Chess Set Theory:
The Fractal Realism of Bontempelli & Borges

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Chess is traced back to its earliest form, *chuturanga*, meaning 'four limbs' or 'four parts' that represent a whole, to 6th century India. Around 1200, the rules take their modern form in southern Europe. It is not until the 1860s, however, that it begins to be conceived of as an international sport, increasingly present in the 20th century when global conflicts are interestingly mirrored or mimicked at the intellectual level by chess competitions and rivalries. Contemporary to this rise in popularity, the chess set as an object becomes markedly important to cultural producers, appearing in fantastic and early science-fiction stories like Arrigo Boito's 1863 "L'alfier nero" and Ambrose Bierce's 1893 "Moxon's Master;" then proliferating around the years of WWI, in works of the historical avant-garde: Giorgio De Chirico's metaphysical paintings, many famously reminiscent of the chess set, with an explicit example in his 1911-12 *L'enigma dell'arrivo e del pomeriggio*, "A Game of Chess" in T.S. Eliot's 1922 modernist poem The Waste Land, René Clair's 1924 film Entr'acte, in which Man Ray and Marcel Duchamp play a game of chess in Paris, the board superimposed on images of the city itself. For Marcel Duchamp using chess in art was not sufficient. In 1918, he had renounced art for chess, and left Paris for Buenos Aires, where he remained for nine months to play the game, of which he said: "The chess pieces are the block alphabet which shapes thoughts; and these thoughts, although making a visual design on the chessboard, express their beauty abstractly, like a poem." (D'Harnoncourt 130) The international chess championship followed him to Buenos Aires in 1927, where the world champion, Cuba's José Raul Capablanca, known as the Chess-Machine, lost his title to Russia's Alexandar Alekhine. This intellectual exchange between Latin America and Europe, with important competitors and competitions in the United States, is illustrative of the game's hyper-cosmopolitan nature. More than physical sports during the interwar period, more than armies, more than most of the art scene, chess crossed frontiers and became a national concern and

international competition. Yet, the game's significance is more profound than a simple global battle of the wits, a sporting allegory of men's more dramatic actions. The figure of the chess set, in literature and art, becomes not just trendy thus prevalent, but prevalent because artists sense it is swollen with meaning. It represents something that is seemingly enigmatic, as seen in De Chirico's title, for in the semiotics and semantics of the game, that which it denotes or could possibly denote is multiple and profound.

It swells precisely when it does, in part, as man intuits in it a transfinite signifier, that is, a finite symbol that—as Georg Cantor first demonstrated in the 1870s with his publications on set theory—can be used to express and theorize about infinity, at the same time that the very idea of transfinity, and, similarly, fractality in universal design are theorized. It is a new signifier of various infinites for a new century, when scientific discoveries caused changes in the way man understood his ontological state and metaphysical beyond. At the turn of the 20th century, Nietzsche had put the last nail in God's coffin and made room for physicists to enter the allegorical metaphysical space He had occupied, to begin in earnest investigations of an empirical beyond. In theoretical physics, the empirical sciences of the Enlightenment increasingly take on aspects of philosophy, as they move further away from our everyday observations and towards the realm of the infinite, the unknown, the unfathomable. Theoretical physicists, like Albert Einstein, explore our grand antecedent, just as religion and philosophy do, but use a different set of symbols and different syntactic rules to arrive there. While philosophers use phrases and letters, scientists use equations and numbers. In 1905, Einstein published his treatise on Special Relativity in which he postulated his famous E=mc^2. Implicit in this treatise is the idea that matter and energy are mutually convertible, energy equals matter equals energy, which means that the invisible equals the visible equals the invisible. This theorem holds profound implications for the status of the human soul, as it states that pure energy does not exist but is measured by the mass it is associated with and which is an innate property of it. Even more important for the purpose of this paper, was Einstein's expansion of Special Relativity to his 1915 theorem on General Relativity. Time as a fourth dimension[1] was implicit in Special Relativity, and in General Relativity it becomes part of the woven experience of reality: spacetime. In

a final advancement that is pertinent here, between 1909 and 1911, nearly the same years as the first postulation of a fourth dimension, Ernest Rutherford proved the already-theorized structure of the atom. It, like the solar system, like the theorized structure of the galaxy, is built of a nucleus with orbiters. For metaphysics and ontology (as well as cosmology), this implies an infinite *mise en abyme*, not just of internal/external conceptions of space and time as experience, but concretely, as the shape of the universe itself. The fractalizing universe problematizes certain strains of philosophy which assume the structure of a sort of calculus-philosophy of limits, always arriving closer to the core answer, but never reaching it. However, this idea is not new to philosophy, Zeno of Elea had already broached it in the 400s BCE with his paradoxes of infinity. The development exists not in the idea of an upper limit to our knowledge of the universe, but rather, in the fact that this philosophical hypothesis finds itself sustained by discoveries in the empirical sciences.

The movement referred to here as "Fractal Realism" marks a shift in imagining experienced by western intellectuals, the product of these and other demonstrations, significantly in the empirical sciences, of an objective invisible-real as well as a complicated new conception of scaled infinities. Fractal Realism developed in (and developed) certain newly discovered spaces, some of the only uncharted geography remaining in the modern world: the spheres of reality that are empirically verified without any direct ocular observation. This paper investigates how and why the Fractal Realist authors Massimo Bontempelli and Jorge Luis Borges sought to express this shift figuratively via the chess set. But first, Fractal Realism needs a rigorous delineation, up from its roots in a greater cultural movement that Franz Roh defined for art in 1925 in his treatise: "Nach Expressionismus: Magischer Realismus: Probleme der neuesten europäischen Malerei." Fractal Realism notably differs from other near-contemporary literary movements. It differs from the fantastic in that the seemingly magical of Fractal Realism does not threaten the quotidian experience of reality, but exists in tandem with it. It differs from Surrealism in that it attempts to maintain a certain objectivity, it is not merely the phantasmagoric and subjective bodying forth of the unconscious. Nor does it cling to Nietzsche's claim, which would later become a tenet of the postmodern, that "there are no facts, only interpretations." (Nietzsche 458) It differs from common definitions of magical realism associated

with the Latin American *real maravilloso* or r*ealismo mágico* in that it is significantly and necessarily a transcontinental phenomenon. Indeed, the use of the term Fractal Realism, rather than of Roh's *magischer realismus* or magic realism, is necessary to better distinguish it from the current conception of magical realism as it was geographically allocated in 1955 by Angel Flores in his "Magical Realism in Spanish American Fiction," and as it is often conceived of today: as the product of hyper-localized sociopolitical conditions that aim to define or redefine the national identity or founding mythology of a subjugated and marginalized people.

Fractal Realism ingests Freud's 1900 conception of the unconscious, which opened the subjective, psychological, dream-sphere that gave scientists and laymen a new means of understanding man's subjective experience of reality. It is objectively tempered, however, by the creative incorporation of advances in the empirical sciences, which open magical and invisible spheres that affect, not man's subjective, but the *objective* experience of reality experienced uniformly across humanity. As this delineation is rooted in *magischer realismus*, it will be useful to ground the argument in some of Roh's original observations, which follow here, cited from his treatise:

- A renewed delight in the real object
- With the choice of 'magic' rather than 'mystic,' one intends the mystery that hides and palpitates behind the world rather than that which descends to it
- The magic of being against the final frontier of space, of nothingness
- A spiritualized objectivity that manifests from an interior point of departure
- Painting now seems to feel the reality of the object and of space, not like copies of nature, but like another creation
- The *feeling of space* has changed … searches for a secret geometry
- It attempts to locate *infinity* in small things, the extent to which the miniature can express maximum power *all by itself* can be explained by thinking of … *the spectacle of the starry sky, through which we experience infinity* [all emphasis his]
- In science the same macro/micro applies: the planetary microcosm of the atom is a mystery in the end, no less than the macrocosm of astronomy

There is in *magischer realismus* a renewed interest in objective reality, in real objects, and in the magic quality of both. The feeling of space has changed and the landscape has become reminiscent, somehow, of the final frontier, a notion that will become important to the fictional landscapes, as well as the real landscape of the Pampas, dealt with here. There is, finally, the attempt to portray the infinite within the smallest form, just as the molecule does.

Significantly, Roh begins his article with this assertion: "The phases of all art can be

distinguished quite simply by means of the particular *objects* [emphasis his] that artists perceive." (Roh 16) In this study of an object—the chess set—as it pertains to a phase of art, it will be significant to see how it fulfills the formal characteristics and desired goals of the phase as described by Roh. Bontempelli's *La scacchiera davanti allo specchio* is traditionally the first text associated with Roh's *magischer realismus*, and, through the figure of the chess set, one can discern similarities of form and content, of philosophy and imagination, that link the European, historical avant-garde movement directly to certain works of Jorge Luis Borges. Both Bontempelli and Borges use the chess set as an entry point to the infinite, a transfinite symbol, as the canvas is to the infinite night sky for Roh. The chess set is powerful enough to play this role because it is a complex signifier of (1) the *mise en abyme* of the dream-sphere, and increasingly imaged and mirrored world (2) the fractal hierarchy of the universe and our relative and variable place in it and (3) the man-made symbols, i.e. numbers, letters, that are encoded and deciphered by man and through which the intellect manifests in physical space, giving him the ability to decipher the universe. These spaces are the same as those which have been altered or unlocked in the first two decades of the 20th century by the exact sciences, but they are also ancient philosophical and mystical themes. The chess set resonates almost-omnipresently across historical-time and space: with the "frigid, metallic" (17) form that Roh calls for in contemporary art for the 1920s, with the modern intellectual, with ancient Indian traditions where the game was born, with the mystical language of the Kabbalah, and with the western chivalric tradition that provides vignettes in European history books and centuries of imagery in literature. This complex resonance gives it nuances of modernity, history, and spirituality that deepen its symbolism, lending it an ancient power in the communal memory, and making it a figure easily capable of unlocking closed doors, as it does in Massimo Bontempelli's novella, *La scacchiera davanti allo specchio*.

In a sort of negative of Lewis Carroll's *Through the Looking Glass*, Bontempelli's young protagonist is transported to a world beyond the mirror via interaction with an animate chess piece. While Carroll's world is full, colorful, marvelous, fascinating, and reminiscent of a nursery rhyme, Bontempelli's is a nonchalant void, without light, without time, without plants or animals, populated by a dusty ground, arrogant and garrulous chess pieces, and haunting images of people who have

looked into the mirror in the 550 odd years since its creation. The tale begins with the narrator, a boy of eight, punished and locked in a blue room with only a dresser, mirror and chess set. Bontempelli immediately sets up the dynamic of his *mise en abyme* as the boy approaches the mirror but is too small to see himself reflected in it. He says: "Io guardavo lo specchio, lo specchio rifletteva la scacchiera." (13) The image of the White King magically looks away from the White King on the dresser and down on the boy, telling him to close his eyes; with the power of his will, he will be transported to the world beyond the mirror's surface. The beyond signified here is multiple as the chess set acts as both access to the unconscious dream-state, as the boy must close his eyes to both enter and exit the land, and to another level or sphere of a fractal universe. This level seems to exist as a lesser dimension $(2D)^2$ within our 3D reality, but it carries within it implications of existing as an equal or somehow higher dimension, problematizing man's place as he sees himself situated between a God above and objects/images below.

Bontempelli's world beyond the mirror allows him to access an existential uncertainty about man's place in the universe that is exacerbated by the increasingly objectified and objectifying reality of the 20th century, and further still by WWI. *La scacchiera* was published the same year as Mussolini's March on Rome, and Bontempelli was a young activist, yet the novella is backward looking, pivoting around the Great War. The narrator who recounts his childhood memory of the mirror-land states in the first pages: "Ne risulterà che l'età di otto anni l'avevo parecchi anni prima che scoppiasse la guerra europea. E questo è quanto basta. Di qualunque fatto si parli l'importante è sapere se avvenne prima della guerra, oppure dopo. Il più o il meno non conta." (10) The narrator deals with it as a foundational event, a turning point. Bontempelli was a passionate *interventista*, desirous of Italian intervention in the war, and afterwards he continued to support revolution, even through violence, as Mussolini's militant March on Rome and Bontempelli's adherence to the party suggest. Thus we cannot assume a pejorative change of point of view after the war and might wonder, what, then, *would* change about this story or this land beyond the mirror if it were a post-WWI event? The answer to that question will come at the end.

Let us start here from the beginning, when the narrator finds himself in a land of objects and

images after being transported through the reflection of the chess set to the land beyond the mirror. There are no plants or animals, which the White King, the boy's sort of Virgilian guide, rationalizes by saying that only beings who look at themselves in the mirror are transported. Chess pieces, he claims, are sentient beings, but humans are too arrogant and self-centered to realize it. In fact, he claims, human history is dictated by chess, that is, it resembles a chess game, and not vice versa: "i pezzi degli scacchi sono molto, molto più antichi degli uomini … Tutto quello che accade tra gli uomini, specialmente le cose più importanti che si studiano poi nella storia, non sono altro che imitazioni confuse e variazioni impasticciate di grandi partite a scacchi, giocate da noi." (35) As proof of the superiority of both the chess set and the mirror land, he points out that images last forever, as do chess pieces. They never age or change and thus time for them is unmeasured and infinite. When the boy wanders away from his guide and the guide's court, an errant knight in a post-apocalyptic chivalric absurdity, he finds himself going up what feels like an incline but what looks like the same flat, endless, horizontal plane. At the top, he finds another sort of board inscribed in the land, a "paesaggio di oggetti, fondato in una piazza quadrata." (46) The land is lorded over by a headless and armless mannequin, who claims that the White King is ignorant and arrogant to claim that chess pieces are superior to other man-made objects. He claims that mirrors are made to receive and eternalize the images of objects and that, as everyone knows, they happen to reflect the images of men and women as well, but that it is an unimportant side effect of their existence. As far as the mannequin is concerned, chess pieces are part man and part object, making them lesser than pure objects. The mannequin himself is lord of the objects, he explains, because he is the object *par excellence*, on which men and women are constantly trying to model themselves so as to seem mannequins themselves.

The mannequin's existence reintroduces the question of the dearth of flora and fauna in a world that is populated by only man-made creations, and by images of men themselves, objectified to resemble their creations. Such a structure makes man the God of this realm, and in fact, the narrator is introduced to the eternalized image of the Venetian mirror-maker, himself, who evokes William Paley's analogy of God as a watchmaker. This could be considered a criticism of man's self-conception

at the turn of the 20th century as an increasingly dominant force on Earth, more powerful, perhaps, than the Earth itself. That there is no sun, nor stars, there is no time or geographical variation, highlights how poorly men's creations compare to nature's. There is but one object-landscape and then as far as the eye can see there is only a gray wasteland. But Bontempelli is not a critic in later years of either scientific advances that hedge in on nature's power over man, nor of the idea of man as creator. In a compilation of aphorisms, *Il bianco e il nero*, written in the last decade of his life, Bontempelli writes: "La preghiera è una rinunzia a se stessi … Verrà il giorno della religione dell'uomo, quando si scoprirà creatore dell'universo dal nulla, dico dell'universo anche fisico. E pregherà a se stesso." (133) Thus the land as a critique of the man-made world, appears oversimplified.

In fact, the land beyond the mirror introduces a complicated hierarchy of realms, which travels, in man's view, in the direction of God to object with man in between. But just as man is at the center of his universe, the White King is at the center of his own universe, and the mannequin at the center of his, introducing a multi-directionality in which all fractal realms are at the point closest to the Godhead, or ultimate realm. This complication of the power structure of existence and man's view of omnipotence descending down to him from an infinite, so naturally larger, outer space, in an infinite, fractal ascension of spheres is an element at play in Borges as well, as in his poem "Ajedrez," which ends: "No saben [las piezas] que la mano señalada / Del jugador gobierna su destino, / No saben que un rigor adamantino / Sujeta su albedrío y su jornada. / También el jugador è prisionero / (La sentencia es de Omar) de otro tablero / De negras noches y de blancos días. Dios mueve el jugador, y éste, la pieza. / ¿Qué dios detrás de Dios la trama empieza / De polvo y tiempo y sueño y agonías?" (191, l. 19-28) The introduction of this realm in Bontempelli, however, threatens to upturn not only man's ontological self-conception, but, his experience of contemporary reality in an acutely relevant key; it sees man as objectified, multiplied, and reflected in image (including reflection in moving image as the creation of cinematic film had recently allowed for), as well as seeing him as subjugated by the objects he creates, questioning in a much more material and concrete way the assumed hierarchy of man over object.[3] The troublesome relationship between man and his objects/

images is intensified when the boy is assaulted by the images who threaten him and then launch an attack, throwing chess pieces at him, until the sound of thunder (another mirror breaking and its dimension being destroyed along with all of its screaming image-inhabitants) disperses the attackers. The boy is terrified by the objects and images when he realizes he has little power in their realm.[4] In order to return to his quotidian reality, he decides he must hold on tight to the White King, again the magical transition piece between realms. In the meantime, he falls asleep, waking to the door of the blue room opening.

If it had not been for the shattering dimension, one presumes the boy would have been overcome and defeated by images and objects, which is a sensation that increasingly worried cultural scholars as the 20th century progressed. Man becomes lost, overwhelmed, overshadowed, and even controlled by the images and objects that surround and assault him. A defining event indicative of the change in relationship between man and his objects comes with the horrific events of WWI, which saw the devastating effects of chemical warfare, strategic aviation bombers, machine guns and modern artillery, leading to an unprecedented number of casualties. Often when WWI is referred to as a historical turning point, as Bontempelli specifically refers to it, it is in the sense that man for the first time realizes the dangerous implications of technological advances. But in Bontempelli's explicitly pre-war tale, we are already given that overwhelming sense of being objectified by the modern world and being subjugated by the power of objects. What, then, are we to make of his insistence that this story could only have taken place before the war, that now, in the post-war world, everything is different? After the war, he has not lost his faith in technology, his faith in modernity (for which he supports, at least to some extent, Fascism until at least 1938 when Mussolini introduces the racial laws against Jews), nor has he lost his faith in the need for adventures and magical tales that push the limits of the imagination to other, potentially real, realms. His writing continues to include protagonists who live in more than one realm, who dialogue with shadows, who live a second life of dreams. It is, in fact, after the war that Bontempelli was introduced to avant-garde theories and broke with the romantic, realist style. It is after the war that Bontempelli begins to open the realm of the mirror, the dream, the fourth dimension as he will come to refer to it. Perhaps, it is that after WWI,

after a collective loss of innocence, and a nailing down of an event in time and in space that all future events refer back to, perhaps it is that all of the European mirrors are broken, or at least the entry point closed. The Great War shattered them all, and one can no longer pass across the finite space of a chessboard and into an infinite dimensionality. Perhaps one must look for that entry point in another land where space can still open up to the infinite. If this is the case, then Bontempelli would look for that space in Buenos Aires, as he states just 11 months before the start of WWII.

On October 12, 1938, Bontempelli spoke at a conference in Rome on the life and culture of Argentina that was part of "El acto inaugural de la exposición del libro argentino" at the Italian Center for American Studies. His talk was titled, in its Spanish translation, "La pampa y la cuadra," and in it he strikingly parallels imagery of Argentina, which he had recently visited, with imagery of the beyond-mirror land in *La scacchiera*. Viewed on its own, Bontempelli's "La pampa" could be seen as a self-promoting essay that purposefully recycles language and imagery from the author's own novella. However, between 1922 when Bontempelli describes the beyond-mirror land and 1938 when he describes the Pampas, there are other descriptions of the Pampas which likewise resemble his mirror world—by such authors as Jules Supervielle, the young Borges, José Ortega y Gasset, Archibald MacLeish[5]—and which demonstrate a coincidence of description that straddles country, language, ocean, and genre. His beyond-mirror land, which precedes all of the similar descriptions of the Pampas, is remarkably a fictional space that, while nonrealistic, becomes subsequently, and independently, commonplace in describing the actual Argentinian Pampas. Essential to these depictions is a reliance on mathematical, rather than figurative terms, and a sense that it is infinite in space and outside of time. The descriptions all allow the space to remain somehow pure, untouched. Indeed, Bontempelli's little-known talk would round out well an argument about the effect on writers' imaginations of the proximity of the ultra-modern mid-20th century Buenos Aires and the sublime Pampas. In light of the events of the World War, perhaps it presents a fresh start for modernity, where all of the possibilities, imaginings, mirrors of other realities had not been shattered.

Bontempelli certainly saw Buenos Aires as a space like this, like the chessboard, able still to access the infinite (Pampas) behind the finite (Buenos Aires). "La impresion que se recibe," he says of

the Pampas, is "de haber llegado a una parte de la corteza terrestre donde el protagonista ya no es más el tiempo ne la historia, sino el espacio." ("La pampa" 18) His description of the land beyond the mirror, in *La scacchiera* was that of a place where "non c'è che spazio." (22) They are both timeless and infinite:

> "La pampa, cuanto más se recorre más grande resulta. Caminas y caminas, de aquí para allá, utilizando cualquier medio, hasta el automovil, y te parecerá estar siempre en el centro del espacio. Tal cual, como uno siempre está siempre [sic] en el centro del espacio. Porque, en efecto, la pampa es inifinita, como el espacio, y está destinada al Juicio Universal de una humanidad en la cual el tiempo terminará solamente con el final de la Eternidad." ("La pampa" 19)

Of the land beyond the mirror the narrator recounts:

> "Correvo senza sapere dove … a un certo punto mi fermai. Tutto intorno a me era identico al luogo donde m'ero mosso. La pianura si stendeva infinitamente uguale. Mi rimisi a correre, poi mi fermai di nuovo. Due o tre volte a quel modo fin che mi sentii spossato. L'orizzonte era sempre altrettanto lontano da me, nulla di nuovo mi appariva intorno." (*La scacchiera* 69)

The White King explains the land to the boy saying: "A ogni specchio corrisponde uno spazio infinito … e mentre [una persona] un giorno o altro muore e il suo corpo, fino al giorno del Giudizio Universale, scompare, invece nello spazio dietro lo specchio la sua immagine dura." (24) The Pampas, furthermore, "siendo infinita, nada tiene de primordial o de salvaje," much like the land beyond the mirror holds nothing non-man-made. "Es abstracta, metafisica, e quíza apolinea. La pampa probablemente está de puro espíritu. Yo no me maravillaría si un matemático escribiese un tratado para demostrar que la pampa es la cuarta dimensión." He goes on to explain that Buenos Aires, like the chess set, is made up of perfect squares: "está construída no por casas sino por CUADRAS [emphasis his]," and "repitiendo hasta el infinito las cuadras, se forma una ciudad, sin los límites necesarios impuestos por la geografía. Todas estas cuadras son iguales." (21) Roh had asserted that *magischer realismus* searches for a secret geometry, that something palpitates behind reality. The chessboard, overlaid on Buenos Aires, acts as a finite entry point to the infinite that exists behind or beyond it, as Roh said that the infinite can exist behind or beyond the finite night sky on a canvas. Now it is Buenos Aires, emphatically described to look like a chessboard, paradoxically described as a city that achieves infinity because it is made of perfect squares, which Bontempelli claims will eventually serve as our entry point to the Pampas as the fourth and ultimate dimension. He describes

the Pampas as being a tangential, perfectly-flat plane (19) that meets the curved sphere of the Earth at none other than the chessboard of Buenos Aires, which is a piece of the Pampas, translated into a city:[6] "Os he dicho que la pampa está pronta para el gran Tribunal del Juicio Universal," a supplement to the "pequeño Valle de Josafat." (18) He says, "Pues bien, cuando se celebre el Juicio Universal, la ciudad - cuadras multiplicadas por cuadras - servirá probablemente como lugar de espera para las almas que deberán pasar a la pampa."[7] (22) In his statement that Buenos Aires is a piece of the infinite translated into a city, and in another claim that "como todas las cosas infinitas - el Tiempo, El Espacio - cada punto de la pampa es igual a los otros puntos, y a la pampa toda," (19) he invokes the complex idea of *transfinity*, Cantor's theory describing an object, or finite set of objects, that represents an infinite set. Here is another way in which we can understand the chess set as an entry point to other imaginings of unseen, but potentially real, realms. It is a finite space, a ruled game, that develops within a finite amount of time, but holds within it a near infinity of possibilities that implicate an infinity of time and space to develop. The infinite possibilities of chess games poetically recreate the sense of the seemingly endless lives lived by men and one single man's seemingly endless possible futures.

The young Borges' Buenos Aires at times evokes the same squareness and flatness of the city, a transfinite piece of the pampas, copied from it and containing its infinity. In his 1925 "Buenos Aires" it is "un trasunto de la planicie que la ciñe, cuya derechura rendida tiene contuación en la rectitud de calles y casas. Las líneas horizontales vencen las verticales. … Atraviesan cada encrucijada cuatro infinitos." (80-1) While in "Fundación mítica de Buenos Aires," the city is born in the Palermo neighborhood, with the spontaneous creation of "una manzana entera pero en mitá del campo / expuesta a las auroras y lluvias y suestadas / La manzana pareja que persiste en mi barrio … Sólo faltó una cosa: la vereda de enfrente." (87) The mature Borges takes this conception of the infinite, timeless square, which represents and includes the entire city and its history, born out of a piece of the Pampas, and abstracts it once more in his 1952 "La biblioteca de Babel,"[8] turning the *cuadra* where he was born into a *hexagon* where he was born,[9] the city into the entire universe,[10] and our single consistent history into all possible histories. Like Bontempelli's Buenos Aires, "repitiendo hasta el

infinito," Borges' library "es ilimitada y periódica. Si un eterno viajero la atravesara en cualquier dirección, comprobaría al cabo de los siglos que los mismos volúmenes se repiten en el mismo desorden (que, repetido, sería un orden: el Orden)." (462)

In considering Borges' use of the chess set as an entry point to the fractally real, it will be useful to keep in mind his tendency to fractalize literature itself; in "La biblioteca de Babel," for example, he creates an infinite library inside of a physical book inside of physical library. Stated more generally, he writes meta-literature, literature that contains itself. Thus, the fractalization of the universe, which we saw in Bontempelli downward, through the miniature White King, into a world created by man, toward the unconscious realm of dream-symbols, includes another fractalization in Borges, an inward movement brought outward, onto the black and white space of the written page. It is the study of the concretization of thought to speech to written word and man's ability to create physical reality from manifesting thought, not through construction, but through description. Thus for Borges the chess set is a signifier of, and is signified by, the man-made symbol, the letter, number, and the mystically supreme aleph. This final *mise en abyme* superimposes the chess set with the page, the chess piece with the aleph/symbol/letter, and in so doing proposes, but at the same time questions, the ability of literature itself to act as an entry point to a beyond that is unseen, undescribed, but perhaps not indescribable. The chess figure is prevalent throughout Borges' writing, but, while always significant for the writer, it does not always act magically, as a fractally real element. In the poem "Los justos," for example, the chess player is one of the unrecognized saviors of the world, and in "El jardín de los senderos que se bifurcan," chess, *ajedrez*, is the unspeakable answer to the ultimate riddle. This study is confined to two short stories in which the chess set is specifically a fractally real agent—"El milagro secreto" and "Tlön, Uqbar, Orbis Tertius," with limited but illustrative references to "El aleph," and his "Prefaces" to *El oro de los tigres* and *El otro, el mismo*—which throw into sharp relief Borges' use of the chess set in a highly complex and disorienting fashion as the entry point to multileveled and multidirectional subtextual worlds. The Fractal Realism of Borges, the seeming magic, comes when those subtextual worlds then act upon the frame world, or even upon the world of the reader, creating a labyrinthine *mise en abyme* in which one must use the

author's historical and philosophical references to navigate. As we travel through his subtexts within subtexts, we will see how his works engage with Bontempelli, as they use the chess set as an entry point to the internal dimension of the unconscious as well as to imagine possible external hyper-dimensions.

"El milagro secreto" was published in 1944, but like Bontempelli, Borges chooses to tell a pre-war (if barely) story. One of the last pre-war events before WWII's official eruption in September of 1939 was Slovakia's proclamation of independence on 14 March 1939 and the remainder of Czech lands accepting German occupation the following day. On 15 March 1939, Hitler marched to Prague Castle and declared the region annexed to the Nazi regime. Borges' story begins the night before the march, with a dream: "La noche de catorce de Marzo de 1939, en un departamento de la Zeltnergasse de Praga, Jaromir Hladík, autor de la inconclusa tragedia *Los enemigos*, de una *Vindicación de la eternidad* … soñó con un largo ajedrez." (545) The game he dreamed had been played for centuries in a secret tower, not by two individuals, but, by two families, for a prize that had been forgotten but that was said to be "enorme y quizás infinito." In his dream, Jaromir cannot remember the game's rules or pieces. So he runs desperately across a rainy desert as the clock continues to strike the hour of his move. Chess here could be said to refigure the tense political maneuvers that were going on in Eastern Europe in an attempt to avoid war. But, when in a second dream the sleeping world acts upon the waking world, the spheres of influence and reality are jumbled, and it becomes clear that the dream-space is not simply a space for unconscious refigurings of waking life, but an access point to the fractally real. Four days after the march on Prague, authorities arrest Jaromir because he is Jewish and because of his literary translations and productions; they sentence him to death by firing squad. Among other Jewish literature, he was known for having translated the *Sefer Yetzirah* (The Book of Creation), which is considered one of the first works of Jewish esotericism as well as a treatise on mathematics and linguistic theory. Historical references act as guides in Borges' writing, thus before diving into the second dream-realm, which will be the portal to the fractally real in the story, let us take a moment to illustrate how the *Sefer Yetzirah* can help see correlations between the chess set in the first dream and the symbol/letter/Godhead to come in the second dream.

The *Sefer Yetzirah*, while differing in many ways from Kabbalah, is the first known rendition of the system described by the latter. The *Sefer* states that the physical as well as the moral world is made up of a series of warring contrasts that are equalized by God, the overarching unity. It describes how the universe was created by God through 32 wondrous ways of wisdom: the ten numbers and 22 letters of the Hebrew alphabet. Thirty-two is the number of human teeth, as pointed out by Bontempelli's narrator in *La scacchiera*,[11] it is also the total number of chess pieces and white and black chessboard squares. The black and white exhibit the dialectical allotment of turns, the contrasting universal powers, enunciated in the *Sefer*, all of which lends to the game a certain spirituality, a sense of likeness and import with and within our own world. Of those 22 letters, there are three mother letters, and supreme among them is the *aleph*, (א in Hebrew, 𐤀 in Phoenician, from which the Latin A is derived). In his short story "El aleph," Borges describes the aleph in Kabbalist terms:

> "Para la Cábala esa letra significa el En Soph, la ilimitada y pura divinidad; también se dijo que tiene la forma de un hombre que señala el cielo y la tierra, para indicar que el mundo inferior es el espejo y es el mapa del superior; para la *Mengenlehre*,[12] es el símbolo de los números transfinitos, en los que el todo no es mayor que alguna de las partes." (169)

The aleph numbers Borges mentions are a sequence of transfinite numbers that represent the size of an infinite set. Thus, they can be thought of as single symbols or pieces of the whole that represent the infinite whole. According to Claude Shannon's work on the game-complexity of chess, just as the aleph can describe an infinite whole in math, so can a chess set describe an infinite whole in the human imagination. In an attempt to write a logarithm for computer chess games, Shannon calculated the game-tree complexity, or the total number of games that can be played, of chess at 10^{120}, which corresponds to more atoms than there are in the seeable universe, which are estimated at 10^{81}. Furthermore, working from the endgame of any given game, according to set theory practices of backwards induction, Shannon states that "a machine operating at the rate of one variation per micro-second would require over 10^{90} years to calculate the first move!" (260) The aleph symbol points up and down, signaling that which is above and below, that which is more and less, it is a connector symbol, between the infinite and the finite, the fathomable and unfathomable, as, perhaps, Borges

would say all written letters and numbers are, for they, indeed, are that with which we write on the two-dimensional page, which open up the infinite imagination and possibly an infinite external. Chess, similarly, points up and down, to man as Godhead and, conversely, to man as a pawn.

In "El milagro secreto," the dream of the chessboard is reminiscent of the powerless feeling of WWII for many Europeans, but it replays, as well, symbolisms seen in other subtexts of the story, hinting at a more complex significance. Jaromir, the night before his execution, prays to God for more time, time enough to finish his play, *Los enemigos*. It is a tragicomedy of errors, itself like a chess game, the entirety of which plays out in an enclosed space, the protagonist's library, where a group of secret enemies silently plot against the protagonist. He evades and outwits them, finally is forced to kill one, until the plot unravels and the protagonist himself is revealed to simply be a raving lunatic repeating the same scenario endlessly in a timeless existence. Like the clock that strikes the same hour in Jaromir's chess dream, the clock is continually striking 7:00 pm in the play. Like the chess game, in which Jaromir does not remember the rules or pieces, the game of life played by his protagonist is enacted without any memory of how to play, for in fact, he is revealed as mad, having forgotten the rules and pieces of life. The halted time in both subtexts is a motif that continues across the story, climaxing in the secret miracle.

The second dream of the short story occurs subsequently to Jaromir's prayer for a postponement of his death. In it Jaromir is in a library, where he is looking for God. The librarian tells him that God can, in fact, be found in one letter of one page of one of the 400,000 library volumes, but that it is a useless search. Just then, a patron comes in to return an atlas. Jaromir picks it up, opens to a map of India and, with a sense of assuredness, "tocó una de las mínimas letras." (548) In that letter, he finds God, who tells him that the time of his work has been granted. In this moment, Borges introduces the fractally real element of his story; for within a tiny letter,[13] in a map, in a library, in a dream, Jaromir accesses God, who grants him time in the reality of the frame story. Here then, we see how the games of chess and language, represented as a whole by one transfinite symbol, are both for Borges possible access points to the infinite. The chess figure is the first entry point into the supposed frame text, and the aleph (as the supreme and therefore representative letter) the second

entry point, into the fractally real. The chess players are explicitly playing for an infinite prize, while the tiny symbol in the atlas, found on a map of India, birthplace of chess (maybe an accidental association by Borges, but, then, nothing in Borges ever seems accidental and his poem "Ajedrez" he proves knowledge of its origin: "En el Oriente se encendió esta guerra" (191, l. 12)), is a more subtle infinity, the infinite Godhead. But what is this omnipotent, infinite force in Borges? What exactly does the symbol in the map represent? The time of Jaromir's labor is granted, but the fact does not change objective knowledge or history; he is still introduced in the first lines of the story as the author of the incomplete play, Los enemigos; the time granted is subjective time, experienced by the protagonist alone. The event is not a typical religious miracle, it is not even a guaranteed event, for Borges' Jaromir gives three explanations for the event: "Pensó *estoy en el infierno, estoy muerto*. Pensó *estoy loco*. Pensó *el tiempo se ha detenido*." (549) Borges is purposefully enigmatic, perhaps because his secret miracle is not a truth, but a possible truth, an imagining of time as changed, subjectively or objectively. By raising various explanations, he gives his reader alternatively possible propositions and thus more assiduously and objectively describes the phenomenon. The explanation he chooses, however, is that of the existence of relative time, which Einstein had proven some decades before. The experience of altered time is like the proposed experience of flying: what would have once been considered a miracle, that is, an event occurring outside of the natural laws that dictate the universe, is suddenly absorbed by science into the realm of the possible and then actual. The idea of altered time is just the sort of idea that *magischer realismus* according to Roh would seek, especially as Roh calls for a new relationship with space and the search for a secret geometry.

Einstein's definition of relative time creates just that; he describes time as the fourth dimension and an integral part of the fabric of the universe, spacetime. The mention of Charles Howard Hinton in "El milagro secreto" (mentioned in "Tlön, Uqbar, Orbis Tertius" as well) is an allusion to the fourth dimension, while Borges deals explicitly with it in his "La cuarta dimensión," where he says "Queda un hecho innegable. Rehusar la cuarta dimensión es limitar el mundo; afirmarla es enriquecerlo." (97) Hinton anticipated the fourth dimension implicit in Einstein's Theory of Relativity and was the inventor of the tesseract, or hypercube,[14] which is a four-dimensional cube,

or n-dimensional analog of a square that has eight cubic surfaces instead of the three-dimensional cube's six plane surfaces. He furthermore anticipated the concept of spacetime itself, and the world lines that populate it. Spacetime is often conceived of as a white graph of equally-sized squares on a black field. A world line is the unique, sequential path in time and space drawn by any body's progress during a lifetime, be it a world or a man. This flat-plane rendering of spacetime evokes the image of abstract bodies tracing lines across a black and white squared field, much like a chessboard, but world lines, because they move through time as well as space, are in movement even when physically still, and this time-movement is charted vertically. The Earth's orbit never returns to the same place, for example, but rather marks a sort of ascending loop. The common, chess-like rendering of spacetime and world lines moving along a plane is actually the portrayal of what is known as a 'world sheet,' or spacetime's analogous two-dimensional surface. This simplified presentation allows a part to represent the whole, and thus enables an intuitive conception of a highly complex idea. The theory of relativity uses world lines to recalculate the positions of apparently straight paths in space in order to reveal their four-dimensional curves. It predicts and ultimately proves that the speed of an object in space slows its progression through time. Theoretically, if an object moves at near the speed of light, it could experience a moment as the length of a year, as if its world line had completed one year's spatial orbit but returned in such a minimally ascended helical increment that it virtually overlays the previous spiral. In the light of this scientific discovery, Borges' secret miracle can be seen as the miracle of a mind that has accelerated to the point of virtually stopping time relative to the speed of light. Jaromir does not move, nothing moves, yet his world line continues to ascend, if barely: "Minucioso, inmóvil, secreto, urdió en el tiempo su alto laberinto invisible." (550) While graphs are most often used to chart world lines, one may also use a sort of log, that is, chart a world line with words. It requires only that each event, or position, is accompanied by a time measurement. "El milagro secreto," begins and ends with such tags: Dawn of 15 March 1939, on the Zelternergasse in Prague and 9:02am on 29 March 1939, in the courtyard of the barracks on the opposite side of the Moldau.

While Borges allows the space for the reader to define the Godhead touched in his dream of the Clementine Library—seeming to define it himself as an actual occurrence accorded by the new

laws of physics—the most relevant fact for the story is another: that somehow the events of a dream affect the events of Borges' frame reality, that a man-made symbol in a dream furnishes contact with God, that the finite is the representative for the infinite. With this unlikely event, Borges introduces a confusion of hierarchies as was found in Bontempelli. He confuses them even further by making the sub and frame texts mutually reminiscent and referential. Which reality is truest then? The dream reality where God is found, the literary reality that Jaromir lives and fights for, or the absurd reality of WWII in the frame story? Perhaps Borges means for us to see them as all equally true, in as far as they are all - even the frame text - two-dimensional, black and white, partial renderings, that, like a world sheet, are analogous by extrapolation to the ultimate frame text, that of the reader. If Bontempelli wonders about the hierarchy of being, if men are simply objects in a mirror world, if men are Gods of lesser worlds, if man's creations could act upon them, then Borges does the same, poignantly exemplified in Jaromir's prayer to God, when he muses about his own status as 'being': "Si de algún modo existo, si no soy una de tus repeticiones y erratas." (548) But in Borges there is an added quandary: What of literature? Literature, certainly, can engage the infinite imagination, but could it create the impossible or unknown or inexistent through the simple act of imagining?

This last idea is probed further by Borges in his "Tlön, Uqbar, Orbis Tertius," in which, furthermore, his use of chess and literature becomes both more complicated and clarified. If Fractal Realism imagines unknown but possible, objective realities, Borges in "Tlön, Uqbar" questions the ability of the human mind and literature to not just imagine, but to *create* these realities through imagination. Bontempelli's glassmaker was the God of his level of a fractalized universe, while in Borges, the author himself is implicated as God, as the story refers back to and acts upon the reality of the reader and author, as implied by the story's title. "Tlön, Uqbar" begins with words that ring familiar: "Debo a la conjunción de un espejo y de una enciclopedia el descubrimiento de Uqbar," (6) in another remixing of mirrors, realities, literature, and, as we will see, chess. A friend recounts to Borges, as the fictive first person narrator, a line from an encyclopedia entry on the nation-state of Uqbar where they believe that "'Copulation and mirrors are abominable.' El texto de la Enciclopedia decía: Para uno de esos gnósticos, el visible universo era una ilusión o (más precisamente) un sofisma.

Los espejos y la paternidad son abominables (mirrors and fatherhood are hateful) porque lo multiplican y lo divulgan." (7) Borges researches Uqbar, referenced only in one edition of the encyclopedic series, and finds that the country is a fictional place, with only the falsified encyclopedia entry to usher it into any sort of existence. Tlön, in turn, is an imagined place of the literature of the imagined place of Uqbar: "la literatura de Uqbar era de carácter fantástico y … sus epopeyas y sus leyendas no se referían jamás a la realidad, sino a las dos regiones imaginarias de Mlejnas y de Tlön." (8) Borges later discovers a volume titled *A First Encyclopaedia of Tlön. vol. XI. Hlaer to Jangr* and learns that the fictional planet has been designed with a carefully planned and detailed cosmos, with all of its rules, languages, customs, minerals, etc. accounted for and described. Most outstanding of the planet's attributes is that of its innate idealism: "El mundo para ellos no es un concurso de objetos en el espacio; es una serie heterogénea de actos independientes. Es sucesivo, temporal, no espacial." (10) There are no nouns in Tlön because no one believes in their reality, there is but one science: psychology. All visible facts and objective mathematical conclusions are explained as associations of ideas and materialism is considered specious reasoning. Interestingly, after centuries of intense and universal idealism, the philosophy begins to influence events on Tlön, ideas and associations of ideas begin to manifest physical objects called *hrönir*, while forgotten objects begin to be effaced in the physical world.

The planet, Borges soon discovers, was created by a secret and benevolent society that spanned generations. The society was funded by a man who wanted to demonstrate "al Dios no existente que los hombres mortales son capaces de concebir un mundo." (14) The society created an initial 40-volume encyclopedia of Tlön, which was the basis for a more detailed edition, called *Orbis Tertius*. The most remarkable fact about Tlön's creation, the fractally real event in the story, occurs when *hrönir* from Tlön begin to manifest in the world of the frame story, in Borges' world. Reality begins to yield to imagination and subjective idealism. Borges reasons that reality longed to yield to such an orderly design of a world, he takes the concept of a man-made or man-controlled world a step farther than *La scacchiera* and "El milagro secreto", in which they are created unwittingly. In "Tlön, Uqbar," men *set out* to design a world and are successful to the point that the divinity-made

world falters in face of it. Borges, thus, redirects the hierarchy of spheres once more. We have seen man as a creator of lesser worlds, the unconscious as more potent than the physical, 'lesser' realms view themselves as superior and closer to the ultimate; now, with the successful creation of Tlön, we see men as more powerful than the omnipotence that created them. Amid this jumbling of spheres, Borges intuits something of man's fascination with chess, as a game, and as a complex allegory: "Tlön será un laberinto, pero es un laberinto urdido por hombres, un laberinto destinado a que lo descifren los hombres." Is not chess just this thing? An infinite world designed and resolved by men? A game that comforts men into believing that the world and its design can be understood, that there is some overarching pattern that can be revealed by the collaboration of great minds? With this idea of an infinite world— that of Tlön and chess—designed by men, let us now take a look at the role chess plays in the story, so closely linked to the role of the aleph in Borges.

We have seen so far in Borges that the aleph and chess set are complex signifiers of (1) the fractal hierarchy of the universe and man's place in/relationship to it and (2) of all man-made symbols that are encoded and deciphered by man and manifest the intellect in physical space. As regards the aleph, however, its presence has changed somewhat. The aleph has been described as a linguistic symbol that functions in mathematics as a transfinite stand-in for the infinite. In this story, however, the stand in for the infinite is the initial encyclopedic edition, vol. xi, which represents the entire cosmos of Tlön and its laws. The encyclopedia functions as a part that represents the whole and as the entry point to the infinite cosmos of Tlön, which like the dreams in "El milagro secreto," is a non-real space (a fictional space within a fictional space), which nonetheless acts upon the reality of the frame story. The fact that Borges makes himself the first person narrator and that the name of the society's endeavor is titled "Orbis Tertius," implicates the reality of the author and reader, so not only does Borges cast his net of intentionally confused hierarchies upward, toward God, he casts it out from the written page, over the ultimate frame story: that of the writer/reader. The title itself is profoundly meaningful in this regard; the progress from 'Tlön' to 'Uqbar' to 'Orbis Tertius' is a progression, in one sense, deeper into the fiction, Uqbar is created by a fictional society, Tlön is created by the people of Uqbar, Orbis Tertius is the revised and expanded cosmos of Tlön, but it is, as well, a reference back to

our own Earth, itself an *orbis tertius* in the solar system.

Once again there is the fractalized universe, Tlön is lesser in dimension and size, it exists only on the written page, in black and white, a finite symbol, yet it represents a powerful boundlessness and the reality of the frame story yields to it. By allowing a work of literature to affect the fundamental laws of nature, Borges would seem to favor a view that the subjective can create the objective, that ideas can dictate physical processes. It is not, however, that simple. Borges, on the one hand, explores Tlön's idealism creatively, willing objects into existence through the force of imagination, but then allowing that same idealism to take a dark turn when the fascination with the idea of Tlön begins to distract people from giving adequate attention to the reality of the Earth. It is as if the turn from modernism to postmodernism and beyond is made in the story, from the optimism of the freedom from doctrine and objective truth and the openness to such theories as Gianni Vattimo's *pensiero debole*, to the harsh realizations of the inequity of a world without material, objective truths, of a world in which he with the loudest voice, he with the greatest distribution of the sensible, creates truth. The story ends with a criticism of Tlön's subjective idealism, while his citation of George Berkeley as a founding member of the society of Tlön implies a criticism of subjective idealism in our own *orbis tertius*. Borges states in the final paragraphs that Tlön's idealism will soon replace both concrete history with a fictitious past and languages with the conjectural language of Tlön, but that this will not stop him from writing. So the author, in one breath, criticizes the creators of Tlön (who other than himself?) and then affirms that he will continue creating, continue writing. For, in fact, there is a difference for Borges between imagining possible, yet inexistent, truths and masking fallacy as truth. There is a difference between a symbol (the aleph) that stands in for the infinite that one cannot express wholly and a symbol (the encyclopedia) that furtively pretends to represent an infinite, but which, rather, is not greater than itself. The prior opens the mind, expands it, encourages imagination and belief, the latter obscures the mind and tricks it.

Borges in the story presents his readers with a false aleph (as, indeed is "El Aleph") and its effects. What then of the chess set? Perhaps it is counterintuitive to leave it out until last in an argument centered around chess, yet it is useful to reintroduce the idea here, to tie together the

problems of parts representing wholes, the relationship of the reality of the mind with objective reality, and the representation of infinity. For chess, indeed, is so profound a figure, in part, precisely because it ties together, plays the role of corollary and uniter. Its sanskrit name, *chaturanga*, means four parts that make up a whole, a name that is uncannily fitting for a 20th century intuitive conception of the game as somehow connecting man to the immanent beyond, described no longer by theology, but by mathematics. Chess is mentioned only twice in "Tlön, Uqbar": once to introduce Herbert Ashe, a member of the society and the character who furnishes Borges with the majority of the information he gleans about Tlön. Ashe was a friend of his father's with whom he used to exchange books, news, and play silent chess games. The game is mentioned again at the end of the story, as Borges muses on the enchantment of Tlön in the world of the frame story: "El contacto y el hábito de Tlön han desintegrado este mundo. Encantada por su rigor, la humanidad olvida y torna a olvidar que es un rigor de ajedrecistas, no de ángeles." (15) Borges, upon discovering Tlön, ponders that which to him is the "problema fundamental" of the fictional place: "¿Quiénes inventaron a Tlön?" He and other researchers conjecture: "este *brave new world* es obra de una sociedad secreta de astrónomos, de biólogos, de ingenieros, de metafísicos, de poetas, de químicos, de algebristas, de moralistas, de pintores, de geómetras... dirigidos por un oscuro hombre de genio." (9) What, then, do these men have in common? Like Ashe and the father of the fictional Borges (Who other than Borges the author?), they have in common the "the rigor of chess masters," which is significantly both paralleled and contrasted to that of angels. Thus, as Tlön's creators can only universally be described as chess masters, it is chess masters who create Tlön and who, in turn, create the entry point for Fractal Realism. Chess masters are seen as the gods, the angels, of another, man-made realm. The game of chess represents a connecting point between two worlds, separated by orders of magnitude and dimension, within the continuous infinite of the universe, patterned on an ever-repeating scale: apparent in the shape of the galaxy, solar system, and atom. Apparent as well in the natural shapes all around us: pinecones, flower blooms, seashells, and galaxies, that are patterned according to the fractal Fibonacci sequence of expansion. Fractal realist authors use chess in the imagining of fractal spheres, in the possible realities they create that are somehow inside of our own without necessarily being

lesser than our own. For is the atom any less than the galaxy? Chess imagines this fractal equality with elegant depth: chess is an allegory for man as creator and at the same time for man as a pawn, for man as occupying a relative point on the continuum from smallest to largest, which does not necessarily, for the fractal realists, translate to a continuum of the least to greatest.

Chess, in this sense, is a transfinite symbol, like the aleph; the chess set, the aleph as the chosen symbol of the written word, and infinity, seem to imply and complicate each other in Borges' mind. In his prologue to *El otro, el mismo*, he concludes: "Ajedrez misterioso la poesía, cuyo tablero y cuyas piezas cambian como en sueño y sobre el cual me inclinaré después de haber muerto," (148) an overlaying of two games with a specificity of rules and positions: chess and poetry. Then in his prologue to *El oro de los tigres*, he states: "Mi lector notará en algunas páginas la preocupación filosófica. Fue mía desde niño, cuando mi padre me reveló, con ayuda del tablero del ajedrez (que era, lo recuerdo, de cedro) la carrera de Aquiles y la tortuga," (304) a representation of the problem of infinity via chess. The paradox of infinity arises in different forms in many of his works, indeed, importantly in "Tlön, Uqbar," as he questions the power of words to create reality. As recounted by Aristotle, Zeno of Elea's paradox of Achilles and the Tortoise is this: "In a race, the quickest runner can never overtake the slowest, since the pursuer must first reach the point whence the pursued started, so that the slower must always hold a lead." (VI: 9, 239 b15) The paradox had great implications for Bernard Bolzano, a mathematician and philosopher who coined the term 'set' of set theory and did great work on infinity paradoxes. In his *Paradoxes of the Infinite*, he reworked Aristotle's theory, which had held for 2000 years that there is no actual infinite, but a potential infinite, in that one cannot conceive of an infinity of natural numbers but one can conceive of any given, finite set of natural numbers having a set that is greater than it. Bolzano is the first mathematician to deal explicitly with infinity as actual, as a mathematical object. He determines that 'sets' are abstracted aggregates, and allows for the discussion of infinity via actual infinite sets that can be defined by finite sets. Unlike Aristotle, Bolzano's definition of an infinite set, through extrapolation from a finite set, does not negate the existence of infinity, but, rather, founds it. In this set theory is born, as well as the transfinite numbers which are later coined by Cantor and introduced in the aleph

number. This is the mathematical 'single representing infinite whole' that is naturally intuited in the chess set and that Borges translates from mathematical to literary symbolism.

Before Borges, however, Bolzano himself, translated the idea of sets and the infinite into the sciences of metaphysics and linguistics. He is known as a precursor to modern logic, and crucial here is his work on 'abstract truth,' a prime example of which is the concept of infinity itself: in his first attempt to prove that infinite sets exist, he proposes that "the set of all 'absolute propositions and truths' can be said to be infinite." (Waldegg 568) If this is the case, however, all statements would appear, paradoxically, to be true, just as idealism would have us believe. He disproves this paradox, however, in his 1837 *Wissenschaftslehre*, in which he studies the realms of language (i.e. words and sentences), of thought (subjective ideas and and judgements), and of logic (objective ideas and propositions). His study of language, thought and logic, like his study of the infinite, differentiates between the part and the whole—words are part of sentences, subjective ideas of judgements, objective ideas of propositions. Furthermore, and important to understanding "Tlön, Uqbar," he differentiates between objects that exist, in as far as they are causally located in space and time, and those that do not. The realm of the logical is populated by ideas, therefore, by objects that do not exist. While the truth known to humans is an infinite set of a larger infinite set of the truths that humans could possibly know, that is not mean that all propositions are true. All propositions must have three characteristics: they are non-existent, they are either true or false independent of any one person's judgement, and they are graspable to humans. A thought which desires to be a truth must be a true proposition. A thought which desires to exist need only be causally connected in time and space, thus it need only become the written word. While Bolzano is never mentioned in "Tlön, Uqbar," there is a negative mention of Berkeley and his Subjective Idealism or Immaterialism, which opposes Bolzano's theory, as well as a positive mention of Liebniz, an early proponent of actual infinity, and a positive mention of Cantor, a follower of Bolzano. Herein, then, lies the subtlety of Borges' sense of the ability of the written word to create reality. It does bring thought into existence, but it does not guarantee that thought to be a *possible truth*. Borges cautions, it seems, the difference between imagining realms and truths beyond those known and erasing the dividing line between truth and fiction, truth and

fallacy, observable facts and idealist notions.

Fractal Realism exists within that precise contradiction, it desires to stand on the point where visible truth, invisible truth, and unknown/possible truth intersect. It desires to imagine fantastic, unseen truths, part of the infinite set knowable to man, part of the unseen infinite, no longer the realm of a theological God-figure, being probed and proven by the exact sciences. The people of Uqbar believe that the visible world is an illusion or sophism, for they, it would seem, believe that the visible is merely an association of ideas. Franz Roh would agree with them partially but for different reasons. The visible universe is a sophism for *magischer realismus*, as well as Fractal Realism, because there is mystery "palpitating behind the world," because spirituality "manifests from an interior point of departure," not from anything visible, because "infinity is locatable in the smallest things," and while the great sky seems more powerful, the invisible atom is no less sublime.

[1] First posited by Henri Poincaré in 1905.

[2] Bontempelli states in his *Il bianco e il nero:* "Considerando che l'ombra è lo stato bidimensionale d'un corpo, che noi conosciamo a tre dimensioni - c'è da sospettare che … siamo le ombre di creature (e di un loro mondo) tetradimensionali. E … che le ombre da noi prodotte hanno anch'esse una vita propria … a due dimensioni." (117)

[3] This question has an interesting further correlation with the game of chess, the logical final concern, posed by John von Neumann in the 1960s, that begins in concerns raised by the events of WWI. The question is of the singularity. The idea of the singularity was raised by the creators of game and set theory, which were used to create algorithms that allowed computers to beat a human mind at a given game. The central game concerned was chess, and the idea that a computer could beat a man in chess, was the initial provocation of the fear of the singularity.

[4] Borges, like the boy, is terrorized by the mirror realm, though for seemingly more broad, metaphysical preoccupations. It is a terror that will ultimately be transferred to the people of Uqbar, but which he claims as his own in "Los espejos": "Yo que sentí el horror de los espejos … Infinitos los veo, elementales / Ejecutores de un antiguo pacto, / Multiplicar el mundo como el acto / Generativo, insomnes y fatales. / Prolongan este vano mundo incierto / en su vertiginosa telaraña; … Nos acecha el cristal. Si entre las cuatro / Paredes de la alcoba hay un espejo, / Ya no estoy solo. Hay otro. Hay el reflejo / Que arma en el alba un sigiloso teatro." (117-8, ll. 1, 21-26, 32-35)

[5] v. Jules Supervielle's 1923 *L'homme de la pampa*, poetry and prose by the young Borges (c1929), José Ortega y Gasset's 1929 "La pampa … Promesas, and Archibald MacLeish's 1938 "The Argentina of the Plate: The Argentina of the Pampas".

[6] "Buenos Aires es verdaderamente un tronzo de Pampa traducido en ciudad." (21)

[7] Similarly, Borges in "La muerte y la brújula," published four years later, turns Buenos Aires into a Valley of Josaphat, as the detective, Erik Lönnrot, chases the *cuatro letras del Nombre* that describe a rhombus around the city. The Valley of Josaphat (meaning 'YHVH judges') is the biblical site of the Last Judgment and the *Nombre* circumscribing Buenos Aires at the end of "La muerte y la brújula" is the Tetragrammaton, YHVH. Valley of Josaphat, an access point at the edge of town to the Tetragrammaton, cum Aleph, cum Pampas, cum infinity of space and knowledge, which Lönnrot experiences first superficially, fractally, with the reader, when he arrives to the site of the final letter and "infinitamente se multiplicó en espejos opuestos" in a "casa [que] le pareció infinita y creciente." Then fully, without the reader, as Red Scharlach performs his final judgment in "el punto que determina un rombo perfecto, el punto que prefija el lugar donde una exacta muerte lo espera." (502, 505)

[8] Sarmiento refers to Buenos Aires as the "Babilonia americana" in *Facundo: Civilización y Barbarie.* (27)

[9] The narrator is old in the story and treats these hexagons as Borges earlier treated the *manzanas* of Palermo: "me preparo a morir a unas pocas leguas del hexágono en que nací." (456)

[10] The space is introduced as the universe, which can be translated in some languages as 'library': "El universo, (que otros llaman la Biblioteca) se compone de un número indefinido, y tal vez infinito, de galerías hexagonales." (455)

[11] "C'era una scacchiera con su tutti i suoi pezzi, i bianchi e i neri, disposti nelle relative caselle: trentadue pezzi, perché, per chi non lo sapesse, i pezzi degli scacchi sono trentadue, come i denti dell'uomo." (11)

[12] The German term for 'set theory'.

[13] We can reasonably presume that the tiny letter is the aleph or its equivalent, as it is the word used to define the ineffable core, the limitless, infinite existing in one point without overlapping, in Borges' short story, "El aleph." In truth, however, any symbol can represent the transfinite symbol, the aleph being only the agreed upon symbol for representation in mathematic problems.

[14] An elegant shape for mysticism of the *Sefer,* as it is a single shape made up 32 edges, as the God created the world through 32 wondrous ways.