The Music Is All That Counts! A Poem-Collage Pair Created During The Pandemic

Sarah Glaz

Department of Mathematics, University of Connecticut, Storrs, CT

Mark Sanders

Rushden, Northamptonshire, UK

Follow this and additional works at: <https://scholarship.claremont.edu/jhm>

Part of the [Arts and Humanities Commons](#), and the [Mathematics Commons](#)

Recommended Citation

Sarah Glaz & Mark Sanders, "The Music Is All That Counts! A Poem-Collage Pair Created During The Pandemic," *Journal of Humanistic Mathematics*, Volume 11 Issue 2 (July 2021), pages 522-529. DOI: 10.5642/jhummath.202102.37. Available at: <https://scholarship.claremont.edu/jhm/vol11/iss2/37>

©2021 by the authors. This work is licensed under a Creative Commons License.

JHM is an open access bi-annual journal sponsored by the Claremont Center for the Mathematical Sciences and published by the Claremont Colleges Library | ISSN 2159-8118 | <http://scholarship.claremont.edu/jhm/>

The editorial staff of JHM works hard to make sure the scholarship disseminated in JHM is accurate and upholds professional ethical guidelines. However the views and opinions expressed in each published manuscript belong exclusively to the individual contributor(s). The publisher and the editors do not endorse or accept responsibility for them. See <https://scholarship.claremont.edu/jhm/policies.html> for more information.

The Music is All That Counts! A Poem-Collage Pair Created During the Pandemic

Sarah Glaz

University of Connecticut, Storrs, Connecticut, USA
sarah.glaz@uconn.edu

Mark Sanders

Rushden, Northamptonshire, UK
sparkymarky63@btinternet.com

Synopsis

The poem-collage pair presented here is a work of collaboration between the mathematician and poet, Sarah Glaz, and the collage and ceramic artist, Mark Sanders. The piece is part of their larger joint poem-collage project involving the history of mathematics. Created at the height of the pandemic, the poem-collage pair reflects the reality of living during a plague and embodies the solace offered by long-distance collaboration and by the arts. Included as background is a brief discussion on the history and mathematics involved, information about Sarah's poem and Mark's collage, and a reflection on how the pandemic influenced both the choice of poem and the imagery appearing in the collage.

To see the poem-collage pair as originally envisioned by Sarah and Mark please place them side by side:

PYTHAGORAS PLAYS HIS LYRE

"What is the wisest thing? Number.
What is the most beautiful? Harmony."
- Iamblichus (ca. 250-330), *Life of Pythagoras*

Pythagoras plays his lyre
surrounded by mathematicians.
We sing paeans as he strikes
the cords:

*We discovered the
law of the cosmos:
All is number!
Mysterious proportions!
The way strings vibrate
to harmonic ratios
makes music sound
like heaven.
The sacred beans sprout
in the nearby fields.
All animals are part
of our family.
In the interval between
earth and the firmament
planets circle and hum
in concert.
Each One a note
in the grand symphony
of all creation.
We guard
its innermost secret.*

The music wafts upward
like smoke from burnt incense
pleasing the gods who watch us
play and pass.

PYTHAGORAS PLAYS HIS LYRE

“What is the wisest thing? Number.
What is the most beautiful? Harmony.”
- Iamblichus (ca. 250-330), Life of Pythagoras

Pythagoras plays his lyre
surrounded by mathematicians.
We sing paeans as he strikes
the cords:

*We discovered the
law of the cosmos:
All is number!
Mysterious proportions!
The way strings vibrate
to harmonic ratios
makes music sound
like heaven.
The sacred beans sprout
in the nearby fields.
All animals are part
of our family.
In the interval between
earth and the firmament
planets circle and hum
in concert.
Each One a note
in the grand symphony
of all creation.
We guard
its innermost secret.*

The music wafts upward
like smoke from burnt incense
pleasing the gods who watch us
play and pass.

Background: History, mathematics, poem, collage, pandemic

The collaboration between Sarah Glaz and Mark Sanders started in 2019, when David Greenslade invited both of them to participate in the poem-collage project he was editing, “Imagined Invited.” The result is the poem-collage pair “Among Practitioners of Cossike Arte,” which appears online at the Bridges 2020 Art Gallery [6] and in the print publications [2, page 28] and [7].

In the summer of 2020, Sarah and Mark decided to collaborate on a new poem-collage project involving the history of mathematics. At that time the first wave of the pandemic was ravaging the United States, and Sarah found herself checking the “daily numbers” with obsessive conscientiousness: number of coronavirus cases, number of hospitalizations, number of deaths in Connecticut, in the US, in the world; speculations on the meaning of the up and down trends, other numbers used around the globe to measure the extent of the pandemic, and more. Whole numbers were everywhere evident and seemed to dictate both the routines of daily life and the mood with which one woke up every morning. The poet heard an echo of a voice from the deep past “All Is Number!” In another period of time long, long ago, people also believed the world around them was governed by whole numbers and their ratios, and tried to understand the relations between numbers and reality in order to have some control over their destiny. This remote period of time is the 6th century BCE, and the people who proclaimed “All Is Number!” were Pythagoras and his followers. And so, poems about the Pythagorean Brotherhood became a natural choice for the new collaborative project.

The poem “Pythagoras plays his lyre,” featured in this poem-collage pair, was written a few years before the pandemic. In the poem, the poet travels in a time machine to the distant past and joins the Pythagorean Brotherhood. The poem was first published in the *Journal of Humanistic Mathematics* [3], and later translated into Spanish and Galician.¹ It also appears in Sarah’s poetry collection, *Ode to Numbers* [4].

Sarah emailed Mark the poem to see if it would act as a source of inspiration for a collage.

Pythagoras was born circa 585 BCE on the Greek island of Samos. Most of what we know about his life filtered down to us through the ages as fantastic stories scattered through ancient writings. Some of these stories, along with the epigraph to the poem, were gathered in Pythagoras’s biography written over 500 years after his death by Iamblicus [11].

¹ You can see Elena Soto’s Spanish translation at <https://establopegaso.wordpress.com/2016/02/16/pitagoras-toca-la-lira/>, and Robin Urquhart’s Spanish translation at <https://www.lamajadesnuda.com/poesia-en-la-voz-de-la-mujer/96-la-maja-desnuda/poesia-en-la-voz-de-la-mujer/1518-sarah-glaz.html>. See <https://tarabelateca.blogspot.com/2016/04/astropoemas-11-sarah-glaz.html> for the Galician translation by Ánxeles Francis and Minia Bongiorno.

Pythagoras seems to have traveled widely through Egypt, the Middle East, and Babylon, where he acquired both mathematical knowledge and a reverential and mystical attitude towards numbers [1, 5, 9, 11]. In his fifties he returned to Samos; he fled from there soon after to settle in Crotona, a Greek city that was part of Magna Graecia, the coastal area of southern Italy colonized by Greece. Here he founded the school of philosophy known as the Pythagorean Brotherhood. The school's aims were at once philosophical, religious, and political. The Pythagorean Brotherhood, which in spite of its name included women, was a tightly knit community following rigid rules of conduct and a common lifestyle and philosophy. Its members learned four *mathemata* (subjects of study): *arithmetica* (arithmetic, in the sense of number theory, not computation), *harmonia* (music), *geometria* (geometry), and *astrologia* (astronomy). Those attending Pythagoras' lectures were divided into two groups: the *acoustici* (listeners) and the *mathematici* (mathematicians). Only after a number of years as listeners did students advance sufficiently to become mathematicians and be allowed to speak to, and to participate in mathematical investigations with the master.

A fundamental belief of the Pythagorean Brotherhood was that whole numbers underlie all natural phenomena. Whether in music, or astronomy, or philosophy, the central position of *number* was everywhere evident. This belief led them to undertake investigations into the properties of numbers and to the discovery of many interesting mathematical results.

Greek mathematics contributed to the discipline its most fundamental principle—the requirement that mathematical results are validated by proofs. The Pythagoreans were among the first to prove many mathematical truths that were in common usage in the ancient world, like for example, the famous Pythagorean Theorem of Right Triangles. They also discovered and proved numerous new results in geometry and number theory. Many of their discoveries were kept secret, and when shared with outsiders, they were presented as a common accomplishment of the entire brotherhood.

Like many ancient cults, the Pythagorean Brotherhood had esoteric initiation rites and dietary and lifestyle restrictions. The symbol on which the members of the Pythagorean Brotherhood swore their oath of allegiance was the Tetractys, or holy fourfoldness. As seen in Figure 1, the Tetractys is a symmetric triangular arrangement of dots with 4 dots on the bottom row, 3 on the row above them, 2 on the next higher row and 1 on top. The total number of dots in the Tetractys is $1 + 2 + 3 + 4 = 10$.

Figure 1: The Tetractys of the Pythagorean Brotherhood. Public domain image from Wikipedia (<https://en.wikipedia.org/wiki/Tetractys>), last accessed on July 28, 2021.

Numbers had their own personalities for the Pythagoreans. In particular, 1 was a male number and the sacred creator of all numbers, since every number is the finite sum of 1s; 2 was a female number and was associated with diversity of opinion; 3 was linked to harmony; and 4 stood for justice. Thus 10, the total number of dots in the Tetractys, was considered to be the very best number since it contained the first four whole numbers, and in dot notation it formed a perfect triangle.

Among other dietary and lifestyle rules, the Pythagoreans considered bean plants to be sacred and were prohibited from eating them. They were also strictly vegetarian. The latter was a result of their belief in the doctrine of transmigration of the souls. The Pythagoreans believed that the soul can temporarily or permanently leave a body and inhabit the body of another person or animal, especially after death, and therefore refrained not only from eating animal flesh, but also from using animal materials in their cloths, such as, for example, leather or wool [1, 9, 11].

Mathematically, the focus of the poem is on the Pythagorean music theory and astronomy. Music was important to Pythagoras and his followers. According to Iamblicus [11], Pythagoras was well educated, learning to play the lyre and to recite the poetry of Homer. In addition to valuing music for its beauty, the Pythagoreans used it to regulate mood and heal illnesses [11]. Pythagoras himself is credited with the discovery that the sound produced by vibrating strings depends on string length. In particular, he noticed that a harmonious sound was produced by plucking two strings, one twice the length of the other — a ratio of string length 2:1 (in modern language, an interval of an octave). Furthermore, he concluded that the most beautiful musical harmonies corresponded to the simplest string length ratios 2:1, 3:2, and 4:3 — 1, 2, 3, and 4, like in the mystical Tetractys. This was the start of music theory. It also reinforced the Pythagoreans’ belief that the whole cosmos is governed by whole numbers and their ratios.

The Pythagorean astronomy, which can be seen as an extension of their doctrine of musical intervals, was a curious mix of facts and mysticism. Following the Greek scientific tradition of his times, Pythagoras believed that the Earth was a sphere and the center of the universe. He also taught that each of the seven known planets, among which he included the Sun and the Moon, revolved around the Earth encased in its own crystal sphere, and as it moved it produced a certain hum according to its distance from the center. The whole system created a celestial harmony, which came to be known as the “music of the spheres” [1, 9, 11]. Nevertheless, Pythagoras recognized that the orbit of the Moon was inclined to the equator of the Earth, and that the planet Venus appears as both the morning star and the evening star [9].

While the poet remained immersed in the 6th century BCE for the duration of the poem, the collagist responded to the poem using imagery that moves through time all the way to the present. The pandemic, although not foremost on Mark’s mind while working on the collage, nevertheless found a way to show itself in the choice of images and the atmosphere created by their juxtaposition.

Pythagoras himself appears multiple times through the collage in various guises. In his role as major philosopher and mathematician, he is depicted surrounded by past and future disciples in Raphael’s fresco *The School of Athens*,² and also as the lone figure in the 1955 Greek commemorative postage stamp on the occasion of the 2500th anniversary of the founding of the first school of philosophy by Pythagoras.

² See [10] for more on *The School of Athens*. Also note that this issue of the *Journal of Humanistic Mathematics* contains an article about Raphael’s masterpiece and engages with several of the ideas in this essay. See [8].

Emphasising the music theme, which is central to both the poem and the collage, Pythagoras appears as the blind, multi-instrumentalist modern jazz genius, Rahsaan Roland Kirk, one of whose landmark recordings was the album titled “The Case of the Three-Sided Dream In Technicolor” — a title evoking both the Tetractys and the Pythagorean Theorem of Right Triangles. To the right of the image of Rahsaan Roland Kirk, the seated audience plays the role of the mathematicians surrounding Pythagoras mentioned in the first stanza of the poem, as well as the role of the gods, mentioned in the poem’s last stanza, who watch from the highest seats in the theatre, while humans offer music, poetry, and art in return for hope. Above Rahsaan Roland Kirk’s head, the Hand of God, originally appearing on the Sixteenth Chapel’s ceiling in Michelangelo’s fresco “The Creation of Adam,” creates not a man, but the muse which bestows on Kirk/Pythagoras the divine gift of music. The lightning strike to the left of this scene represents the energy and power of creation, be it the creation of the world or that of a piece of art or mathematics; whilst also reflecting in its shape the Tetractys.

From the point of view of the imagery alone, the coronavirus arrived among us like a lightning strike. The microscopic virus itself is a thing of unquestionable visual beauty. Were it a sea anemone or a flower, we would be admiring its other-worldly colors and shape. Lightning appears in the sky just as impressively, lighting up the darkness and fabulous to behold. However, both have the capability to be utterly disruptive and destructive—beauty taking on a sinister and terrifying form.

Pythagoras, embodying the values and beliefs of the Pythagorean Brotherhood expressed in the poem, is also represented symbolically by the five Tarot cards placed in the lower part of the collage: The card Il Bagatto/the Magician, representing the sacred, religious, and cultish mysteries and secrets of the society of the Pythagoreans; L’Appeso/The Hanged Man, representing the ultimate sacrifice, which alludes to Pythagoras’s assassination; Il Mondo/The World, representing cosmic consciousness and a union with the One power of the universe; Il Sole/The Sun, representing the light shining on truth; and La Morte/Death. Often misread to mean death itself, this last card refers to rebirth and represents the Pythagoreans’ belief in the doctrine of transmigration of the souls. Interspersed between the tarot cards are images of the sacred fava bean pods. Legend tells how Pythagoras fleeing from his enemies was struck down and killed because he refused to run to safety through a bean field for fear of trampling the sacred plants. The radar image at the bottom right represents the Pythagorean’s search for the ultimate laws of the cosmos. These images convey the attempt to understand the mysteries of life and death, the seeking of information and truth, the search for solace and spiritual guidance — all too relevant in a time of pandemic as they were in the time of the Pythagoreans.

For interested readers, Sarah and Mark’s other poem-collage collaboration involving the Pythagoreans and their mathematics, “Square Root of 2,” can be accessed at https://www2.math.uconn.edu/~glaz/Square_Root_of_2/index.html.

References

- [1] David M Burton. *The History of Mathematics*, McGraw Hill, 2011.
- [2] Conan Chadbourne, Robert Fathauer, Nathan Selikoff, and Bruce Torrence, editors, *Bridges 2020 Art Exhibit Catalog*, 2020.
- [3] Sarah Glaz, “Pythagoras plays his lyre,” *Journal of Humanistic Mathematics*, Volume 6 Issue 1 (January 2016), page 291.
- [4] Sarah Glaz, *Ode to Numbers*, Antrim House, 2017.
- [5] Sarah Glaz, “Mathematics in the poetry of Sefer Yetzirah,” *Proceedings of Bridges 2021*, pages 39–46, 2021. Available at <http://archive.bridgesmathart.org/2021/bridges2021-39.html>, last accessed on July 27, 2021.
- [6] Sarah Glaz, Mark Sanders, and David Greenslade, “Among Practitioners of Cossike Arte,” Mathematical Art Galleries, 2020 Bridges Conference, available at <http://gallery.bridgesmathart.org/exhibitions/2020-bridges-conference/sarahglaz>, last accessed on July 13, 2021.
- [7] David Greenslade, editor, (with artwork by Mark Sanders), *Imagined Invited*, Hafan Books, 2020.
- [8] Frode Sirnes Larsen, “Leonardo da Vinci in Raphael’s *School of Athens*,” *Journal of Humanistic Mathematics*, Volume 11 Issue 2 (July 2021), pages 196–243. Available at <https://scholarship.claremont.edu/jhm/vol11/iss2/9>.
- [9] John J. O’Connor and Edmund F. Robertson, “Pythagoras of Samos,” MacTutor History of Mathematics Archive, last updated January 1999. Available at <https://mathshistory.st-andrews.ac.uk/Biographies/Pythagoras/>, last accessed July 13, 2021.
- [10] Jessica Stewart, “The story behind Raphael’s masterpiece ‘The School of Athens’,” *My Modern Met*, September 6, 2018. Available at <https://mymodernmet.com/school-of-athens-raphael/>, last accessed on July 13, 2021.
- [11] Thomas Taylor, *Iamblichus’ Life of Pythagoras*, Inner Translations International, Ltd., 1986.