The Aleph
by Jorge Luis Borges

O God! I could be bounded in a nutshell, and count myself a King of infinite space...
*Hamlet*, II, 2

But they will teach us that Eternity is the Standing still of the Present Time, a *Nunc-stans* (as the schools call it); which neither they, nor any else understand, no more than they would a *Hic-stans* for an Infinite greatness of Place.
*Leviathan*, IV, 46

On the burning February morning Beatriz Viterbo died, after braving an agony that never for a single moment gave way to self-pity or fear, I noticed that the sidewalk billboards around Constitution Plaza were advertising some new brand or other of American cigarettes. The fact pained me, for I realised that the wide and ceaseless universe was already slipping away from her and that this slight change was the first of an endless series. The universe may change but not me, I thought with a certain sad vanity. I knew that at times my fruitless devotion had annoyed her; now that she was dead, I could devote myself to her memory, without hope but also without humiliation. I recalled that the thirtieth of April was her birthday; on that day to visit her house on Garay Street and pay my respects to her father and to Carlos Argentino Daneri, her first cousin, would be an irreproachable and perhaps unavoidable act of politeness. Once again I would wait in the twilight of the small, cluttered drawing room, once again I would study the details of her many photographs: Beatriz Viterbo in profile and in full colour; Beatriz wearing a mask, during the Carnival of 1921; Beatriz at her First Communion; Beatriz on the day of her wedding to Roberto Alessandri; Beatriz soon after her divorce, at a luncheon at the Turf Club; Beatriz at a seaside resort in Quilmes with Delia San Marco Porcel and Carlos Argentino; Beatriz with the Pekingese lapdog given her by Villegas Haedo; Beatriz, front and three-quarter views, smiling, hand on her chin... I would not be forced, as in the past, to justify my presence with modest offerings of books — books whose pages I finally learned to cut beforehand, so as not to find out, months later, that they lay around unopened.

Beatriz Viterbo died in 1929. From that time on, I never let a thirtieth of April go by without a visit to her house. I used to make my appearance at seven-fifteen sharp and stay on for some twenty-five minutes. Each year, I arrived a little later and stay a little longer. In 1933, a torrential downpour coming to my aid, they
were obliged to ask me for dinner. Naturally, I took advantage of that lucky precedent. In 1934, I arrived, just after eight, with one of those large Santa Fe sugared cakes, and quite matter-of-factly I stayed to dinner. It was in this way, on these melancholy and vainly erotic anniversaries, that I came into the gradual confidences of Carlos Argentino Daneri.

Beatriz had been tall, frail, slightly stooped; in her walk there was (if the oxymoron may be allowed) a kind of uncertain grace, a hint of expectancy. Carlos Argentino was pink-faced, overweight, gray-haired, fine-featured. He held a minor position in an unreadable library out on the edge of the Southside of Buenos Aires. He was authoritarian but also unimpressive. Until only recently, he took advantage of his nights and holidays to stay at home. At a remove of two generations, the Italian “S” and demonstrative Italian gestures still survived in him. His mental activity was continuous, deeply felt, far-ranging, and — all in all — meaningless. He dealt in pointless analogies and in trivial scruples. He had (as did Beatriz) large, beautiful, finely shaped hands. For several months he seemed to be obsessed with Paul Fort — less with his ballads than with the idea of a towering reputation. “He is the Prince of poets,” Daneri would repeat fatuously. “You will belittle him in vain — but no, not even the most venomous of your shafts will graze him.”

On the thirtieth of April, 1941, along with the sugared cake I allowed myself to add a bottle of Argentine cognac. Carlos Argentino tasted it, pronounced it “interesting,” and, after a few drinks, launched into a glorification of modern man.

“I view him,” he said with a certain unaccountable excitement, “in his inner sanctum, as though in his castle tower, supplied with telephones, telegraphs, phonographs, wireless sets, motion-picture screens, slide projectors, glossaries, timetables, handbooks, bulletins...”

He remarked that for a man so equipped, actual travel was superfluous. Our twentieth century had inverted the story of Mohammed and the mountain; nowadays, the mountain came to the modern Mohammed.

So foolish did his ideas seem to me, so pompous and so drawn out his exposition, that I linked them at once to literature and asked him why he didn’t write them down. As might be foreseen, he answered that he had already done so — that these ideas, and others no less striking, had found their place in the Proem, or Augural Canto, or, more simply, the Prologue Canto of the poem on which he had been working for many years now, alone, without publicity, with fanfare, supported only by those twin staffs universally known as work and solitude. First,
he said, he opened the floodgates of his fancy; then, taking up hand tools, he resorted to the file. The poem was entitled *The Earth*; it consisted of a description of the planet, and, of course, lacked no amount of picturesque digressions and bold apostrophes.

I asked him to read me a passage, if only a short one. He opened a drawer of his writing table, drew out a thick stack of papers — sheets of a large pad imprinted with the letterhead of the Juan Crisóstomo Lafinur Library — and, with ringing satisfaction, declaimed:

> Mine eyes, as did the Greek’s, have known men’s towns and fame,
> The works, the days in light that fades to amber;
> I do not change a fact or falsify a name —
> The voyage I set down is... *autour de ma chambre*.

“From any angle, a greatly interesting stanza,” he said, giving his verdict. “The opening line wins the applause of the professor, the academician, and the Hellenist — to say nothing of the would-be scholar, a considerable sector of the public. The second flows from Homer to Hesiod (generous homage, at the very outset, to the father of didactic poetry), not without rejuvenating a process whose roots go back to Scripture — enumeration, congeries, conglomeration. The third — baroque? decadent? example of the cult of pure form? — consists of two equal hemistichs. The fourth, frankly bilingual, assures me the unstinted backing of all minds sensitive to the pleasures of sheer fun. I should, in all fairness, speak of the novel rhyme in lines two and four, and of the erudition that allows me — without a hint of pedantry! — to cram into four lines three learned allusions covering thirty centuries packed with literature — first to the *Odyssey*, second to *Works and Days*, and third to the immortal bagatelle bequathed us by the frolicking pen of the Savoyard, Xavier de Maistre. Once more I’ve come to realise that modern art demands the balm of laughter, the scherzo. Decidedly, Goldoni holds the stage!”

He read me many other stanzas, each of which also won his own approval and elicited his lengthy explications. There was nothing remarkable about them. I did not even find them any worse than the first one. Application, resignation, and chance had gone into the writing; I saw, however, that Daneri’s real work lay not in the poetry but in his invention of reasons why the poetry should be admired. Of course, this second phase of his effort modified the writing in his eyes, though not in the eyes of others. Daneri’s style of delivery was extravagant, but the deadly drone of his metric regularity tended to tone down and to dull that extravagance.
Among my memories are also some lines of a satire in which he lashed out unsparingly at bad poets. After accusing them of dressing their poems in the warlike armour of erudition, and of flapping in vain their unavailing wings, he concluded with this verse:

But they forget, alas, one foremost fact — BEAUTY!

Only the fear of creating an army of implacable and powerful enemies dissuaded him (he told me) from fearlessly publishing this poem.

Only once in my life have I had occasion to look into the fifteen thousand alexandrines of the *Polyolbion*, that topographical epic in which Michael Drayton recorded the flora, fauna, hydrography, orography, military and monastic history of England. I am sure, however, that this limited but bulky production is less boring than Carlos Argentino’s similar vast undertaking. Daneri had in mind to set to verse the entire face of the planet, and, by 1941, had already dispatched a number of acres of the State of Queensland, nearly a mile of the course run by the River Ob, a gasworks to the north of Veracruz, the leading shops in the Buenos Aires parish of Concepción, the villa of Mariana Cambaceres de Alvear in the Belgrano section of the Argentine capital, and a Turkish baths establishment not far from the well-known Brighton Aquarium. He read me certain long-winded passages from his Australian section, and at one point praised a word of his own coining, the colour “celestewhite,” which he felt “actually suggests the sky, an element of utmost importance in the landscape of the Down Under.” But these sprawling, lifeless hexameters lacked even the relative excitement of the so-called Augural Canto. Along about midnight, I left.

Two Sundays later, Daneri rang me up — perhaps for the first time in his life. He suggested we get together at four o’clock “for cocktails in the salon-bar next door, which the forward-looking Zunino and Zungri — my landlords, as you doubtless recall — are throwing open to the public. It’s a place you’ll really want to get to know.”

More in resignation than in pleasure, I accepted. Once there, it was hard to find a table. The “salon-bar,” ruthlessly modern, was only barely less ugly than what I had excepted; at the nearby tables, the excited customers spoke breathlessly of the sums Zunino and Zungri had invested in furnishings without a second thought to cost. Carlos Argentino pretended to be astonished by some feature or other of the lighting arrangement (with which, I felt, he was already familiar), and he said to me with a certain severity, “Grudgingly, you’ll have to admit to the fact that these premises hold their own with many others far more in the public eye.”
He then reread me four or five different fragments of the poem. He had revised them following his pet principle of verbal ostentation: where at first “blue” had been good enough, he now wallowed in “azures,” “ceruleans,” and “ultramarines.” The word “milky” was too easy for him; in the course of an impassioned description of a shed where wool was washed, he chose such words as “lacteal,” “lactescent,” and even made one up — “lactinacious.” After that, straight out, he condemned our modern mania for having books prefaced, “a practice already held up to scorn by the Prince of Wits in his own grateful preface to the Quixote.” He admitted, however, that for the opening of his new work an attention-getting foreword might prove valuable — “an accolade signed by a literary hand of renown.” He next went on to say that he considered publishing the initial cantos of his poem. I then began to understand the unexpected telephone call; Daneri was going to ask me to contribute a foreword to his pedantic hodgepodge. My fear turned out unfounded; Carlos Argentino remarked, with admiration and envy, that surely he could not be far wrong in qualifying with the ephitet “solid” the prestige enjoyed in every circle by Álvaro Melián Lafinur, a man of letters, who would, if I insisted on it, be only too glad to dash off some charming opening words to the poem. In order to avoid ignominy and failure, he suggested I make myself spokesman for two of the book’s undeniable virtues — formal perfection and scientific rigour — “inasmuch as this wide garden of metaphors, of figures of speech, of elegances, is inhospitable to the least detail not strictly upholding of truth.” He added that Beatriz had always been taken with Álvaro.

I agreed — agreed profusely — and explained for the sake of credibility that I would not speak to Álvaro the next day, Monday, but would wait until Thursday, when we got together for the informal dinner that follows every meeting of the Writers’ Club. (No such dinners are ever held, but it is an established fact that the meetings do take place on Thursdays, a point which Carlos Argentino Daneri could verify in the daily papers, and which lent a certain reality to my promise.) Half in prophecy, half in cunning, I said that before taking up the question of a preface I would outline the unusual plan of the work. We then said goodbye.

Turning the corner of Bernardo de Irigoyen, I reviewed as impartially as possible the alternatives before me. They were: a) to speak to Álvaro, telling him the first cousin of Beatriz’ (the explanatory euphemism would allow me to mention her name) had concocted a poem that seemed to draw out into infinity the possibilities of cacophony and chaos: b) not to say a word to Álvaro. I clearly foresaw that my indolence would opt for b.

But first thing Friday morning, I began worrying about the telephone. It offended me that that device, which had once produced the irrecoverable voice of Beatriz,
could now sink so low as to become a mere receptacle for the futile and perhaps angry remonstrances of that deluded Carlos Argentino Daneri. Luckily, nothing happened — except the inevitable spite touched off in me by this man, who had asked me to fulfill a delicate mission for him and then had let me drop.

Gradually, the phone came to lose its terrors, but one day toward the end of October it rang, and Carlos Argentino was on the line. He was deeply disturbed, so much so that at the outset I did not recognise his voice. Sadly but angrily he stammered that the now unrestrainable Zunino and Zungri, under the pretext of enlarging their already outsized “salon-bar,” were about to take over and tear down this house.

“My home, my ancestral home, my old and inveterate Garay Street home!” he kept repeating, seeming to forget his woe in the music of his words.

It was not hard for me to share his distress. After the age of fifty, all change becomes a hateful symbol of the passing of time. Besides, the scheme concerned a house that for me would always stand for Beatriz. I tried explaining this delicate scruple of regret, but Daneri seemed not to hear me. He said that if Zunino and Zungri persisted in this outrage, Doctor Zunni, his lawyer, would sue ipso facto and make them pay some fifty thousand dollars in damages.

Zunni’s name impressed me; his firm, although at the unlikely address of Caseros and Tacuarí, was nonetheless known as an old and reliable one. I asked him whether Zunni had already been hired for the case. Daneri said he would phone him that very afternoon. He hesitated, then with that level, impersonal voice we reserve for confiding something intimate, he said that to finish them poem he could not get along without the house because down in the cellar there was an Aleph. He explained that an Aleph is one of the points in space that contains all other points.

“It’s in the cellar under the dining room,” he went on, so overcome by his worries now that he forgot to be pompous. “It’s mine — mine. I discovered it when I was a child, all by myself. The cellar stairway is so steep that my aunt and uncle forbade my using it, but I’d heard someone say there was a world down there. I found out later they meant an old-fashioned globe of the world, but at the time I thought they were referring to the world itself. One day when no one was home I started down in secret, but I stumbled and fell. When I opened my eyes, I saw the Aleph.”

“The Aleph?” I repeated.
“Yes, the only place on earth where all places are — seen from every angle, each standing clear, without any confusion or blending. I kept the discovery to myself and went back every chance I got. As a child, I did not foresee that this privilege was granted me so that later I could write the poem. Zunino and Zungri will not strip me of what’s mine — no, and a thousand times no! Legal code in hand, Doctor Zunni will prove that my Aleph is inalienable.”

I tried to reason with him. “But isn’t the cellar very dark?” I said.

“Truth cannot penetrate a closed mind. If all places in the universe are in the Aleph, then all stars, all lamps, all sources of light are in it, too.”

“You wait there. I’ll be right over to see it.”

I hung before he could say no. The full knowledge of a fact sometimes enables you to see all at once many supporting but previously unsuspected things. It amazed me not to have suspected until that moment that Carlos Argentino was a madman. As were all the Viterbos, when you came down to it. Beatriz (I myself often say it) was a woman, a child, with almost uncanny powers of clairvoyance, but forgetfulness, distractions, contempt, and a streak of cruelty were also in her, and perhaps these called for a pathological explanation. Carlos Argentino’s madness filled me with spiteful elation. Deep down, we had always detested each other.

On Garay Street, the maid asked me kindly to wait. The master was, as usual, in the cellar developing pictures. On the unplayed piano, beside a large vase that held no flowers, smiled (more timeless than belonging to the past) the large photograph of Beatriz, in gaudy colours. Nobody could see us; in a seizure of tenderness, I drew close to the portrait and said to it, “Beatriz, Beatriz Elena, Beatriz Elena Viterbo, darling Beatriz, Beatriz now gone forever, it’s me, it’s Borges.”

Moments later, Carlos came in. He spoke drily. I could see he was thinking of nothing else but the loss of the Aleph.

“First a glass of pseudo-cognac,” he ordered, “and then down you dive into the cellar. Let me warn you, you’ll have to lie flat on your back. Total darkness, total immobility, and a certain ocular adjustment will also be necessary. From the floor, you must focus your eyes on the nineteenth step. Once I leave you, I’ll lower the trapdoor and you’ll be quite alone. You needn’t fear the rodents very much — though I know you will. In a minute or two, you’ll see the Aleph — the
microcosm of the alchemists and Kabbalists, our true proverbial friend, the
multum in parvo!”

Once we were in the dining room, he added, “Of course, if you don’t see it, your
incapacity will not invalidate what I have experienced. Now, down you go. In a
short while you can babble with all of Beatriz’ images.”

Tired of his inane words, I quickly made my way. The cellar, barely wider than
the stairway itself, was something of a pit. My eyes searched the dark, looking in
vain for the globe Carlos Argentino had spoken of. Some cases of empty bottles
and some canvas sacks cluttered one corner. Carlos picked up a sack, folded it in
two, and at a fixed spot spread it out.

“As a pillow,” he said, “this is quite threadbare, but if it’s padded even a half-inch
higher, you won’t see a thing, and there you’ll lie, feeling ashamed and
ridiculous. All right now, sprawl that hulk of yours there on the floor and count
off nineteen steps.”

I went through with his absurd requirements, and at last he went away. The
trapdoor was carefully shut. The blackness, in spite of a chink that I later made
out, seemed to me absolute. For the first time, I realised the danger I was in: I’d
let myself be locked in a cellar by a lunatic, after gulping down a glassful of
poison! I knew that back of Carlos’ transparent boasting lay a deep fear that I
might not see the promised wonder. To keep his madness undetected, to keep
from admitting he was mad, Carlos had to kill me. I felt a shock of panic, which I
tried to pin to my uncomfortable position and not to the effect of a drug. I shut
my eyes — I opened them. Then I saw the Aleph.

I arrive now at the ineffable core of my story. And here begins my despair as a
writer. All language is a set of symbols whose use among its speakers assumes a
shared past. How, then, can I translate into words the limitless Aleph, which my
floundering mind can scarcely encompass? Mystics, faced with the same
problem, fall back on symbols: to signify the godhead, one Persian speaks of a
bird that somehow is all birds; Alanus de Insulis, of a sphere whose center is
everywhere and circumference is nowhere; Ezekiel, of a four-faced angel who at
one and the same time moves east and west, north and south. (Not in vain do I
recall these inconceivable analogies; they bear some relation to the Aleph.)
Perhaps the gods might grant me a similar metaphor, but then this account would
become contaminated by literature, by fiction. Really, what I want to do is
impossible, for any listing of an endless series is doomed to be infinitesimal. In
that single gigantic instant I saw millions of acts both delightful and awful; not
one of them occupied the same point in space, without overlapping or
transparency. What my eyes beheld was simultaneous, but what I shall now write
down will be successive, because language is successive. Nonetheless, I’ll try to
recollect what I can.

On the back part of the step, toward the right, I saw a small iridescent sphere of
almost unbearable brilliance. At first I thought it was revolving; then I realised
that this movement was an illusion created by the dizzying world it bounded. The
Aleph’s diameter was probably little more than an inch, but all space was there,
actual and undiminished. Each thing (a mirror’s face, let us say) was infinite
things, since I distinctly saw it from every angle of the universe. I saw the
teeming sea; I saw daybreak and nightfall; I saw the multitudes of America; I saw
a silvery cobweb in the center of a black pyramid; I saw a splintered labyrinth (it
was London); I saw, close up, unending eyes watching themselves in me as in a
mirror; I saw all the mirrors on earth and none of them reflected me; I saw in a
backyard of Soler Street the same tiles that thirty years before I’d seen in the
entrance of a house in Fray Bentos; I saw bunches of grapes, snow, tobacco, lodes
of metal, steam; I saw convex equatorial deserts and each one of their grains of
sand; I saw a woman in Inverness whom I shall never forget; I saw her tangled
hair, her tall figure, I saw the cancer in her breast; I saw a ring
of baked mud in a
sidewalk, where before there had been a tree; I saw a summer house in Adrogué
and a copy of the first English translation of Pliny — Philemon Holland’s — and
all at the same time saw each letter on each page (as a boy, I used to marvel that
the letters in a closed book did not get scrambled and lost overnight); I saw a
sunset in Querétaro that seemed to reflect the colour of a rose in Bengal; I saw
my empty bedroom; I saw in a closet in Alkmaar a terrestrial globe between two
mirrors that multiplied it endlessly; I saw horses with flowing manes on a shore
of the Caspian Sea at dawn; I saw the delicate bone structure of a hand; I saw the
survivors of a battle sending out picture postcards; I saw in a showcase in
Mirzapur a pack of Spanish playing cards; I saw the slanting shadows of ferns on
a greenhouse floor; I saw tigers, pistons, bison, tides, and armies; I saw all the
ants on the planet; I saw a Persian astrolabe; I saw in the drawer of a writing table
(and the handwriting made me tremble) unbelievable, obscene, detailed letters,
which Beatriz had written to Carlos Argentino; I saw a monument I worshipped
in the Chacarita cemetery; I saw the rotted dust and bones that had once
deliciously been Beatriz Viterbo; I saw the circulation of my own dark blood; I
saw the coupling of love and the modification of death; I saw the Aleph from
every point and angle, and in the Aleph I saw the earth and in the earth the Aleph
and in the Aleph the earth; I saw my own face and my own bowels; I saw your
face; and I felt dizzy and wept, for my eyes had seen that secret and conjectured
object whose name is common to all men but which no man has looked upon —
the unimaginable universe.
I felt infinite wonder, infinite pity.

“Feeling pretty cockeyed, are you, after so much spying into places where you have no business?” said a hated and jovial voice. “Even if you were to rack your brains, you couldn’t pay me back in a hundred years for this revelation. One hell of an observatory, eh, Borges?”

Carlos Argentino’s feet were planted on the topmost step. In the sudden dim light, I managed to pick myself up and utter, “One hell of a — yes, one hell of a.”

The matter-of-factness of my voice surprised me. Anxiously, Carlos Argentino went on.

“Did you see everything — really clear, in colours?”

At that moment I found my revenge. Kindly, openly pitying him, distraught, evasive, I thanked Carlos Argentino Daneri for the hospitality of his cellar and urged him to make the most of the demolition to get away from the pernicious metropolis, which spares no one — believe me, I told him, no one! Quietly and forcefully, I refused to discuss the Aleph. On saying goodbye, I embraced him and repeated that the country, that fresh air and quiet were the great physicians.

Out on the street, going down the stairways inside Constitution Station, riding the subway, every one of the faces seemed familiar to me. I was afraid that not a single thing on earth would ever again surprise me; I was afraid I would never again be free of all I had seen. Happily, after a few sleepless nights, I was visited once more by oblivion.

Postscript of March first, 1943 — Some six months after the pulling down of a certain building on Garay Street, Procrustes & Co., the publishers, not put off by the considerable length of Daneri’s poem, brought out a selection of its “Argentine sections”. It is redundant now to repeat what happened. Carlos Argentino Daneri won the Second National Prize for Literature. [“I received your pained congratulations,” he wrote me. “You rage, my poor friend, with envy, but you must confess — even if it chokes you! — that this time I have crowned my cap with the reddest of feathers; my turban with the most caliph of rubies.”] First Prize went to Dr. Aita; Third Prize, to Dr. Mario Bonfanti. Unbelievably, my own book The Sharper’s Cards did not get a single vote. Once again dullness and envy had their triumph! It’s been some time now that I’ve been trying to see Daneri; the gossip is that a second selection of the poem is about to be published. His felicitous pen (no longer cluttered by the Aleph) has now set itself the task of writing an epic on our national hero, General San Martín.
I want to add two final observations: one, on the nature of the Aleph; the other, on its name. As is well known, the Aleph is the first letter of the Hebrew alphabet. Its use for the strange sphere in my story may not be accidental. For the Kabbala, the letter stands for the *En Soph*, the pure and boundless godhead; it is also said that it takes the shape of a man pointing to both heaven and earth, in order to show that the lower world is the map and mirror of the higher; for Cantor’s *Mengenlehre*, it is the symbol of transfinite numbers, of which any part is as great as the whole. I would like to know whether Carlos Argentino chose that name or whether he read it — applied to another point where all points converge — in one of the numberless texts that the Aleph in his cellar revealed to him. Incredible as it may seem, I believe that the Aleph of Garay Street was a false Aleph.

Here are my reasons. Around 1867, Captain Burton held the post of British Consul in Brazil. In July, 1942, Pedro Henríquez Ureña came across a manuscript of Burton’s, in a library at Santos, dealing with the mirror which the Oriental world attributes to Iskander Zu al-Karnayn, or Alexander Bicornis of Macedonia. In its crystal the whole world was reflected. Burton mentions other similar devices — the sevenfold cup of Kai Kosru; the mirror that Tariq ibn-Ziyad found in a tower (*Thousand and One Nights*, 272); the mirror that Lucian of Samosata examined on the moon (*True History*, I, 26); the mirrorlike spear that the first book of Capella’s *Satyricon* attributes; Merlin’s universal mirror, which was “round and hollow... and seem’d a world of glas” (*The Faerie Queene*, III, 2, 19) — and adds this curious statement: “But the aforesaid objects (besides the disadvantage of not existing) are mere optical instruments. The Faithful who gather at the mosque of Amr, in Cairo, are acquainted with the fact that the entire universe lies inside one of the stone pillars that ring its central court... No one, of course, can actually see it, but those who lay an ear against the surface tell that after some short while they perceive its busy hum... The mosque dates from the seventh century; the pillars come from other temples of pre-Islamic religions, since, as ibn-Khaldun has written: ‘In nations founded by nomads, the aid of foreigners is essential in all concerning masonry.’”

Does this Aleph exist in the heart of a stone? Did I see it there in the cellar when I saw all things, and have I now forgotten it? Our minds are porous and forgetfulness seeps in; I myself am distorting and losing, under the wearing away of the years, the face of Beatriz.

*El Aleph*, 1945. Translation by Norman Thomas Di Giovanni in collaboration with the author.