



ANTHROPOSOPHY STUDIES AT THE GOETHEANUM

BOTHMER GYMNASTICS

AND

PROJECTIVE GEOMETRY



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"Through my human nature, revealed in my own life, the mathematical, the geometrical, and by stretching my up-down, my right-left, my front-back, I embrace, from myself, the world."

Rudolf Steiner

PERSONAL IMPACT

Why did I choose this topic ?

In 2017, I began my studies in Bothmer gymnastics in Córdoba, Argentina. That same year, I participated in the Ibero-American Movement Congress in Colombia, where I met Georg Glöckler (23-09-1933 – 1-03-2019, professor of physics and mathematics, Waldorf teacher, and director of the Mathematics and Astronomy Section at the Goetheanum) for the first time.

At this congress, he was responsible for the anthroposophical lectures and also for a workshop on projective geometry. There, teachers informed us about the opening of a new Bothmer gymnastics training group in Brazil, along with Georg Glöckler and Michael Neu, a Bothmer gymnastics teacher from Stuttgart, Germany.

It was also my first encounter with Astrid Wrede, a physical education and Bothmer gymnastics teacher from Brazil. She was responsible for bringing Bothmer gymnastics to South America, she was a teacher since 1979 at the Rudolf Steiner Waldorf School in São Paulo, Brazil. She studied Bothmer gymnastics in Germany in 1982 and years later began promoting movement congresses in South America with other colleagues, which later evolved into congresses of movement, music, and eurythmy.

In January 2018, I began my training in São Paulo, Brazil. There, the contact with Glöckler was even closer since there were only 30 students. He was in charge of the anthroposophical study in the mornings and projective geometry in the afternoons, while Michael Neu was responsible for the Bothmer classes and the physical education curriculum throughout the training.

I remember that day as if it were yesterday. In the first class with Glöckler, he had us draw a rhombic dodecahedron. It was my first time enjoying a mathematics and geometry class so much. Over six days, we covered various elements of mathematics and geometry, such as Platonic solids, projections in space, and polar bodies.

Since then, my interest in geometry has grown more and more. Over the years, the link between each exercise offered by Bothmer gymnastics and the various aspects of geometry has become stronger: the connections, the similarities, the mutual aids, etc.

In July 2018, Professor Glöckler visited us for the first time in Córdoba, Argentina, to share an intensive week of Bothmer gymnastics and geometry. In the mornings, he gave lectures on



the twelve senses, in the afternoons, projective geometry, and in the evenings, as a gift, the path of life post-mortem. It was the last time we saw him as he crossed the threshold on February 1, 2019. This was very impactful as he was a great mentor to me. In 2021, I completed my Bothmer gymnastics studies, where we gave a final presentation in honor of our dear teacher Georg Glöckler.

During these years, my connection with geometry continued to develop internally. Upon arriving here at the Goetheanum, where Glöckler spent so many years, I feel it has gained even more strength.

At this time, I believe there is a great need to perceive ourselves in the space we inhabit each day and the need for meaningful movement in children, adolescents, and adults.

This research project is entirely inspired by Mr. Glöckler's work on the relationship between movement and projective geometry and by Astrid Wrede's immense dedication to bringing Bothmer gymnastics to South America.



Golden spiral being an echo of the vigorous fall (Bothmer exercise)



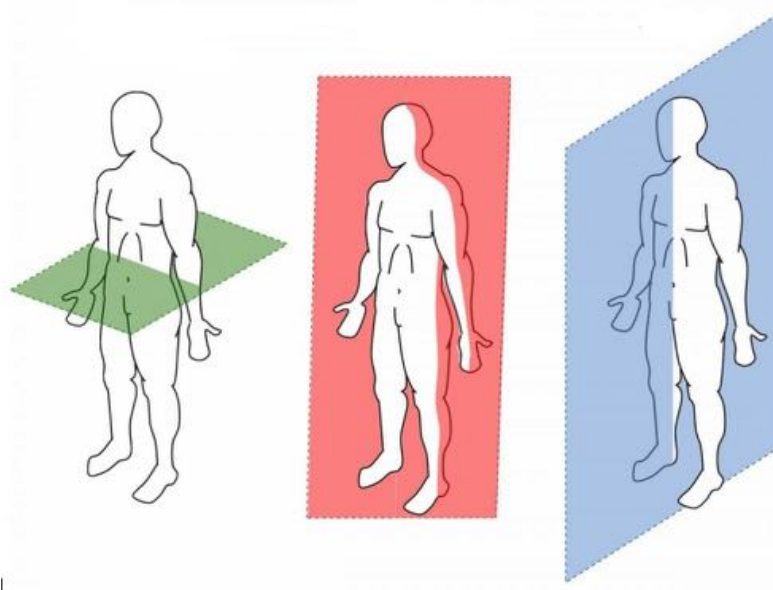
INTRODUCTION

BOTHMER GYMNASTICS AND PROJECTIVE GEOMETRY

This project seeks to find a deep relationship between Bothmer Gymnastics and Projective Geometry, as "two areas that meet and work together."

Bothmer gymnastics is a form of exercise based on anthropological and pedagogical principles, developed as part of physical education in Waldorf pedagogy. It was created by Count Fritz von Bothmer in the 1920s in Germany. Bothmer gymnastics is an educational and therapeutic approach to movement that originated in the context of Waldorf pedagogy, with the goal of promoting the integral development and harmony of the individual.

Bothmer Gymnastics is a movement learning method based on the joint action of the human figure, its functional realities, and spatial dimensions. It manifests the relationship between the human being and space and its forces through movement. It allows experiencing a space organized in three fundamental dimensions: front-back, right-left, up-down, which correspond to the three planes of the structure and organization of the human being: horizontal (up-down), frontal (front-back), and sagittal (right-left).



The right-left dimension is determined by the sagittal plane, dividing the body into perfect symmetry. In our head, we can observe the two halves of our brain, two eyes, the ribcage, lungs, and our limbs (arms and legs). This area brings us spatial awareness through the reflective image between the right and left, thanks to ocular capability. When I observe an object, when the hands touch at a central axis, the axes of vision cross, and we experience space.

The front-back dimension is referred to as the dimension of will. An individual moves out into the world, receiving impressions from behind and moving forward to encounter the



world and the future. They can move towards the shadowy past behind them or, conversely, move towards the future.

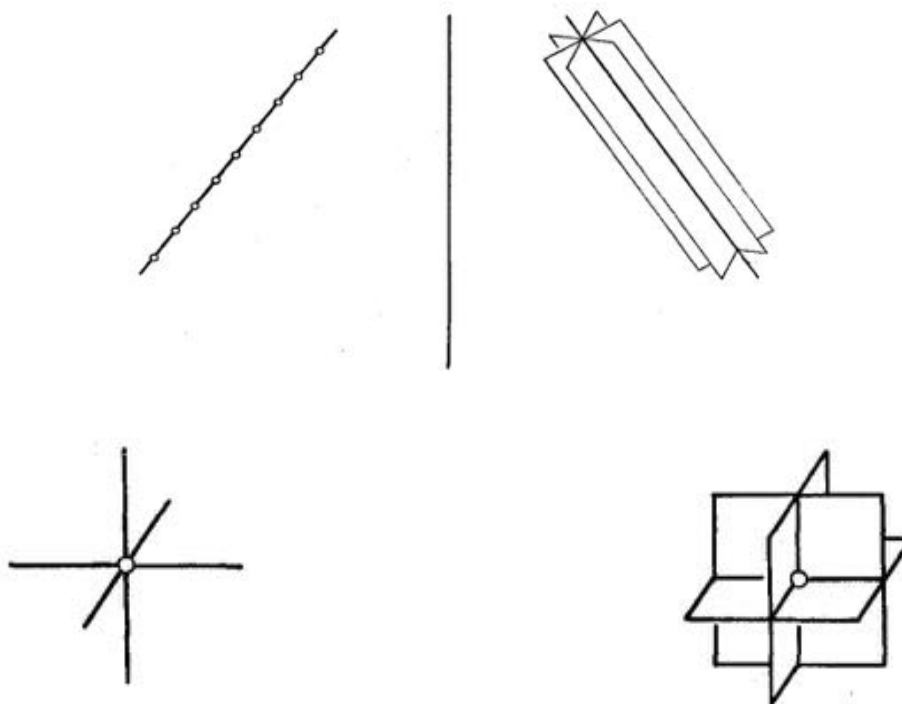
The up-down dimension, determined by the horizontal plane, when we pass this plane through the neck, it separates the head from the trunk, and when we pass it through the waist, it separates the limbs from the trunk.

On the other hand, projective geometry studies the relationship between three-dimensional figures in space and their projections onto a plane.

"Projective geometry holds that in a plane, two parallel lines have a common point, just like any pair of non-parallel lines. Therefore, the statement 'two points determine a line' is as valid as its dual statement 'two lines determine a point.' Projective geometry introduces the concept of infinity." (Organic Geometry: Notes on Projective Geometry - Aldo Di Stilio - 2013)

Other contributions of projective geometry are described by Georg Glöckler in his book (Projective Geometry: Pathway to Integral Understanding of Space - Georg Glöckler - 2014)

"It was discovered that each basic geometric element (point, line, and plane) corresponds to a complementary element: point to plane, plane to point, and line to line. The line is polar to itself. Analogously, an area of points and a bundle of planes are polar to each other."



Polarity point - line

Line as a carrier of points and surfaces.



JUSTIFICATION

This research project is based on the experience that each human being can have of their body awareness through the practice of Bothmer gymnastics and projective geometry in collaboration with movement. Body awareness is understood as self-perception of one's own body in space; how to expand the field of perception and achieve greater awareness of the surrounding space.

Nowadays, because of technology, materialism, we are more and more disconnected from our own body, our temple. It is necessary to work on spatial body perception as human beings, Bothmer gymnastics helps with the perception of the physical body, and projective geometry assists in the perception of space. Therefore, through mutual work, we can achieve a harmonious encounter between our body and space.

“When practicing geometry, the gesture of movement is internal, it is a process where thinking is of great importance. On the other hand, when practicing Bothmer gymnastics, the gesture of movement is external, the physical body is put into action, bringing what has been developed internally into the external world.” (Words of Professor Georg Glöckler during a lecture in Córdoba, Argentina, 2018)

This is why Bothmer gymnastics and geometry have two polar and at the same time complementary gestures of movement.

Some of the questions that accompanied me during the development of this project and motivated every moment of the process were:

- What are the origins of the relationship between geometry and Bothmer?
- What happens in my physical constitution when practicing geometry and Bothmer?
- How can I transform a Bothmer exercise into a meditative exercise?
- How can I find meditation or the meditative process in geometry and Bothmer gymnastics?
- Where does my movement impulse come from?
- What happens to my spatial perception after exercising, drawing, or thinking through a geometric representation exercise?
- Can the will be awakened through a thinking process?



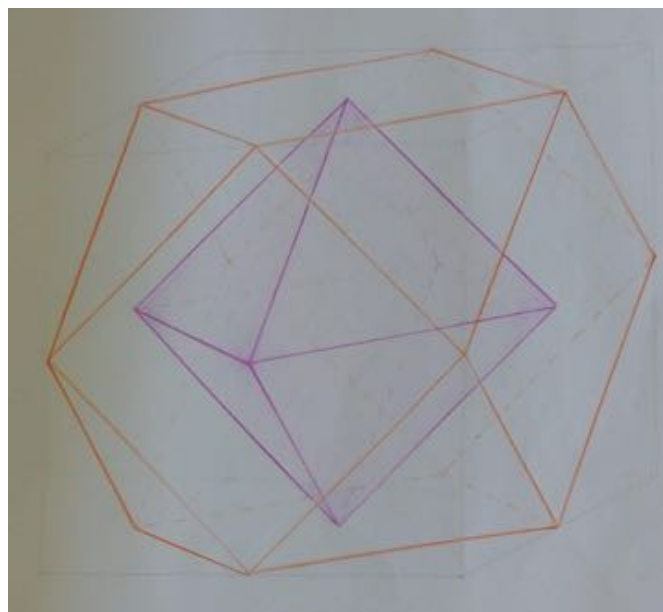
METHODOLOGY

- My own experience practicing Bothmer gymnastics and projective geometry.
- Bothmer gymnastics and geometry classes with interested individuals around the Goetheanum, where I collected information about the experience of the connection between both.
- Interviews with Bothmer gymnastics teachers from Argentina, Brazil, and Switzerland.
- Work with clay exploring forms and movement gestures.
- Interview with teachers from the Anthroposophy course at the Goetheanum.

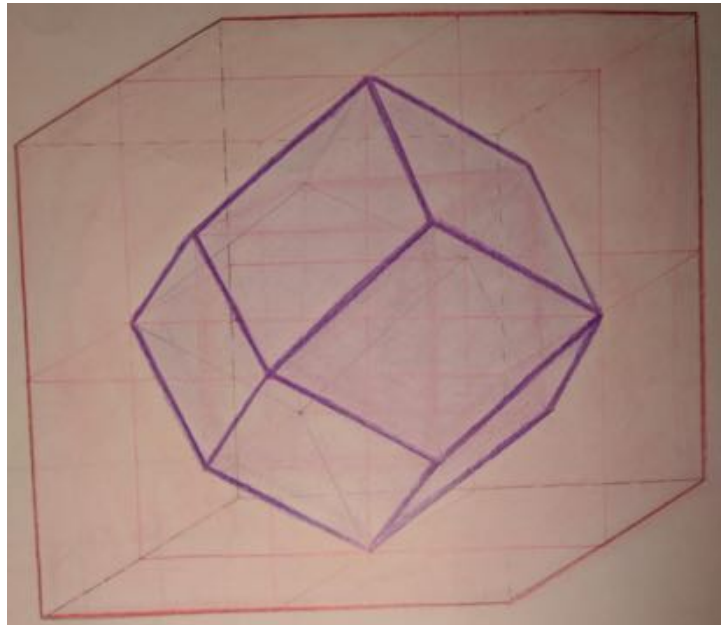
OBSERVATION OF RESULTS

One of the research methods was the practice of drawing Platonic solids and their polarities. This provides us with various experiences, from mental processes like discovering the law that manifests the form, to an emotional process related to perceiving the interior space offered by three-dimensional bodies and their reflection within me as a human being inhabiting the inside and outside, contraction and expansion.

These drawings express various possibilities for perceiving space: Platonic solids, polarities of the bodies, interior and exterior space, space and counter-space, forms or movements that are revealed through the repetition of a law and movement gestures.

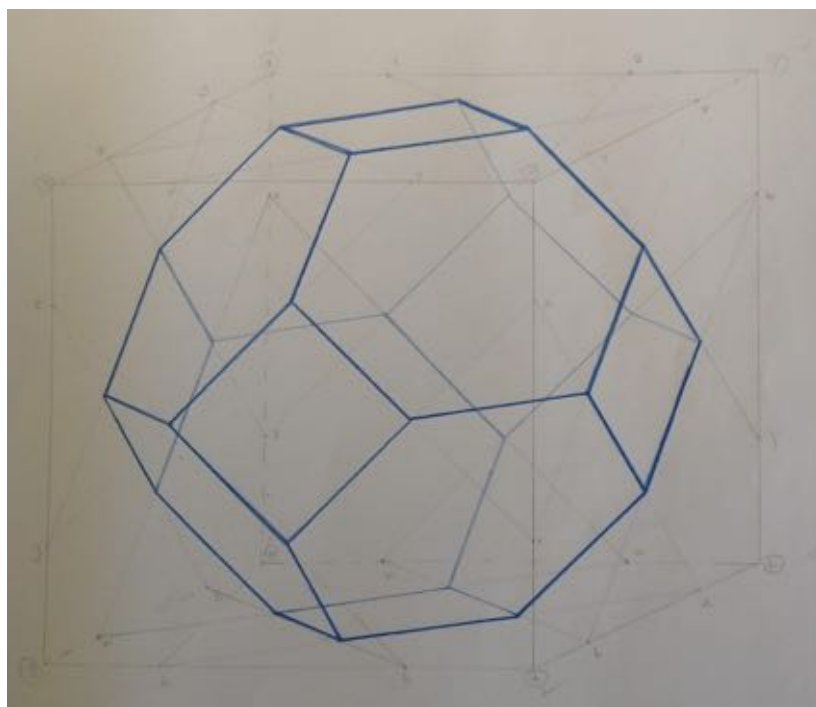


Polarity Hexahedron and Octahedron – Cuboctahedron

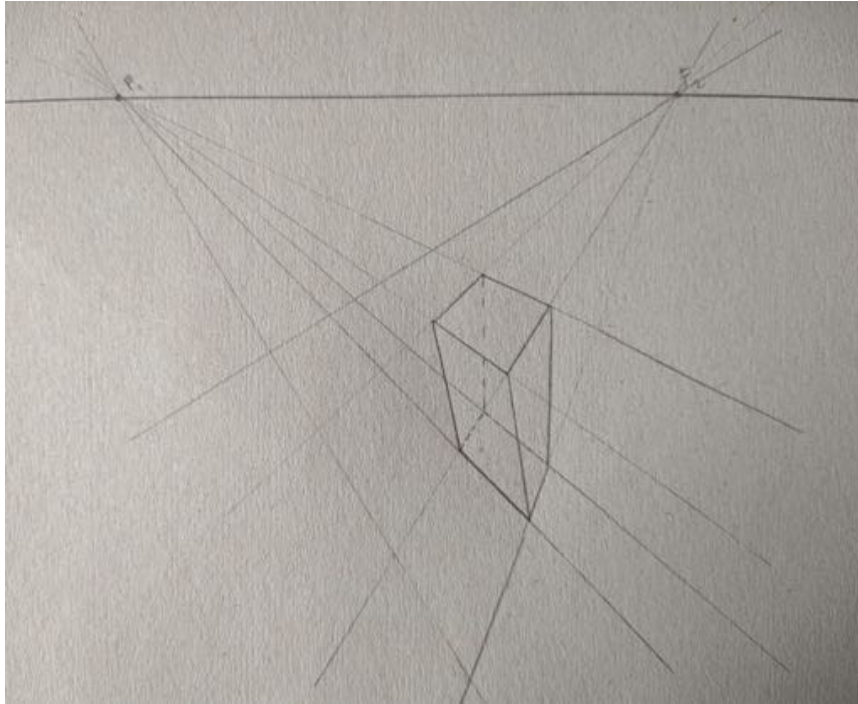


Rhombic Dodecahedron inserted in a Hexahedron.

The Cuboctahedron (previous image) is also the polarity of the Rhombic Dodecahedron.



Truncated Octahedron enclosed within a Hexahedron



Hexahedral cube in projective space with vanishing points on the horizon.

INSIGHTS

Platonic Solids and Polar Bodies

Platonic or regular solids are convex polyhedra in which all faces are congruent regular polygons, and all solid angles are equal.

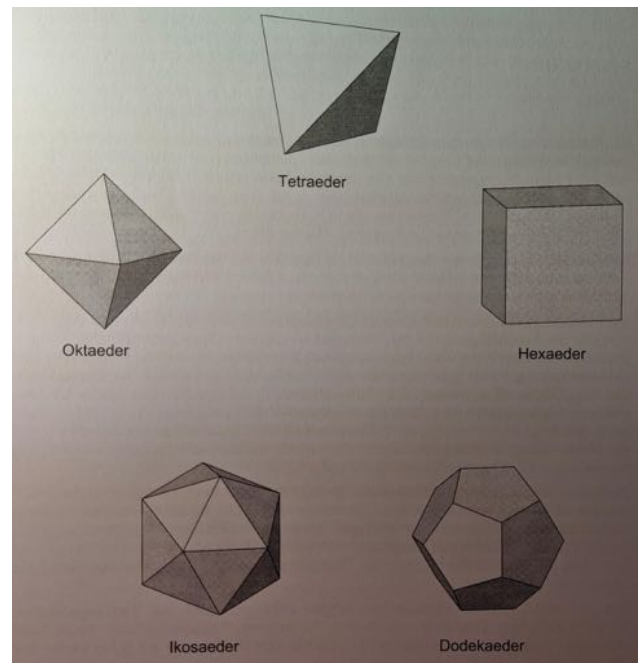
Plato associated each of the four elements that the Greeks believed formed the Universe—fire, air, water, and earth—with a polyhedron: fire with the tetrahedron, air with the octahedron, water with the icosahedron, and earth with the hexahedron or cube. Finally, he associated the last regular polyhedron, the dodecahedron, with the Universe.

To begin discussing three-dimensional bodies, it is necessary to understand how we perceive the three spatial dimensions. To construct this image, it is necessary to start from the point, which is a figure without any dimensionality, having zero dimensions. When a point moves in a constant direction, it forms a straight line, or a one-dimensional figure. Now, visualize the line moving. The result is a plane, which has length and width. Finally, a moving plane describes a three-dimensional figure, with height, length, and width.



Steiner also speaks of a fourth dimension that we cannot perceive but can think about. A tesseract is a geometric body of the fourth dimension: "The spiritual world exists in the fourth dimension of space." (R. Steiner - The Fourth Dimension, Chapter 4, 2001)

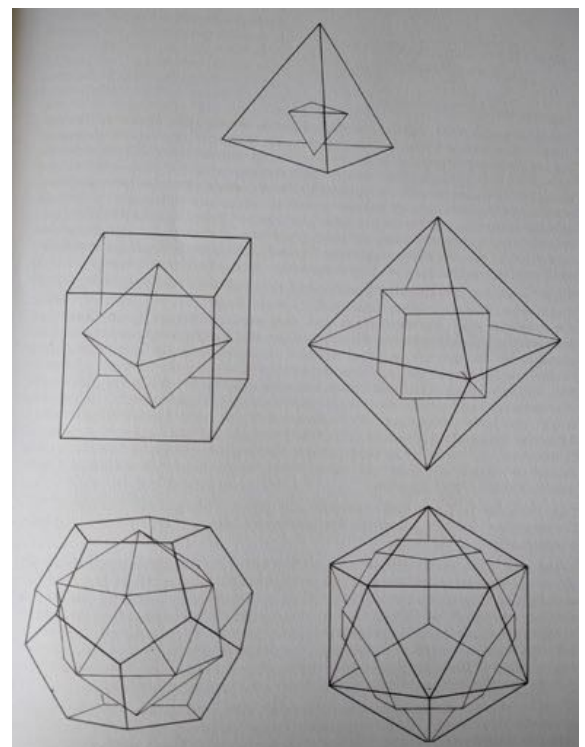
Three-dimensional bodies are the first to provide an interior space. The transition through the dimensions to the third invites the experience of spatiality, to perceive for the first time an inside and, therefore, an outside.



Platonische Körper Renatus Ziegler

From the study of Platonic solids, one observes an interior space and, therefore, an exterior space. Considering this, polar bodies emerge.

Referencing the book *Platonische Körper* (Renatus Ziegler, 2012), we can only reach an understanding of polar bodies if we include the surrounding or exterior space in the Platonic solids. This leads to star polyhedra in the cases of the octahedron, dodecahedron, and icosahedron. If the edge lines and surface planes are extended to the infinitely distant plane, of projectively extended space, we obtain marvelous and harmonious configurations of points, planes, and lines that weave through the entire space.



If this distant plane with its configurations is set in motion in a particular way, the Platonic solids, in particular, undergo a series of developments that can be described as inversion, as there are transitional stages in which the interior of the polyhedron is "inverted" to the exterior.

This idea underlies the so-called Platonic inversion models. The basic idea of the inversion mechanism comes from Paul Schatz, whose ideas were conveniently expanded and adapted to certain additional conditions by various researchers and inventors.

Cubes can transform into octahedrons and dodecahedrons into icosahedrons, and vice versa, if the center of the sphere is placed at the center of the polyhedron; a tetrahedron



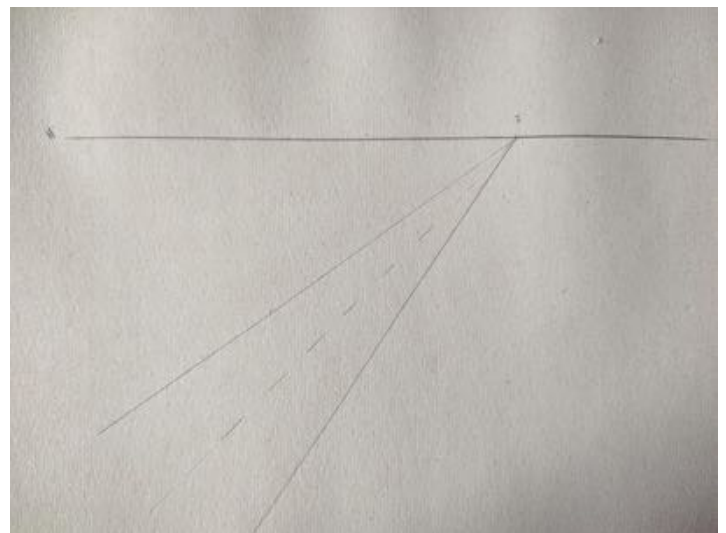
transforms into another tetrahedron. All polarity between two Platonic solids is also a duality. The reverse is also true, as any two Platonic solids can always be positioned such that there is a sphere for which the dual Platonic solids are polar. (Studies on Organic-Dynamic Spatial Awareness - Paul Schatz 2013)

Projections: A New Way of Perceiving Spatiality

Georg Glöckler, in his book Pathway to Integral Understanding of Space - 2014 writes:

"First, it was the artists who internally perceived the modern form of spatial consciousness, and this was especially manifested in painting. Paintings that achieve the effect of perspective with colors (Leonardo da Vinci's famous Madonna of the Rocks) and later images based on linear perspective (Raphael's The School of Athens) show us this new way of perceiving space. In later times, this will be described by mathematicians and geometers who formulate the laws on which perspective is based.

In the following drawing, it can be observed how "parallel" lines coincide at the vanishing point F and also converge with the horizon h. This vanishing point is what first reaches the consciousness of the person seeking to know the point on the infinitely distant horizon in a geometrically visible way; for example, a street that goes towards the horizon.



Observation through perspective proves to be a way of seeing space, where this observation mediates between finite thinking and the thinking of the surrounding space. While Euclidean space describes shapes and figures that belong to this finite world and thus provides a basis for the vision of a compact world, space thought of in terms of perspective offers us the means to approach the limit of the infinite without surpassing it. In other words, the realm of the infinite is transferred to the visible through the vanishing point, the horizontal line, and the distant plane, allowing for conscious interaction with the so-called infinite. In representation through perspective, distant elements are captured in a constructive and functional way, making them accessible to manipulation and drawable."



DISCUSSION

During the research process, many ideas and pieces of information emerged. In this final stage, I want to focus on four aspects in which geometry can collaborate with Bothmer gymnastics and which can be used in the future by teachers, training programs, or working groups in Bothmer gymnastics in collaboration with projective geometry. This is also relevant for the interdisciplinary link between the movement teacher and the mathematics teacher in schools.

The aspects that I will soon develop are the following: *Platonic solids and their polarities, the fourth dimension, spatial projections, and manual work with clay.*

Practicing projective geometry allows for an understanding of expansion in space, observing lines and curves in motion through projections and the construction of laws. This deeply benefits Bothmer gymnastics since, through movement and thanks to the concepts of geometry, the possibility of projecting oneself in all directions, into infinity, is found.

Geometry provides the existence of internal and external space through the knowledge of Platonic solids and their polar bodies. The drawing or imaginative activity of these is an internal experience of the human being, which can be manifested in the external world through a Bothmer movement.

Platonic Solids

Three-dimensional bodies are the first to provide an interior space. The transition through dimensions until reaching the third invites the experience of spatiality, allowing one to perceive an inside and, consequently, an outside for the first time.

This is why I find it important and necessary to experience the existence of internal and external space through the drawing of geometry, specifically through the knowledge of Platonic solids and their polar bodies.

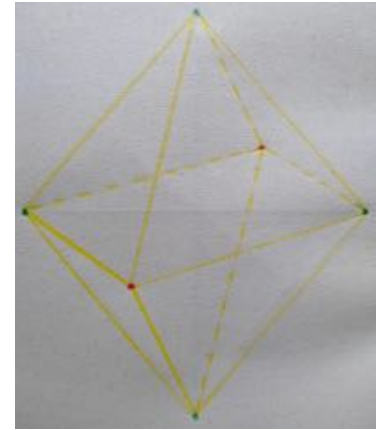
At this moment, I will focus attention on one of the Platonic solids, the octahedron. This solid provides us with the image of a three-dimensional human. From it, we can create the image of the polarities of up-down, right-left, and front-back. At each vertex, there is a union of planes that gives us a point. If this point is extended to infinity through a line, we can find ourselves in the surrounding infinite space. From my three spatial directions, I connect with the infinite.

Here, I will develop an exercise combining words and movement gestures through which we can create, from imagination, an octahedron around our human figure.



Moving Between Six Points

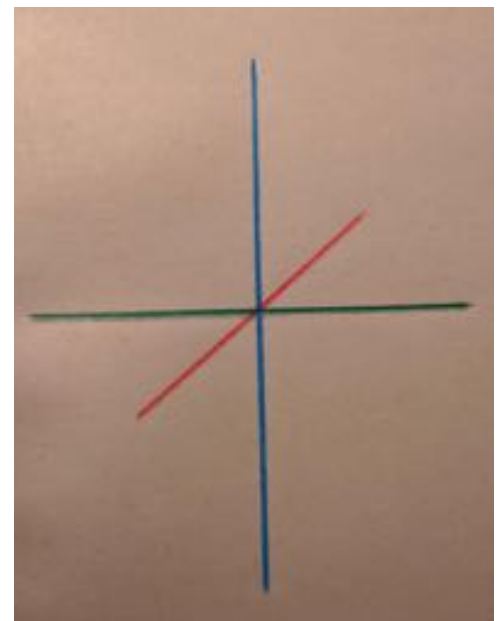
Starting Position: Stand upright, feet together, arms at your sides.



Vertical Axis: Begin by slightly bending your knees and lowering your head, accompanied by a gentle curve of the upper spine. Return to the vertical position, imagining a line projecting from your feet to your head, passing through the center of your body, creating a line that connects the sky and the earth.

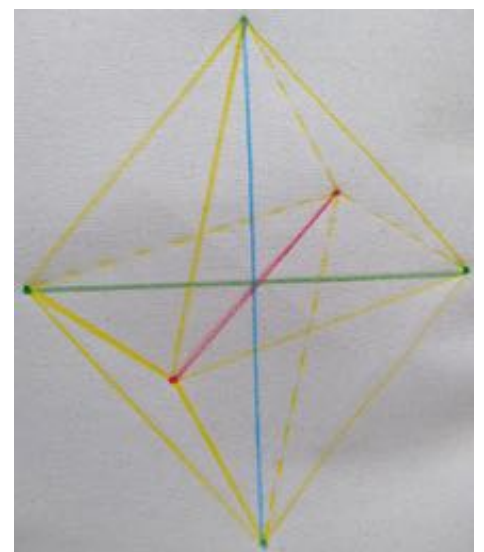
Horizontal Axis: Perform a small swaying movement from right to left, forming a horizontal line that connects your right and left extremities. Gradually decrease this movement, finding the midpoint of this horizontal line and generating the central point. Here, we see the cross in the center of our body, conquering the up-down and right-left axes.

Perform the same swaying gesture **forwards and backwards**, creating a horizontal plane. Repeat the same procedure as before, and when you reach the center, you can observe that you have conquered the three spatial directions of the human being.



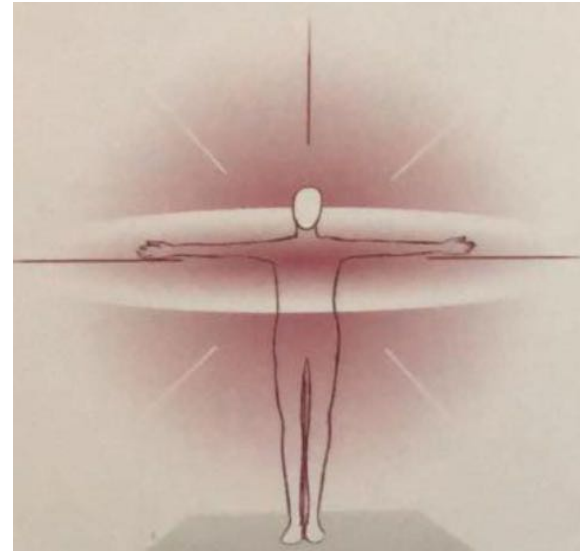
At this moment, through an imaginative process, connect the six points you achieved (front, back, right, left, up, down) with lines, thus forming an octahedron around you.

Through my movement and imagination, I achieve the union of the lines, creating planes and therefore an internal space where I find myself as an individual, generating a vessel to receive the Christ within me. I provide shelter for the spiritual world in the center of my body.





This exercise of constructing an octahedron around the body, is closely related to one of the final exercises in Bothmer gymnastics: The Cross. At the end of the exercise, the human being stands still in a general spatial cross (right-left, up-down, front-back). The hands are in the frontal plane, which, as mentioned earlier, is associated with will and actions. The human being becomes a focal point for forces radiating from within to the outside, while internally there is the mediastinum, this space protects many of the body's vital structures generating, it is the abode of the spiritual world. In this exercise, it is more clearly observed how, through movement, we can consider and connect with the soul and spirit. The breathing between the inside and the outside is balanced.



The Cross - Alheidis Bothmer

Triangle: A New Way of Understanding the Surrounding Space

Through the knowledge of projective geometry, a new concept of the triangle developed by Aldo Di Stilio can be understood.

In Figure A, we can observe the perimeter path of the triangle. In the first image, the traversal is from the inside, and in the subsequent images, it is from the outside. By understanding the concept of infinity and the limit point, we can walk the figure of the triangle from the outside in the direction indicated by the arrows. When we reach the limit point, we reappear at its opposite. For example, in the second triangle, if we choose the upper vertex and walk upwards as indicated by the arrow, upon reaching the limit, we reappear from below.

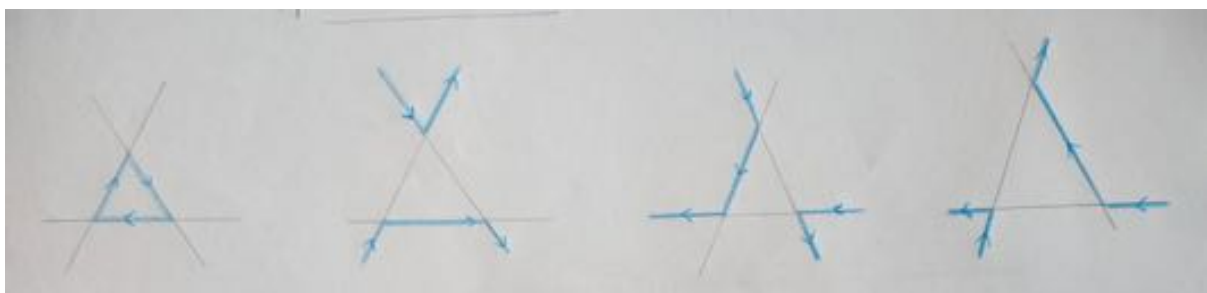


Figure A

From the Above, Three Lines in the Plane Define a Conventional Triangle and Three Triangles with the New Concept



Aldo Di Stilio calls these figures "Trilátero." Three lines divide the plane into four sections. In Figure B, we can observe the metamorphosis of the trilátero. Two of the lines rotate around the horizontal vertices, as indicated by the arrows, until they become parallel and then the triangle reappears from below

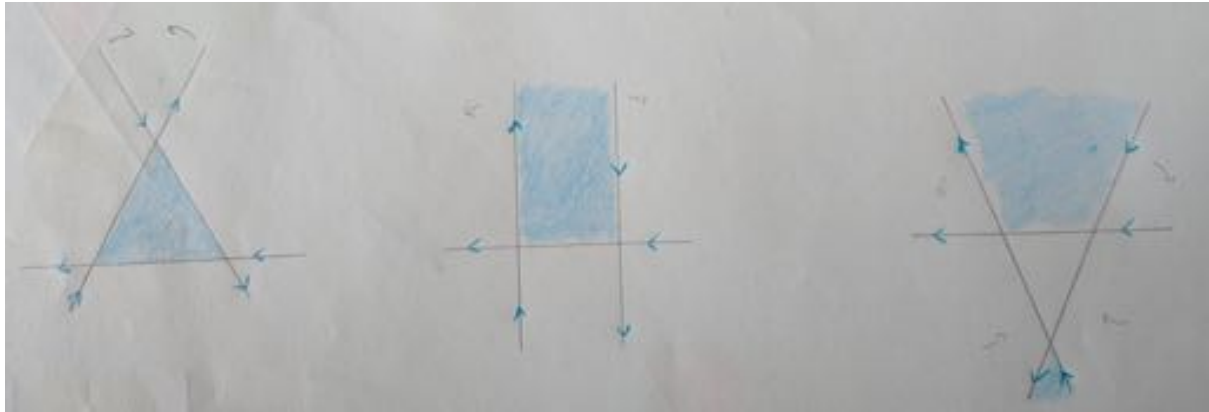


Figure B

In Figure C, we can observe both exercises together, the metamorphosis of the trilátero along with the visualization of the 4 triangles in the plane



Fig C

This concept introduces a new way to perceive the space surrounding the triangle, emphasizing the continuity and interconnectedness of spatial elements. It encourages the perception of space not just as a static entity but as a dynamic field where movement and transitions between inside and outside, as well as finite and infinite, are fluid and interconnected.

By incorporating these geometric concepts into Bothmer gymnastics, practitioners can gain a deeper understanding of their spatial movements and relationships, enhancing both their physical exercises and their awareness of space and form.



This new understanding of the trilátero offers a unique perspective on spatial division and transformation. By visualizing the continuous movement and metamorphosis of geometric shapes, we can develop a more profound comprehension of the relationships between lines, angles, and spaces.

In Bothmer gymnastics, incorporating the concept of the trilátero the person who practices can improve the spatial awareness and movement precision. By imagining the rotation and transformation of lines and shapes around their body, individuals can explore new dimensions of movement and spatial interaction. This approach can lead to more fluid and interconnected motions, mirroring the geometric transformations observed in the trilátero.

This fusion of projective geometry and Bothmer gymnastics can provide a integral approach to understanding and experiencing space, enhancing both cognitive and physical dimensions of spatial interaction.

This exercise has a deep connection with the Bothmer exercise: the Triangle. This exercise is introduced from the age of 12, the school age when children receive their first geometry lessons in Waldorf schools. This exercise can help guide individuals, regardless of age, to a harmonious relationship between polar force currents. In this exercise, there is a two-dimensional experience between up and down, front and back, experiencing the forces of lightness and heaviness. (Alheidis V. Bothmer in her book *Bothmer Gymnastics, Possibilities for Pedagogical and Therapeutic Applications*- 2008, p. 63)

In this exercise, the question arises: where does the infinite manifest? When, through my movement, I go down and back with my arms, I am seeking the upper vertex of the triangle to the infinity in space and bringing it towards me. Now, the upper vertex is within me, becoming my physical midpoint between front and back, up and down. I bring the infinite space into the finite, where my interior also becomes infinite (see the metamorphosis of the Triangle exercise).

In the human being development, they need to find themselves grounded on the earth. When performing a jump with legs apart, what is the appropriate with? Some people jump





too wide, while others jump too narrow. Both deviations indicate the individual's personal sensation of gravity and lightness. A very wide jump indicates a strong connection with the force of gravity, while a very narrow jump indicates a tendency towards lightness. However, both forces need to be brought into a harmonious relationship.

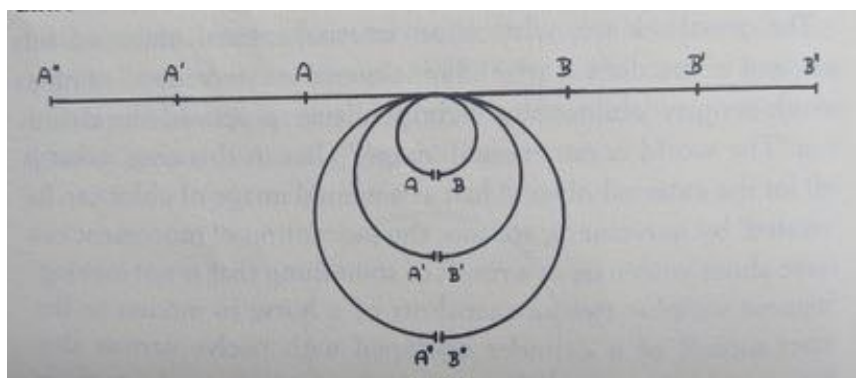
The forces of the two triangles converge at the center of the human being (see metamorphosis number 7). Below, the force of gravity acts on the body, while above, the force of lightness and light radiate inward, making cosmic forces accessible.

Projections and Perspectives

How does drawing projections benefit me in such a way that, when practicing Bothmer, I can experience these projections with my body in space?

In chapter 1 of the book "The Fourth Dimension" by Rudolf Steiner (2001 Edition). it is mentioned that as human beings, we have the capacity to perceive and experience the third dimension, but we also have the ability to think in the fourth dimension. In this context, he provides the example of how two points, A and B, can be connected through movement to form a circle in space.

Imagine now that we make the left endpoint A of this line segment coincide with the right endpoint B, so that they meet below the original line. Then we can pass through the superimposed endpoints and return to our starting point. If the original line segment is short, the resulting circle will be small.



But if I keep curving segments of the line into circles with increasingly longer lengths, the meeting point of their ends moves progressively further from the original line until it becomes infinitely distant. The curvature becomes progressively lighter until, eventually, the human eye can no longer distinguish the circumference of the circle from the straight line. (Figure 1)



In this same example, we can see how the exercise of Bothmer, with its increasing amplitude, reflects the same law of movement (Figure 2). Through movement, one can experience the projection of the midpoint of the circumference into infinity.

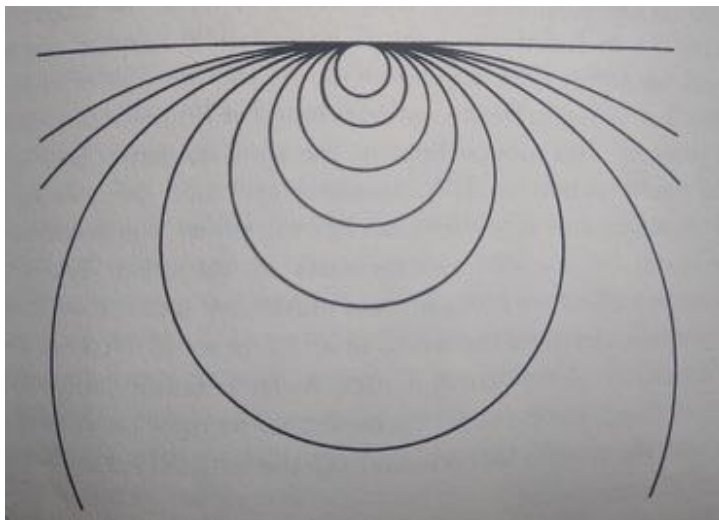
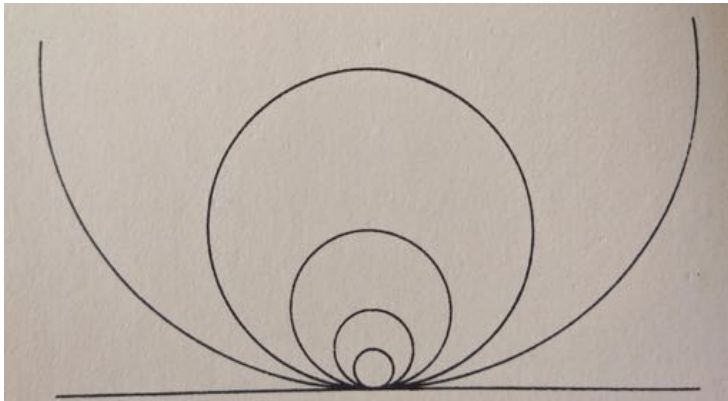
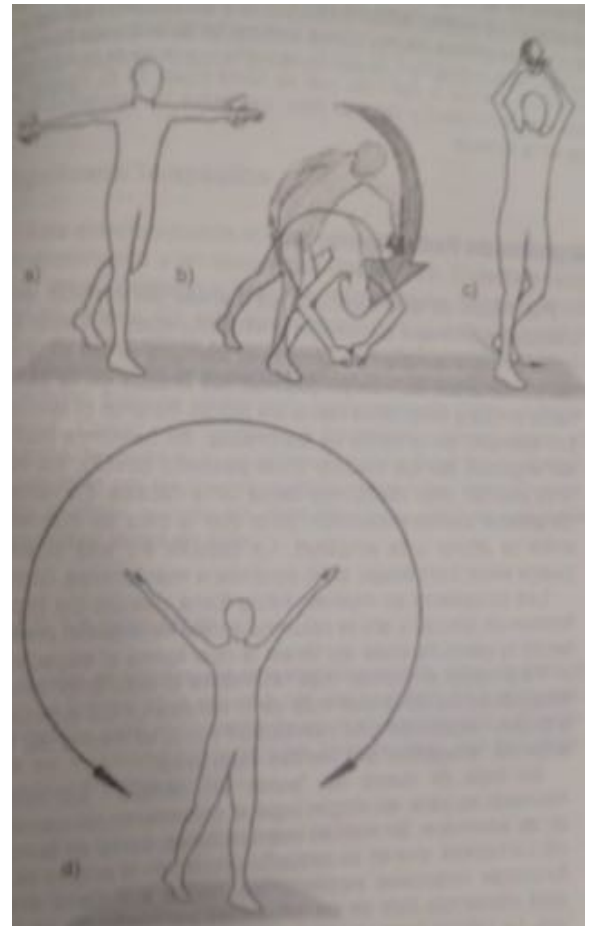


Figure 1



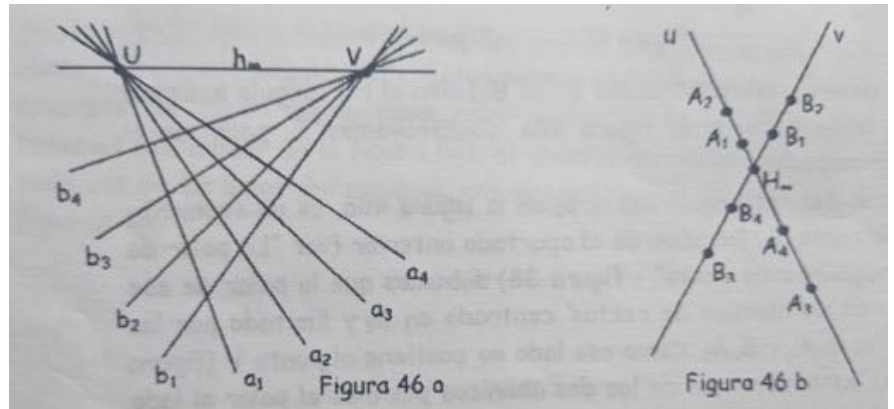
Bothmer Exercise: Increasing Amplitude
(Alheidis Bothmer)

On the other hand, thinking about projections and perspectives paves the way for understanding polar bodies, a topic interrelated with Platonic solids. Once the concept of the polar body is achieved, the laws to find the polarities of the bodies can be discovered.

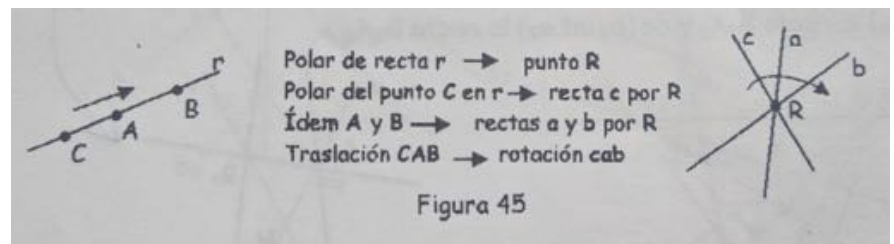
To understand the idea of space and counter-space, it is necessary to revisit the concepts of polarities. We said that the polar of a point is a line and vice versa. Therefore, I will use the following example proposed by Aldo Di Stilio in his book "Geometria Orgánica - 2013" to create an image of how to construct polarity:



Polarity point – line



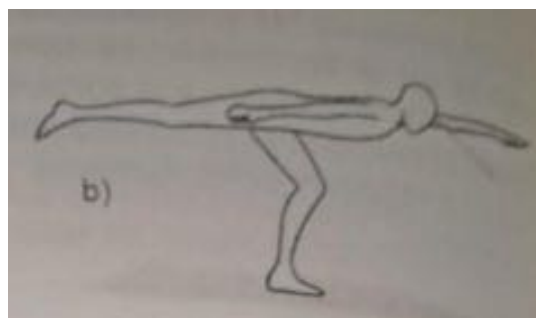
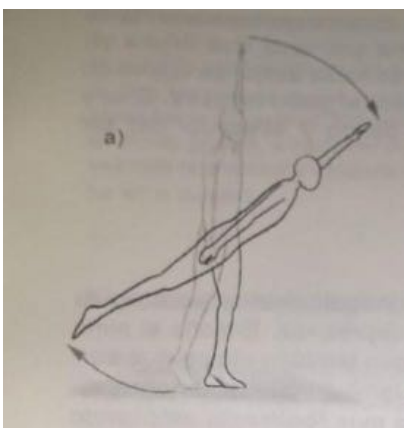
Polarity line – point



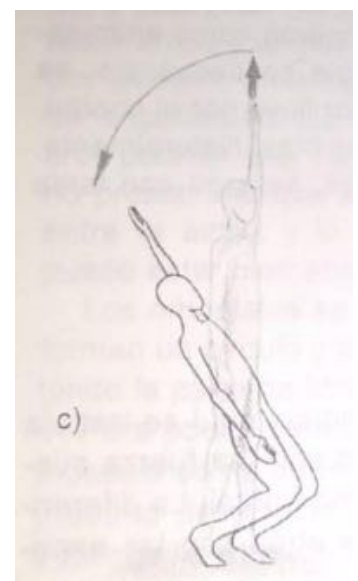
From this concept, there is a law that we can transfer to Bothmer gymnastics exercises by asking, how can I find the polar exercise to a Bothmer exercise?

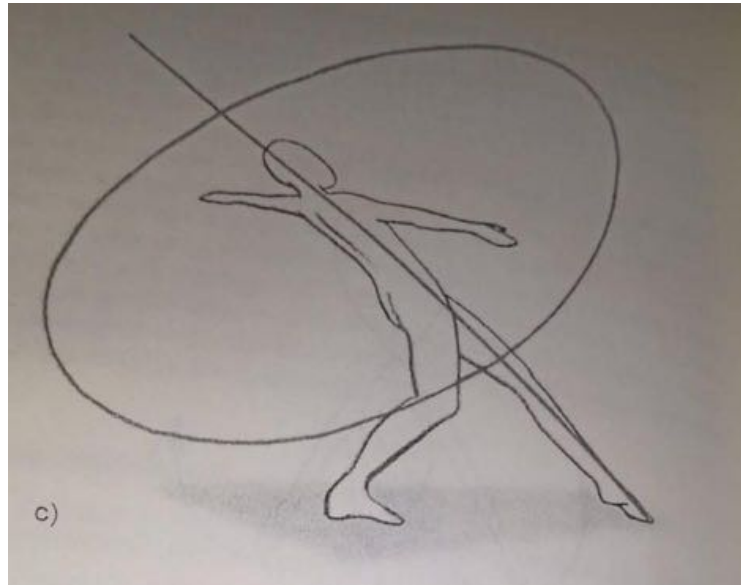
For this, it is necessary to know what elements I need to consider to say that one exercise is polar to another. Just as in geometry, the point is polar to the line, in all Bothmer exercises, various aspects or elements can be distinguished, such as height, width, depth, point and periphery, planes: frontal, sagittal, horizontal. These aspects allow me to "classify" the various exercises into groups. Thus, from these aspects, I can combine exercises and discover polarities among them. Of course, it is not something finished and perfect like a geometric element, but from understanding these aspects, I can play and create harmonious spatial combinations.

I will take as an example two Bothmer gymnastics exercises to observe polarities: the grand line and the turn in the inclined plane.



The Great Line (Alheidis Bothmer)





Rotation on the Inclined Plane
(Alheidis Bothmer)

In these two exercises, the example of the polarity between a line and a point is clear. In the turn on the inclined plane, the center is in the circumference, experienced externally and circumferentially. In the grand line, the experience is internal, representing the line or radius of the circumference. With the turn on the inclined plane, one experiences the circumference from the horizontal plane, while in the grand line, one has the possibility to experience the interior line of that great circumference from the frontal plane.

Manual Work with Clay

The last aspect to develop is manual work, uniting movement (Bothmer Gymnastics) and thinking (projective geometry).

The method I will focus on here involves working with clay, exploring the metamorphosis of movement that can be generated by imprinting one's will onto the material. When a person receives a piece of clay with the willpower of their hands, they have the potential to transform it, imprinting their entire being onto it, discovering a law, and manifesting a form. In this case, the metamorphosis of manual movement manifested in the Platonic solid, the icosahedron.

Working with clay provides a tangible way to explore and manifest the forms and gestures of movement learned in Bothmer Gymnastics and projective geometry. Through this hands-on approach, individuals can deepen their understanding and connection to the spatial concepts they are studying. The process of shaping clay involves a direct engagement with the material, allowing for a physical embodiment of the geometric principles and



movements. This not only reinforces theoretical knowledge but also enhances the individual's bodily awareness and spatial perception.

By integrating the tactile experience of clay modeling with the intellectual and physical practices of Bothmer Gymnastics and projective geometry, a comprehensive learning process is created. This approach bridges the gap between abstract concepts and physical reality, fostering a deeper appreciation and understanding of the harmonious relationship between the human body and the surrounding space. Through this interdisciplinary method, educators and practitioners can cultivate a more comprehensive and embodied experience of spatial awareness and geometric principles





CONCLUSION

If we consider physical movement in isolation, as merely a manifestation of the physical body, we fall into materialism, into something finite and necrotizing. However, if we observe, think about, and experience movement projected into space with a profound sense, like the way a point travels through space to become a line, rises with its forces to verticality, and generates an internal space to "welcome and receive" the spiritual world, an internal space is also created within the human being for spirituality to dwell. Starting from oneself, from one's own will and awareness in the limbs, one projects into space, finding that subtle connection with the spiritual world, that "in-between" space between one's own perception of the physical-sensory constitution and the surrounding elemental spiritual world.

In this sense, projective geometry aids in that projection into space, in the encounter with the laws of space, the three planes, and dimensions that the human being perceives through their own constitution. This makes a person conscious of three-dimensionality, which is inherent to them. In contemplating, experiencing, and feeling space as such, one creates a movement with meaning, a salutogenic movement in connection with the spiritual world. Thus, it can be said that the space experienced through Bothmer Gymnastics is a space for encountering the spiritual.

We, as human beings, perceive these three physical spatial dimensions. Rudolf Steiner in the lecture series (The balance in the World and Man, Lucifer and Ahriman - GA 158 21.11.1914), also mentions these three related dimensions that we, as human beings, constantly struggle with against the Ahrimanic and Luciferic forces:

"In morality, in logic and in all the activity of the soul, Lucifer and Ahriman are working one upon the other, and man stands at the boundary between them.."

In the forward and backward dimensions, we struggle with antipathies and sympathies. In the upward and downward dimensions, we deal with the terrestrial forces of gravity and the cosmic forces of levity. In the right and left dimensions, he describes it as the struggle of thought: the left represents thinking from the heart, Luciferic, and the right is related to the thinking from the brain. It is our task to find the middle ground and not become polarized.

Through Bothmer, we can work on and become aware of these polarities, work on our physical constitution, and thus find a healthy balance within ourselves.

By focusing on geometry, the entire being contracts into deep thought, with forces moving inward in a continuous, gentle breath—expansive and deeply contracting. These external forces gradually shape and manifest forms through one's own will.

When working with clay, the contraction force becomes even more visible. From the outside, one imprints this contraction force, and through modeling, discovers the law and manifests the geometric figure, the form. The moment when one discovers a law of movement and the



form appears repeatedly is crucial. This is where Bothmer Gymnastics and geometry profoundly intersect. The internal sensation of exploration, of delving deeper into discovering the law until, in a moment of complete contraction, it manifests.

This moment can be referred to in various ways: as infinity from a mathematical-geometric perspective, where everything transforms and returns from its opposite with a new quality; as an inspirational moment where one, as an individual, has the ability to connect with the universal cosmic idea, and the law reveals itself. In "The Philosophy of Freedom" (1894 GA 4) Rudolf Steiner refers to this deepest stage, where the boundaries between oneself and the cosmic universal blur, as intuition. It is a unique moment of inner transformation—something within changes, something is discovered, and a new perception arises, leading to an inner transformation.

This moment is unique in both geometry and Bothmer. Delving into a movement, contemplating it, practicing it repeatedly in deep contraction, like a whirlwind reaching the point of infinite convergence, transforms and opens up new perspectives, qualities, and inner experiences. This transformation within allows one to explore and experience the outer space.

In Bothmer gymnastics, we always move around space, traverse it, cut through it, experiencing from three dimensions. Thanks to the contribution of projective geometry, we can think that there is a projective space, an infinity, a vanishing point, and a counter-space. Now, with each movement, one projects into the surrounding infinity; it's not in a specific point but all around me.

With each movement, one projects, finding that union with the infinite. But through one's own will, one can transform the movement into the infinite and return from the other side, only through will, through movement can we make the gesture continue, otherwise, we would get lost in the infinite.

We can think about the infinite, we can imagine it. Projective geometry is an imaginative process, and thanks to that, Bothmer can expand its movements in space. Movement does not end at the fingertips; it ends in the infinite, which is a paradox because it has no end. They are eternal movements that, through will, one can find the breath between oneself and the world, between oneself and the infinite, between oneself and the spiritual world.

I deeply believe that geometry provides the quality of contraction and Bothmer the quality of expansion; one needs the other. If one lives solely in geometry, in thought, and law, one risks losing oneself. Similarly, living in complete expansion also risks losing oneself. Thus, in complete communion, through the combined work of geometry and Bothmer, one can find balance, that healthy equilibrium of spatial movement laws. Experiencing the polarities of expansion and contraction, and playing to find one's center, the midpoint, the mediastinum, where the Christ lives within, makes one conscious of this inner space with its polarity in the



outer, cosmic universal, spiritual world. Geometry shapes the inner space, while Bothmer allows one to experience the outer space.

Spiritualizing space and imbuing movement with deeper meaning, we uncover a spiritual backdrop underlying our actions. We engage with our surroundings through our forces of movement, shaping and transforming the very form of the space we inhabit. This connection between our inner essence and the external world allows us not only to perceive physical space but also to experience its spiritual dimension. In each gesture, in every conscious movement, we find an opportunity to transcend the material and explore the depths of our being.

As Steiner mentions in the first chapter of "The Threshold of the Spiritual World" (Ga 16/17 2006): *"In thinking, I experience myself united with the stream of cosmic existence"*

"Durch meine Menschlichkeit
offenbart sich mir in meinem
Leben,
das Mathematische, das
Geometrische,
und in dem ich verlängere
mein Oben-Unten,
mein Rechts-Links,
mein Vorne-Hinten,
umfasse ich von mir aus,
die Welt."

"A través de mi naturaleza humana
se reveló en mi propia vida,
el matemático, el geométrico,
y al estirar mi arriba-abajo,
mi derecha-izquierda,
mi frente-atrás,
yo abarco, a partir de mí,
el mundo."

"Through my human nature, revealed in my own life,
the mathematical, the geometrical, and by stretching
my up-down, my right-left, my front-back,
I embrace, from myself, the world."

Rudolf Steiner



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