Finding and Figuring Flow:
Notes Toward Multidimensional Poetry Visualization

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Abstract

Under a grant funded by the NEH in the US and the AHRC, ESRC, and JISC in the UK, we are collaborating with computer scientists to create digital poetry visualization tools for fellow creative writers and literary scholars, beginning with sonic patterns and moving on first to more abstract figural constructs such as images and metaphors and then to relationships among poems. Like other digital humanities teams, we aim to develop software that will help readers recognize and analyze patterns in and among poems as aids to close readings and eventually to larger scholarly inquiries. What we hope will help distinguish our project from other efforts, though, is the strong emphasis we are placing on poetry's multidimensionality—especially its relationship to and experience of time, which we are working to access through time-dependent visualizations via the metaphor of "flow."

Keywords: poetry, digital humanities, design research, knowledge discovery

Under a Digging Into Data Challenge grant funded by the National Endowment for the Humanities in the United States and the Arts and Humanities Research Council, Economic and Social Research Council, and JISC in the United Kingdom, we are collaborating with computer scientists to create digital poetry visualization tools for fellow creative writers and literary scholars. In particular, we are working to design appropriate visual forms to represent constructs and arrangements in poetry, beginning with sonic patterns and moving on first to more abstract figural constructs such as images and metaphors and then to relationships among poems. Like other digital humanities researchers, we aim to develop software that will help readers recognize and analyze patterns in and among poems as aids to close readings and eventually to larger scholarly inquiries (Chaturvedi, 2011; Chaturvedi, Gannod, Mandell, Armstrong, & Hodgson, 2012; Clement, 2012; Ruecker, Radzikowska, Michura, Fiorentino, & Clement, 2008; Plamondon, 2006; Unsworth & Mueller, 2009). What we hope will help distinguish our project from other efforts, though, is the strong emphasis we are placing on poetry's multidimensionality—especially its relationship to and experience of time, which we are working to access through time-dependent visualizations via the metaphor of "flow." Throughout this process, we are continually asking whether and how the tool we are developing 1) is genuinely innovative; 2) creates opportunities to produce new knowledge, rather than information only; and 3) can support and enhance the kind of wisdom in literary practice that arises only from close engagement by a reader with the text. The following discussion of our preliminary results shows how we are proceeding in each of these areas.

Our initial focus is on the sonic features of individual poems. Specifically, we are working to reveal the sound structures and moments of phonic changes within a given poem in order to better understand it as a complex dynamic system of sounds. This first stage of our project will equip critics to leverage the close readings they already conduct, opening the poem to new observations and interpretations. At the same time, we take seriously literary critic Marjorie Perloff's warning in her introduction to the 2009 anthology *The Sound of Poetry / The Poetry of Sound* that much recent "empiricist" study

> allows for little generalization about poetic modes and values: the more thorough the
> description of a given poem's rhythmic and metrical units, its repetition of vowels and

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consonants, its pitch contours, the less we may be able to discern the larger contours of a given poet's particular practice, much less a period style or cultural construct. (p. 2)

With this warning in mind, we sought an abstraction or visual metaphor for poetry to help our collaborators create flexible, extensible software that would both enhance and empower close reading and permit useful "generalization about poetic modes and values." We believe this metaphor will help structure visualizations not only of individual poems, but of larger data sets as well.

In the earliest weeks of our project, we tried and rejected as flawed a number of potential metaphors (a pressure cooker, an expanding universe, a fire, etc). Very quickly, we came to understand that our focus must be experiential; we want the experience we evoke through visualization to be as multidimensional as the experience of poetry itself, equipping users not only to engage writing as text, but also to enhance their engagement with language as experience. Thus, we came to understand that our visualization must itself involve several orders of time and space, and especially that time and temporality in particular are essential to how we conceive of and understand poetry.

Our collaborators' preliminary visualizations of sound in poetry, as well as examples published by others, did not seem to us to fully embrace this multidimensionality. Early visualizations of Louise Bogan's poem "Night"—which were really, at that point, as much propositions as our own early metaphors—were flat and static (Figure 1).
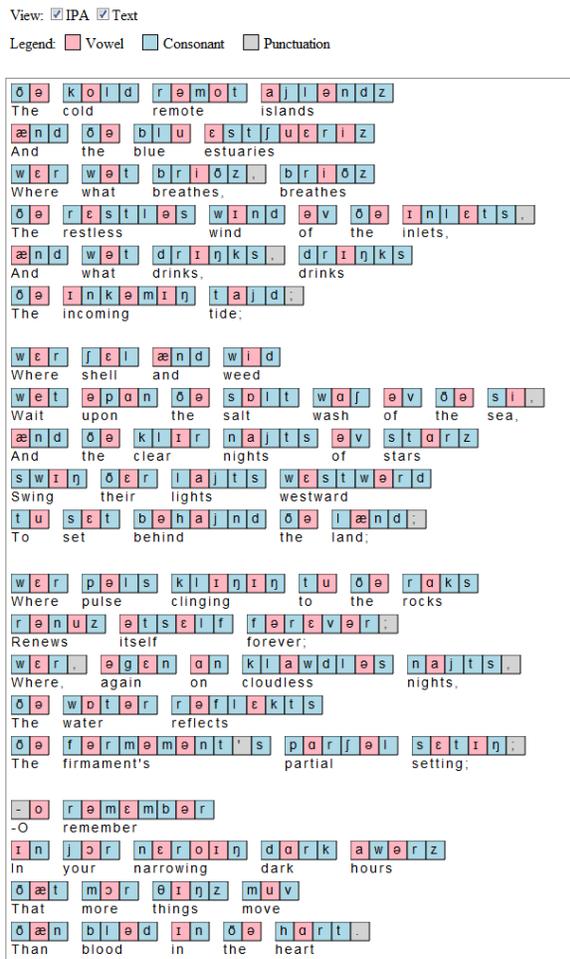

Figure 1. Night by Louise Bogan (sound components). Copyright 2012 by Alfie Abdul-Rahman, Oxford e-Research Centre, University of Oxford, UK. Used with permission.

For example, one visualization helpfully included phonetic characters for each sound and used color-coding to reveal the distribution of vowels and consonants throughout the poem. But it did not show how these sounds connect through and modulate over time. We did not yet see, for instance, visualized relationship between the long "o's" in "cold remote" and the shorter "oohs" that followed in the next line's "blue estuaries." Another early visualization of the same poem was more time-dependent, with arcs showing the frequency and placement of repeated sounds throughout the poem: a method sometimes used to show musical refrains (Figure 2).
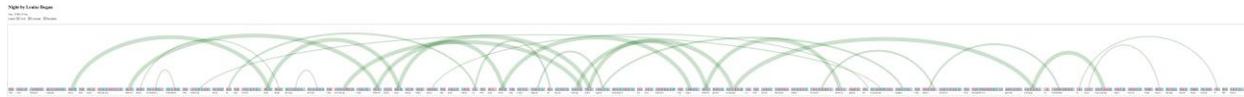

Figure 2. Night by Louise Bogan. Copyright 2012 by Alfie Abdul-Rahman, Oxford e-Research Centre, University of Oxford, UK. Used with permission.

This overview image suggests that sonic repetitions are fairly dense in Bogan's poem, comprising both smaller, fleeting pairings and other, more dominant patterns that link several times throughout the poem. One problem, though, is that it is difficult to see detail. Even if we magnify the image (Figure 3), following individual arcs remains challenging.
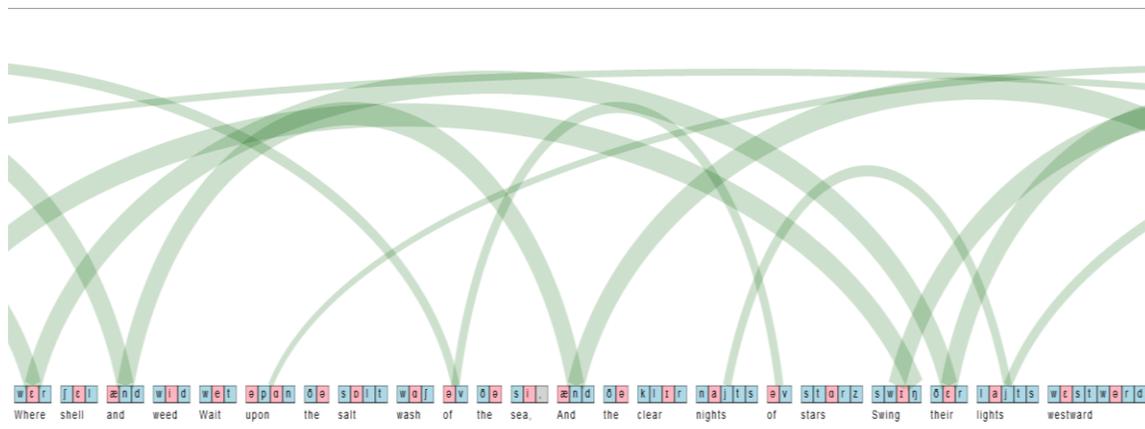

Figure 3. Night by Louise Bogan. [Detail.] Copyright 2012 by Alfie Abdul-Rahman, Oxford e-Research Centre, University of Oxford, UK. Used with permission.

Moreover, this visualization raised questions about how rhyme was to be defined and identified, for it did not link "westward," "estuaries," "restless," "inlets," and other words repeating and reordering the same cluster of sounds. Overall, then, these and other preliminary visualizations prompted us to begin to think more deeply about the experience of the poem and how that experience is created. At this point, we decided that if we were even to begin to articulate and recreate something like the experience of a poem, we needed to include not only sound, but other poetic devices, and we extended our thinking to include the image. Specifically, we have been working to articulate for our computer scientists, for other scholars and poets, and for ourselves what we understand about how sound on the one hand and the image on the other hand develop in time through the language of specific poems. The insights we achieved through this thinking have now led us to a fresh metaphor about poetry and our experience of it: "flow."

      Currently, the team is thinking of the poem as *a fluid (or fluids) moving via its linguistic devices and figures through a (self-)defined space*. This is not an entirely revolutionary metaphor for poetry; in fact, Alfred Corn points out that both rhythm and rhyme—elemental characteristics of poetry—are etymologically linked to Greek and Latin terms meaning, "to flow" (p. xviii, 72). But this is the first time that the metaphor has been used to develop tools that will allow the scholar actually to view patterns of flow in individual poems. We believe the idea of "flow" is specific enough to be a great help with our immediate

visualization challenge (to see how first sounds and then images move and change through a particular poem). But we are also confident that it will be strong and flexible enough to take on other kinds of problems, both within the poem or in tackling larger, more complex data sets that have not yet been conceived, much less visualized. For example, we are very excited by the possibility of being able to examine how specific patterns of energy (repeating phonemes, for instance) might interact with other patterns (semantic profiles of words, different repeating phonemes or sonic clusters, particular meters, etc.); how they might emerge, intensify, or dissipate through these interactions.

This attention to non-hierarchical dynamism opens new ways both to visualize poetic behavior and understand poetic time. On the sonic level, if various permutations of rhythm and rhyme, including devices like repetition, alliteration, assonance, etc., create distinct measurements and experiences of time, then each poem through its particular flow "shape" creates its own unique temporal experience and identity. In this view, lyric poems might be less manifestations of single, isolated, static "moments" somehow "outside of" time, as they have been seen in the past, than experiences of immersion in *multiple temporal flows* created, in part, through their sonic and semantic qualities. These durational, shifting patterns may be rendered as various types of flow, such as swells, surface waves, ripples, splashes, eddies, whirlpools, etc.: a flexibility that will enable us not only to differentiate the various flows in a poem, but to see their relative direction, frequency, and power. In response to our thinking in this area, our collaborators are now working to create a model that allows us to view the dynamics of a given poem within a structure that takes the poem's actual shape.

Unlike other existing programs, our approach, we hope, will not only help users detect, for example, instances of repetition and rhyme and show their spatial proximity within a text. Rather, by introducing temporality, we may also see how those patterns truly *change* throughout a poem in relationship to other patterns. We may be able to observe modulation from long to short vowels or between full and slant rhymes—or whether and when rhymes reinforce or detract from large temporal thrusts of regular meter. Nor will we be bound to a rigid structure, needing to arbitrarily decide whether to subordinate assonance to metaphor for instance: a problem the developers of the Myopia tool confronted (Chaturvedi et al., 2012). Instead, we will be able to see whether various features converge, whether one flows from another, and which one is dominant in the particular poem in question. This kind of nuance in visual expression and attention to permeable interactions between data and experience fits with the "Humanities Approaches to Graphical Display" recently outlined by Johanna Drucker (2011). We plan to adopt this approach in our explorations not only of sound, but also of image—specifically the "image in time."

Though the image is often considered to be a medium for introducing stillness into a poem, close analysis reveals that images constructed from language are anything but static. Not only are they apprehended in and across the temporal waves and eddies created by syntax, line, and sentence, they evolve within those temporal movements both as visual and as linguistic objects, accumulating and dissipating presence and immediacy as they simultaneously navigate and work to create the poem's time. Eventually, we hope not only to use visualizations to observe how these individual images are constructed within and help to create our sense of a poem's time, but also to perceive how a given poem relates its individual images to each other through repetition and variation across the poem's temporal as well as its actual space. As with sound, we hope to see, through patterns visually rendered, how these relationships create our experience and apprehension of the poem.

Beyond analysis of individual poems, the metaphor of flow may be productive for scholars researching larger concepts of literary and historic influence and habitual poetic movements that have not yet been conceived—much less visualized—in these terms. Eventually, we hope our software will allow us to advance knowledge in multiple directions by helping to identify larger moments of change and innovation over poets' careers or even within literary histories. We anticipate being able to recognize, examine, and begin to explain widespread poetic responses to historical events, social phenomena, or technological invention, and to compare works of multiple authors within or across historic periods. In the long run, we may even use this metaphor to help describe psychological and phenomenological engagements with poems and in communities (Csikszentmihalyi, 1991/2008).

So, while our visualizations in this relatively early phase are not yet useful aids to close readings, much less to broad examinations of literary trends, they have pushed us to consider poetic form in new ways and also to understand that to do what we need them to do the visualizations must be not static, as the initial visualizations have been, but time dependent, in motion. Still, the early visualizations and our interactions with them have already changed and deepened our thinking about poetry and the possibilities

presented for the creation of knew knowledge, even new wisdom, in relation to it. We believe that a vital understanding of the human experience of the poem in all its temporal, spatial, historical, and emotional complexity can lead us to a greater understanding of human experience in general.

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