make the text more accessible to the reader. In the context of the Canterbury Tales Project research, the editor translated the text into a simplified "semiotic system" (Robinson and Solopova 1993, 21) that would make it more approachable for untrained contemporary readers without access to a professor.

The regularization of medieval characters to modern forms removes a layer of difficulty that, although relatively easy to overcome in a classroom context, might result in alienation for an independent reader. This rationale justifies the regularization and modernization of i/j and u/v. The modern punctuation should also contribute to a better comprehension of the text, although because the *General Prologue* has only very few lines of dialogue, and these are relatively clear, quotation marks were not used in the text. In hindsight, this likely was a mistake that might have been problematic if Lina Gibbings' performance were not available in the edition. The lack of dialogue markers is a more pressing issue in other sections of the Canterbury Tales which the project will be releasing in the next few years. For those, and in future iterations of the *General Prologue*, the edited text will include them for all forms of dialogue.

Let us consider some of the cases in which the edited text deviates from the Hengwrt manuscript. In the first line of the Tales, Hg reads "Whan that Aueryll," and for years members of the Project, particularly Bordalejo and Robinson, have quoted the peculiar spelling as potentially meaningful and likely to be archetypal, but the reading is not the one present in the reader's text, which instead has the Ellesmere spelling, the more modern and immediately understandable, Aprill. Another example of how the manuscript's text was emended can be found in line 277. Hengwrt, and a significant proportion of other witnesses, read "thencress" (or a variant spelling). The conflation of article and noun is relatively common in early manuscript and the distribution in the textual tradition suggests that such practice is an old one. However, "the encress" is likely more readable for an independent reader.

There are only 19 instances in which the CantApp *General Prologue*'s edited text departs from the Hengwrt manuscript in a significant manner. Each of those instances was considered individually according to the aims of the edition. As the examples above show, the editor made an effort to maintain the relationship with the earliest manuscript of the *Canterbury Tales* while, at the same time, attempting to bridge the paleographic challenges presented by the original

document and the linguistic distance between a Middle English text and a contemporary, independent reader.

Making the app

By mid-2013, the contents of the app had been broadly agreed, and all had committed to developing a prototype of the app in time for demonstration at the New Chaucer Society conference in July 2014. Peter Robinson, on the advice of James Robinson, used the application PhoneGap to develop this prototype, which was ready in time to be shown, and downloaded on Android phones, by the July 2014 conference. Originally, it was planned to release the full app of the whole of the *General Prologue* by the end of 2014. For various reasons, this date was pushed back. There was a considerable amount of work to be done on the preparation of the notes and glosses. North was covering the same ground which took Malcolm Andrew over 600 pages in his *Variorum Chaucer* volume, and North was including substantial new scholarship (Andrew 1993). In these circumstances, to produce a full draft of his notes and glossary as early as July 2015 was remarkable. In parallel, Gibbings' performance was being developed through his MA project, towards the "world première" of April 9, 2015, supplemented by the experience of his performances of other medieval works in this period. While all these performances, including that of the *General Prologue*, were recorded on video an audio-only performance could not simply be the audio part of the video. For quality alone, the performance should be recorded in a studio. This would also permit line-by-line editing and re-recording of the audio. This was deferred until after the series of performances, finally occurring on 28 April 2016, in the EMAP studio at the University of Saskatchewan, with Wayne Griesbach as the sound engineer. The file for the recording was delivered the next day. By this time, a version of the full app, including all the notes and glosses and Bordalejo's draft text, was ready, and it appeared that the full app might be released as early as May 2016. However, at this point Robinson encountered difficulties in scaling from the prototype, which presented just 70 lines of the *General Prologue*, to the full 850 lines. The major difficulty was to do with controlling the movement of the "whiteboard" synchronized to Gibbings' performance against all three of the manuscript, Jones' translation and Bordalejo's text. Robinson was not able to resolve these difficulties by the end of the summer of 2016, and put the project aside. At this time, the development of Textual Communities -- the foundation for all the work of the Canterbury Tales project -- was taking up all his attention.

He was not able to return to the app until the summer of 2019. A benefit of the delay is that North's notes could now include his latest research on Chaucer's Knight, where he revised the long-accepted chronology of the many battles of the Knight (North 2020). In the next months, the full text of the introductory matter was included in the app (a biography of Chaucer, newly prepared by North, material on the text, performance, and the dating of the Prologue

prepared by other members of the team), and many revisions were made to the material submitted on 2015 and 2016. At this point, however, problems were emerging with the choice of PhoneGap as the development platform for the app. The great virtue of PhoneGap is that it allowed Robinson, who was very familiar with the base web technologies of HTML, CSS and JavaScript, to use those skills to make a conventional web application (to be seen at www.sd-editions.com/CantApp/GP), which could then be ported as an app to Android and Apple mobile device platforms. The great defect was that by 2019 PhoneGap was an old and limited technology. Firstly, this model (develop for the Web, port to app) was defective: it did not take account of the many features of mobile device technology which have no counterpart on the web (e.g.: full support for all the gestures associated with touch-screens: swipes in different directions, pinches, long presses, and more). Secondly, the distance between the "native modes" of mobile devices, focussed around the concept of the "view", and the document-centric model of the web, created all kinds of incapacities, most visibly in the inconsistencies around the movement of the scrolling box in mobile devices. Robinson was able to get this working properly (most of the time) in the web application, and in some mobile devices a good part of the time, but not all. The effect is that the app is clunky and unreliable in some contexts on mobile devices. Thirdly, most seriously: PhoneGap has a complex history, which finally came to affect critically a key element of the app. PhoneGap began life in 2008, as a project of a company specializing in mobile device development, Nitobi. In late 2011, Nitobi announced that they were donating PhoneGap to the Apache Foundation, a major open-source group. Almost simultaneously, Adobe announced that it was purchasing Nitobi, and with it the development team who had worked on PhoneGap. For several years, Adobe saw PhoneGap as a critical component of its product line, and it allowed (and it seems encouraged) its developers to contribute to the Open Source materials derived from Nitobi, now under the name Cordova, and built its own product PhoneGap Build on the Open Source Cordova platform (Wargo 2013).

It was PhoneGap Build that Robinson used to create the IoS and Android apps from the web application at www.sd-editions.com/CantApp/GP. Adobe, for its own good commercial reasons, permitted apps up to 50 megabytes in size to be created free in PhoneGap Build, and Robinson used this to create the prototype mobile device apps. However, when it came to release of the full app in 2019, the sound file for the whole General Prologue alone was 93 megabytes -- far more, on its own, than permissible in the free version of PhoneGap Build. In the early years of PhoneGap Build this was no problem: one could buy a licence from Adobe which waived the 50-megabyte limit. However, at some point around 2018 (the exact date is unclear as it seems Adobe never formally announced any change) Adobe decided to withdraw support for PhoneGap Build. This meant that you could no longer buy a license from Adobe for PhoneGap Build, and so there was no way past the 50-megabyte limit. PhoneGap Build remains online, and it is still working, but multiple discussions on the web refer to questions to Adobe about PhoneGap build going unanswered. Practically, this meant that the final app had to be less than 50 megabytes in size. This meant that the sound file had to be reduced in size, all the way down to 12.1

megabytes. To our ears on most devices, the reduced version is nearly indistinguishable from the full sound file. However, some of the app's users reported very inferior sound, and that may be a result of the compression.

By December 2019 the app was finally nearly ready, or as ready as we felt it reasonably could be, and the team began discussions of how and when it should be released. From 2016 on Jones could not contribute the video we had planned to the development of the app, due to the onset of progressive aphasia. However, by a happy chance, Robinson was able to show the nearly-finished app to Jones on December 6th 2019. From the moment Terry Jones heard the first words of Gibbings' performance of the *General Prologue* ("Whan that April with his shoures soote..") -- words that he knew perhaps more than any other in the language -- and saw the box moving down the screen as Gibbings spoke, he was transfixed. For an hour he and Robinson listened to Gibbings' performance, watching as the box moved all the way, line by line and page by page, through the Hengwrt manuscript.

The app was ready.

Figure 7. Terry Jones and Peter Robinson responding to the nearly-complete app, 6 December 2019, in Highgate, London. Photograph by Anna Soderstrom, and reproduced with her permission.

The impact of the app.

In December 2019, a final tweak had been given to the app when Bordalejo and Robinson taught in a digital humanities workshop at the Indian Institute of Technology, Gandhinagar, India. One of the students there, Santana Duttu, suggested a simple adjustment to the opening screen: that we should suppress the header menu in this view, so that it appears only when the user presses on the ☰ icon in the top left of the screen. With this change, and the last edits and corrections to the textual material, we were ready to launch. Tentatively, we considered a launch date in late January/early February. Because we wanted to draw as much attention as we could to the app, and because we thought the app offered something significantly new, we approached the press offices of our respective universities (Saskatchewan and University College London) to seek their aid. On 5th December 2019 Robinson had visited the National Library of Wales at Aberystwyth to show the app and gain the library's full agreement to our use of the Hengwrt manuscript images in the app. The Library expressed its own eagerness to be part of the launch. Thus, we were committed to a simultaneous launch by all three institutions involved. This required coordination of three press offices as three sets of press releases were prepared, and we are grateful for the professionalism of all those involved: Federica Giannelli at Saskatchewan, Natasha Downes at UCL, Owain Rhys Roberts at the NLW.

We settled on a launch date of Monday 3rd February 2020. We choose this date because it was the first working day after Jones' 78th birthday on February 1st, and we conceived this as a gift for him. However, on 21st January our valued friend and collaborator died. The last change we made on the app before release was to include a statement on the title page: "In celebration of Terry Jones, 1942-2020".
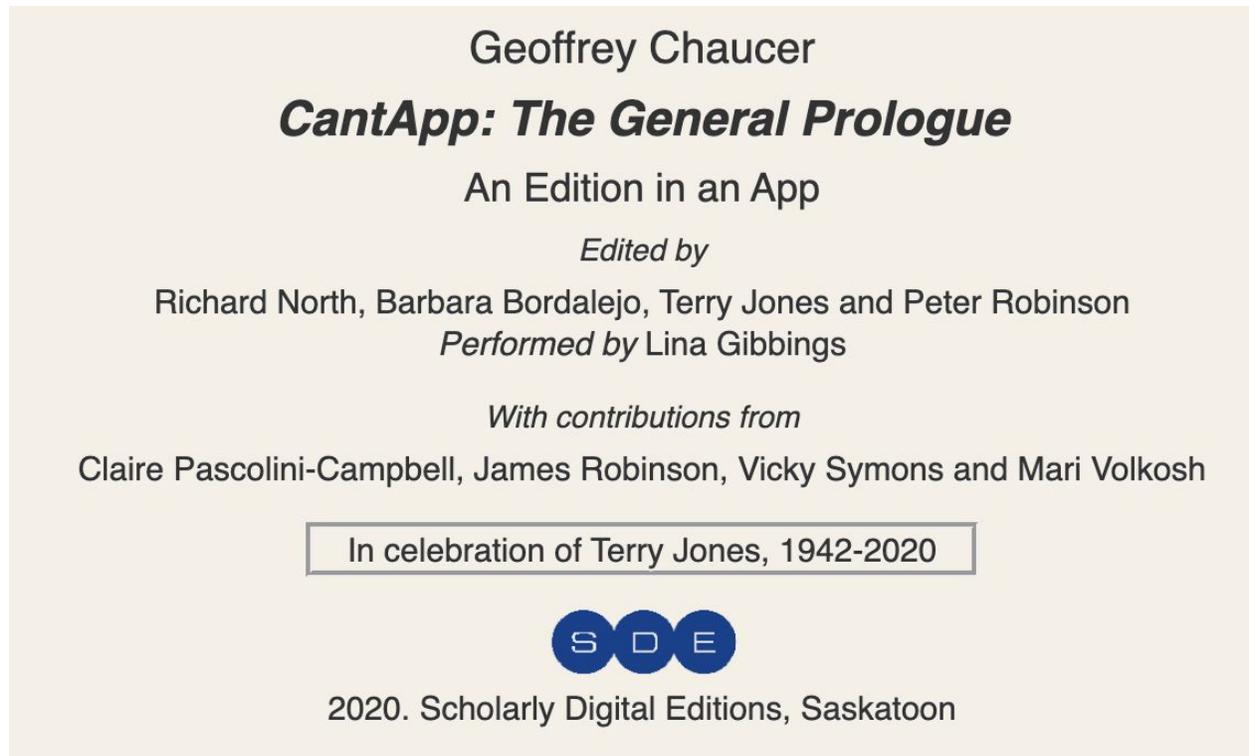
Geoffrey Chaucer

CantApp: The General Prologue

An Edition in an App

Edited by

Richard North, Barbara Bordalejo, Terry Jones and Peter Robinson
Performed by Lina Gibbings

With contributions from

Claire Pascolini-Campbell, James Robinson, Vicky Symons and Mari Volkosh

In celebration of Terry Jones, 1942-2020

S D E

2020. Scholarly Digital Editions, Saskatoon

Figure 8. Title page of the app.

The death of so loved a man, from one of the most influential creative troupes of the century, was bound to make a "greater crack". The release of the app, within two weeks of this event, caught the wind of the outpouring of tributes to Terry Jones, Python, Independent Scholar, and Serious Humorist. Unquestionably, the app gained far more attention than it might have done had it been released six months earlier or later. There were articles in most of the major newspapers in the UK, in the BBC, and in many outlets in North America, Australia, and elsewhere. We had the satisfaction of "going viral" as Facebook, Instagram and Twitter picked up the scent. All this attention was reflected in the app downloads and web accesses. Here are some figures. Note that the figures given for viewers of the web application at www.sd-editions.com/CantApp/GP before 10 February are estimated, on the basis of one web viewer for every mobile download (historically, the actual figure from 10 February was 1.67 web viewers to every mobile download).

	Android	Apple	Web	Totals
1-4 Feb	1386	2146	3532	7064
5-9 Feb	4456	10455	14911	29822
10-29 Feb	1935	4252	7800	13987

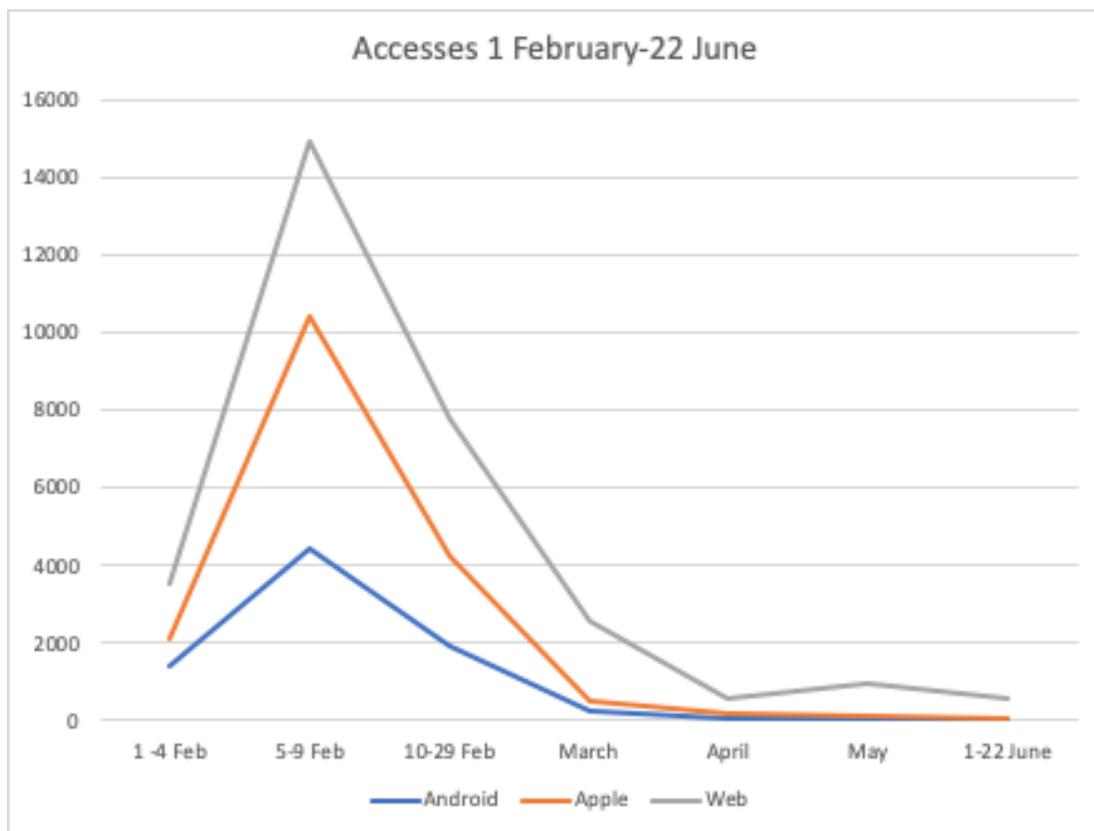|				
March	249	531	2600	3380
April	87	195	598	880
May	65	151	989	1205
1-22 June	18	49	571	638
	8196	17779	31001	56976

Expressed in chart form:

Figure 9. Graph of accesses/downloads of the app, 1 February-22 June 2020.

Altogether, this gives a total of around 57,000 accesses from the launch in February up to 22 June. A notable feature is that while downloads to mobile devices drop sharply after the first month, with some 95% of all downloads to both Apple and Android devices being recorded in the first month and only around 5% in nearly four months since, accesses to the web app continue at a higher level. From 1 March onward, the 4758 accesses to the web app more than triple accesses on mobile devices (1105 downloads to Apple, 560 to Android).

This last figure, that accesses to the web app far outnumber the accesses to mobile devices after the first month, is instructive. The month-by-month figures for the web app confirm the steadiness of access to the web app: 2600 sessions in March, 598 in April, 989 in May, 571 in June. One may compare the combined downloads to the two mobile device platforms over the same months: March 780 (Apple 531 and Android 249), April 282 (195 and 87), May 216 (151 and 65), June 67 (49 and 18). It is quite clear from this that after the initial flush, fuelled by the publicity associated with Jones' death, an increasing proportion of our users are going to the web app. Perhaps most surprisingly: nearly half of the accesses to the web app come from browsers running on mobile devices. This is rather remarkable. All those people might have chosen to download the app, but they did not. It suggests that for many people, the route to the app lies through an internet search. The first ten results for "Canterbury Tales app" in Google are all references to items about our app, and most of them give the web address of the web app.

As well as the quantitative evidence for the reach of the app just cited, many of those downloading the app left comments and ratings. On Android, 36 people left ratings, for an average of 4.649 out of 5: 1 one star, 1 two star, 4 four star, and 30 five star reviews. On Apple, 96 people left ratings, for an average of 4.1: 13 one star (apparently because several people could not get the sound to work), 5 two star, 4 three star, 10 four star, and 64 five star. The comments (18 on Android, 41 on Apple) are revealing. Many focus on Gibbings' performance, with the following being typical:

My all-time favourite poem as an app, and beautifully read too! Thank you to all who have brought this 600+ year-old classic into the modern age and breathed new life into the lovely sound of spoken Middle English. I think Chaucer would be thrilled to know his work is still honoured and loved after all this time.

The idea that so many people, not just those in academic bubbles or those with the privilege to continue higher education, are able to hear these tales as they once were is wonderful. As someone pursuing a degree in literature, it's so interesting to see both the modern translations, hearing the rhyme schemes as they would have been, and seeing the actual manuscripts. The historical value of this is outstanding. This is a beautiful thing.
Thank you.

Listening to this lovely reading while following along with my 45-year-old copy of the Tales, which has Middle English on one page and modern on the facing page. Such a delight to hear the prologue as Chaucer's audiences would have heard it. Can't wait for more! Thank you.

I enjoyed listening to this.

I'm so excited this exists

Invaluable! Gorgeous. This is a brilliant use of technology; produced and designed beautifully.

Not all comments were positive. Several people noted that they could not get any sound on their iPhones, a problem we were not able to replicate on any iPhone or Apple device. Others commented on the "clunkiness" of the interface. Only one person mentioned using the notes and glossary, or any of the other substantial textual materials in the mobile versions of the app.

Finally, we must note that some 57,000 readers in a few months is, on its own, far more than the total sum of all the CD-ROMs and internet licenses of the Canterbury Tales Project sold over twenty years.

Lessons for the future

The number of people using the app cited in the last paragraph demonstrates, by a simple metric, that the effort of making this app was worth it. However, the situation is rather more complicated than a simple metric (more than 55000 people) can express. Firstly, overall more people have accessed the app over the internet (including those coming from mobile devices), than have accessed it via app downloads to the mobile. Secondly, making the app for mobile devices was very difficult. On top of the challenge of developing for two very different mobile environments at once, one has to reckon with the difficulties of submitting the apps to Google Playstore and the Apple AppStore. Both Android and Apple are rightly demanding that apps must satisfy multiple requirements, as to stability, use of resources, technology, audience, and more. Negotiating all these requirements is not at all easy. Secondly, the choice of development platform has a significant impact on the final product. Had we been able to release the app in 2015, our choice of PhoneGap Build as the development platform would have been satisfactory; but by 2019 this choice led to several deficiencies. Robinson has now moved development of this and further apps to the ReactNative platform, which is now the clear leader in cross-device development, with the 2020 Stack Overflow survey showing around twice as many developers using ReactNative as Cordova ("Stack Overflow Developer Survey 2020"). An aside: the difficulties we had with PhoneGap in the last days of the project are a caution against reliance on Open Source software. It would be easy to blame Adobe for withdrawing its support from Adobe PhoneGap Build. This is unfair. Adobe gave exceptional support to Apache Cordova, which is the Open Source base of PhoneGap. The problems with PhoneGap are traceable to the problems with the fundamental architecture of Cordova, and to the impact of newer cross platform development platforms (especially ReactNative, which is also Open Source) whose architecture better reflects evolving mobile phone technologies. The contrasting current takeup of

Cordova/PhoneGap and ReactNative likely is also a reflection of the fortunes of their respective corporate sponsors, Adobe and Facebook. It is rather common for digital humanities to speak of Open Source software as a mantra which solves all problems. Our experience with Cordova and PhoneGap shows that Open Source software can become unfit for service, as developers move on to other projects. One should choose Open Source software with as much care as one does anything else.

One might reasonably conclude that because most accesses were to the web app rather than to the mobile device apps, scholarly projects such as ours might reckon that there is no point making the mobile device apps, particularly in light of the difficulties referred to in the last paragraph. There are several responses to this. Firstly, perhaps the most remarkable metric which emerged from the launch was that nearly half of the 12500 accesses to the web app after 10 February -- around 44% -- were from mobile devices. Because the web app behaves identically to the mobile apps, this meant that users had the same experience of the app running in a browser on their mobile device as they had if they downloaded and installed the mobile app. One lesson is clear. Scholarly projects such as ours need to have an interface which is attractive and appropriate when viewed in a browser on mobile devices.

Was it worth our effort, to create this app? Despite all the delays, the answer is clearly yes. The novelty of "an edition in an app" -- the very first time, so far as we have been able to discover, that a scholarly edition has been developed specifically for an app interface -- combined with the publicity generated in the wake of Terry Jones' death gave our work a visibility it has never had before. Further, the experience of making the app will make it much easier for us to make the next and following apps. Robinson is planning to structure the use of ReactNative so that any project with the same ingredients (manuscript images, audio performance, notes and glossary) can turn them into an app for mobile devices. However, it is apparent that some things we included in the mobile device version of the app were little used. Thus the extensive text of the editorial introductions: in future apps, we might reserve this for the web app but not include in the mobile app.

Overall: we have found a far larger audience -- more than 50000 people -- than we have ever had before. We have learnt some important lessons about how to reach this audience and to keep them coming back. A scholarly edition is only useful when it is used, and we have found ways to be used we did not know before.

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