

# GRAPHING TREES: THE NODES & EDGES OF NABOKOV'S WORLDS

Shakeeb Arzoo\*

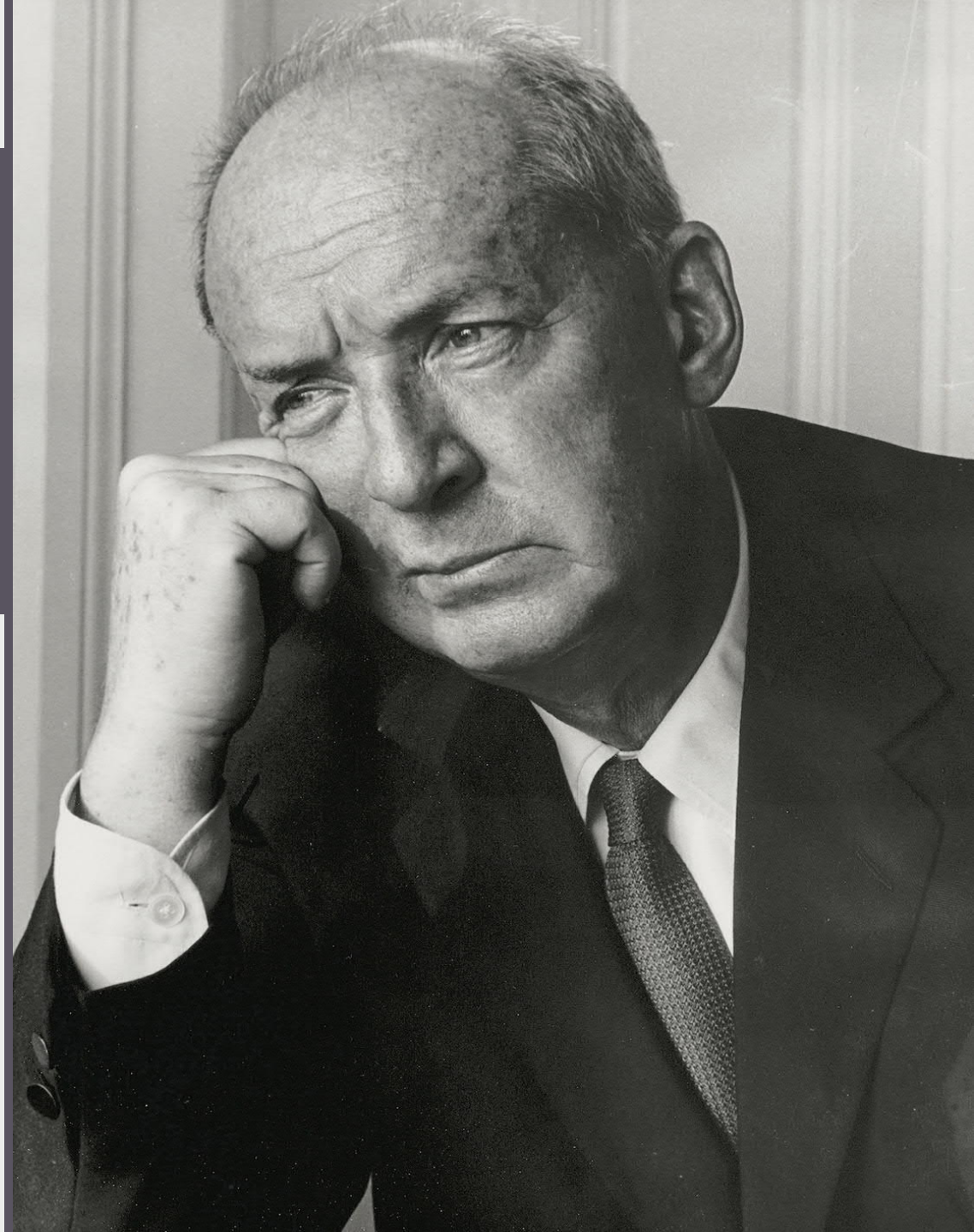
\*International Vladimir Nabokov Society

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‡University of Tennessee, Knoxville

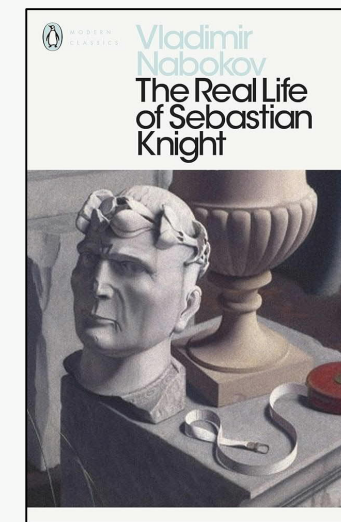
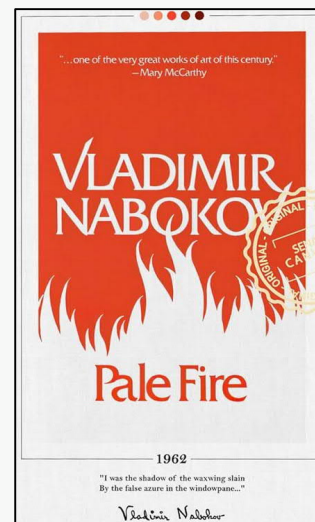
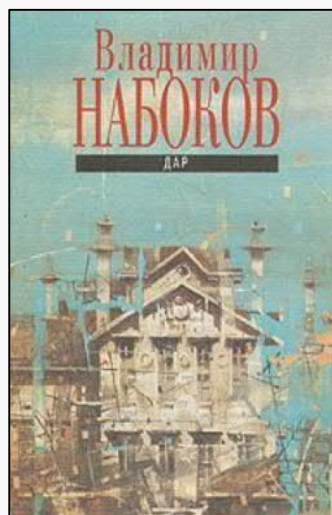
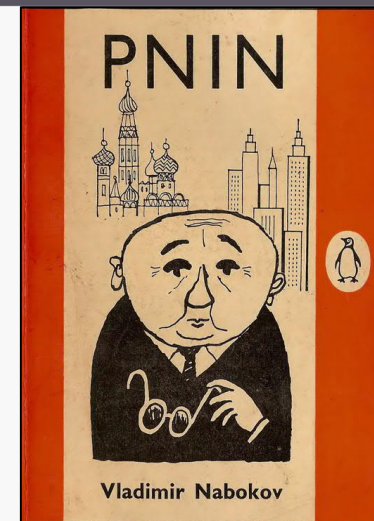
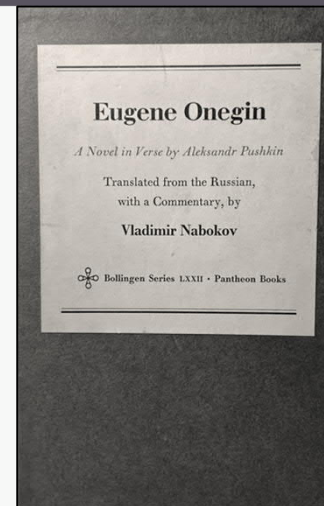
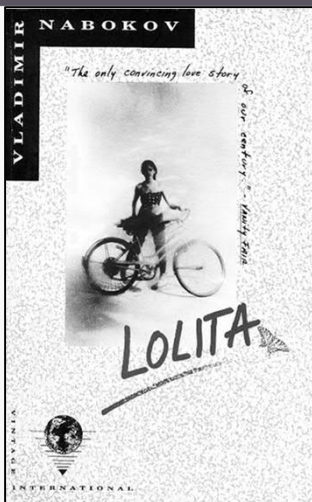


# Introducing VN

“ There was once a Russian writer, let's call him V, who was prodigiously gifted: learned, intelligent, observant, inventive. He wrote poems, plays and novels, but above all novels, and in the first part of his career he built up a considerable reputation in the limited but distinguished circles of those who could read him: Russians abroad, other non-Soviet readers of Russian. One such reader, herself a novelist, said V's book about a tormented chess genius was certainly the best novel of the emigration; later she said it was the best Russian novel of the century.

”

# VN: His Life in Art



# VN: His Life in Art

## ODE TO A MODEL

I have followed you, model,  
in magazine ads through all seasons,  
from dead leaf on the sod  
to red leaf on the breeze,

from your lily-white armpit  
to the tip of your butterfly eyelash,  
charming and pitiful,  
silly and stylish.

Or in kneesocks and tartan  
standing there like some fabulous symbol,  
parted feet pointing outward  
—pedal form of akimbo.

On a lawn, in a parody  
Of Spring and its cherry tree,  
near a vase and a parapet,  
virgin practicing archery.

Ballerina, black-masked,  
near a parapet of alabaster.  
“Can one—somebody asked—  
rhyme ‘star’ and ‘disaster’?”

Can one picture a blackbird

## THE ROOM

The room a dying poet took  
at nightfall in a dead hotel  
had both directories—the Book  
of Heaven and the Book of Bell.

It had a mirror and a chair,  
it had a window and a bed,  
its ribs let in the darkness where  
rain glistened and a shopsign bled.

Not tears, not terror, but a blend  
of anonymity and doom,  
it seemed, that room, to condescend  
to imitate a normal room.

Whenever some automobile  
subliminally slit the night,  
the walls and ceiling would reveal  
a wheeling skeleton of light.

Soon afterwards the room was mine.  
A similar striped cageling, I  
groped for the lamp and found the line  
“Alone, unknown, unloved, I die”

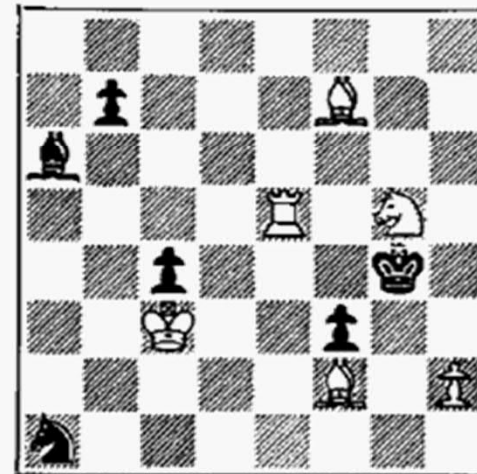
in pencil, just above the bed.

## THE PROBLEMIST

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V. Nabokov  
(U.S.A.)

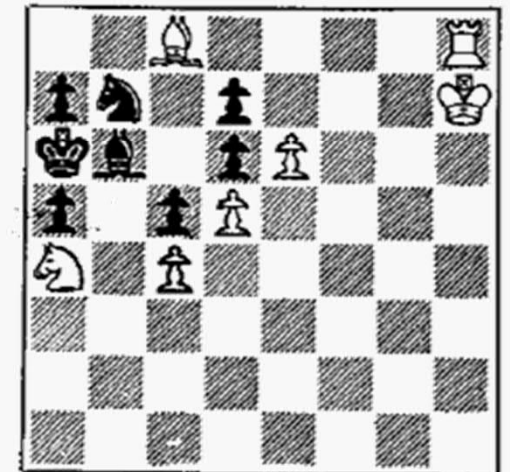


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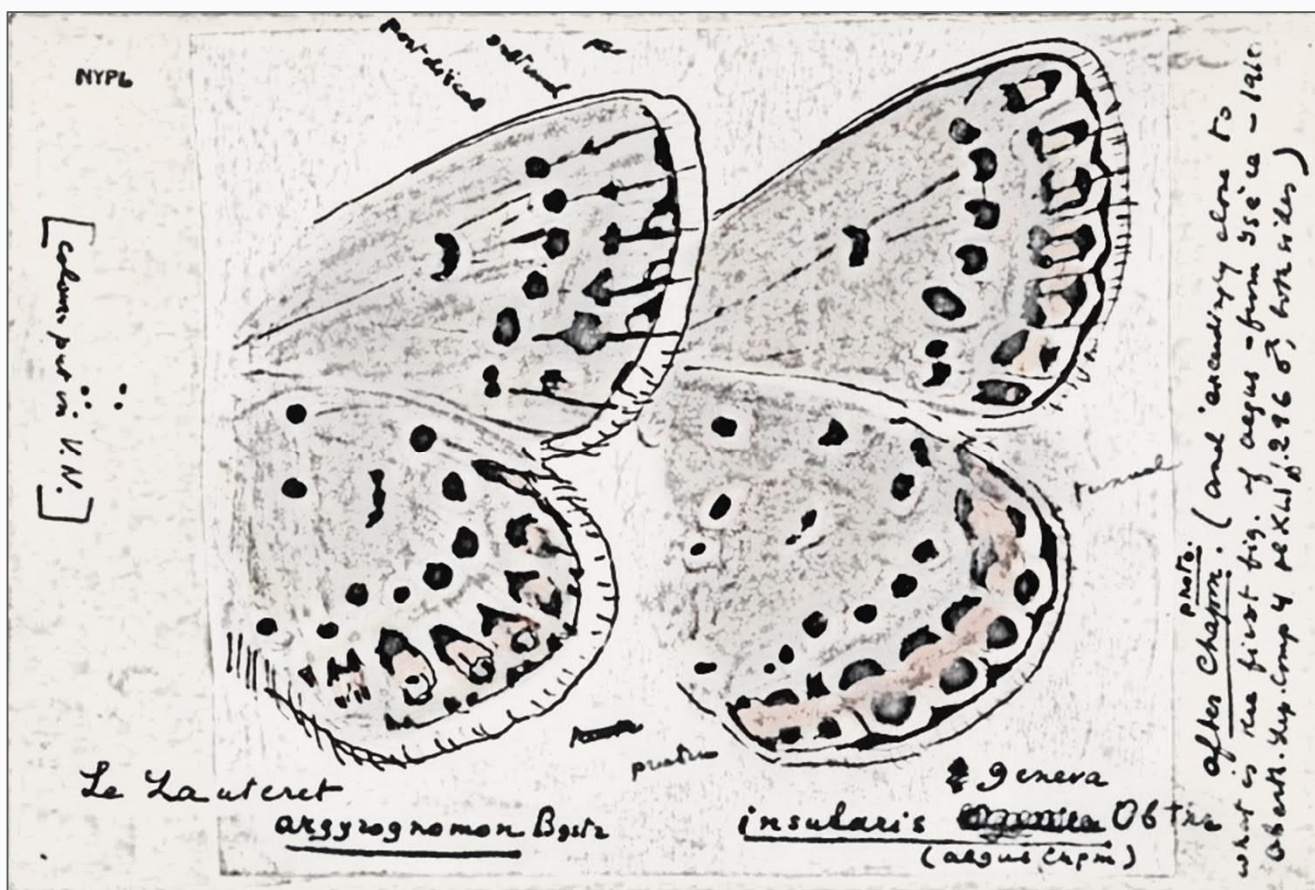
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V. Nabokov  
(U.S.A.)



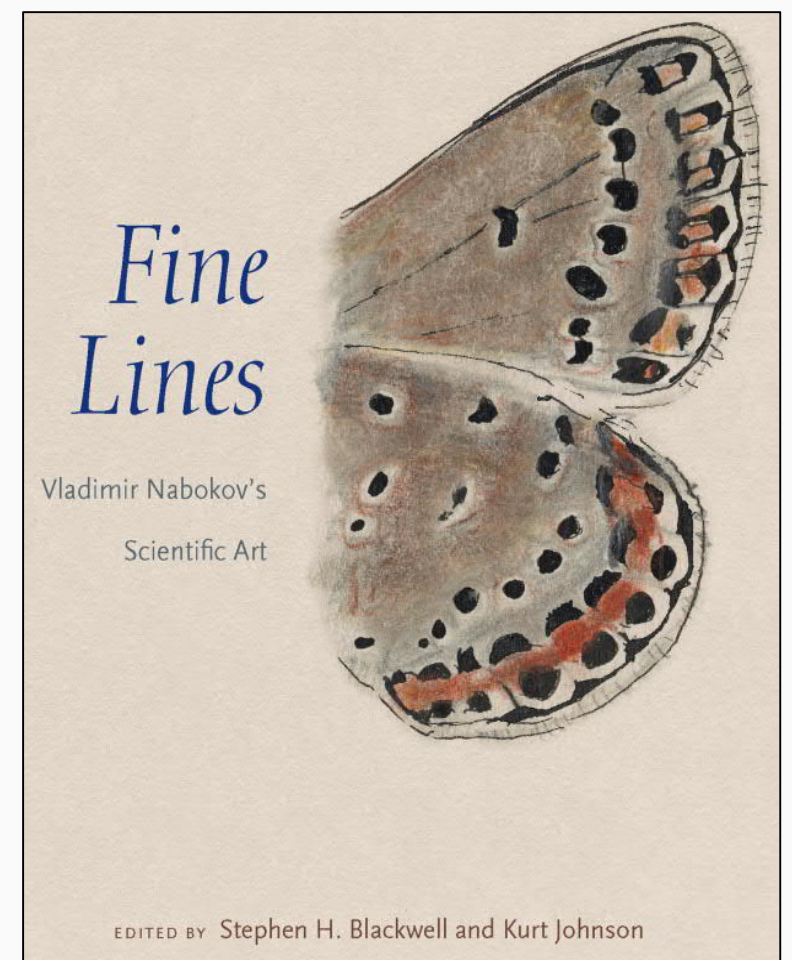
(7+8)

3



*Plebejus argyrognomon*

*Plebejus pseudaeon insularis*



# VN: His Life in Science

# Nabokov butterfly evolution theory stands vindicated

**VLADIMIR NABOKOV** may be known to most people as the author of classic novels like *Lolita* and *Pride and Prejudice*. But even as he was writing those books, Nabokov had a parallel existence as a self-taught expert on butterflies.

He was the curator of lepidoptera at the Museum of Comparative Zoology at Harvard University, and he collected the insects across the US. He published detailed descriptions of hundreds of species. And in a speculative moment in 1945, he came up with a sweeping hypothesis for the evolution of the butterflies he studied, a group known as the *Polyommatus* blues. He envisioned them coming to the New World from Asia over millions of years in a series of waves.

Few professional lepidopterists took these ideas seriously during Nabokov's lifetime. But in the years since his death in 1977, his scientific reputation has grown. And over the past 10 years, a team of scientists has been applying gene-sequencing technology to

**meanwhile** Carl Zimmer

**Nabokov came up with a sweeping hypothesis for the evolution of the butterflies known as the *Polyommatus* blues. He envisioned them coming to the New World from Asia over millions of years in a series of waves**



A male Acmon blue butterfly (*Icaricia acmon*). Vladimir Nabokov described the *Icaricia* genus in 1944. PHOTO: NYT

*Polyommatus* blues evolved. Last week in the proceedings of the Royal Society of London, they reported that Nabokov was absolutely right.

"It's really quite a marvel," said Naomi Pierce of Harvard, a co-author of the paper.

Nabokov inherited his passion for butterflies from his parents. When his father was imprisoned by the Russian authorities for his political activities, the 8-year-old Vladimir brought a butterfly

to his cell as a gift. As a teenager, Nabokov went on butterfly-hunting expeditions and carefully described the specimens he caught, imitating the scientific journals he read in his spare time. Had it not been for the Russian Revolution, which forced his family into exile in 1919, Nabokov said that he might have become a full-time lepidopterist.

In his European exile, Nabokov visited butterfly collections in museums. He

used the proceeds of his second novel, *Invitation of a Small Creature*, to finance an expedition to the Pyrenees, where he and his wife, Vera, netted more than a hundred species. The rise of the Nazis drove Nabokov into exile once more in 1940, this time to the US. It was there that Nabokov found his greatest fame as a novelist. It was also there that he delved deepest into the science of butterflies.

Nabokov spent much of

the 1940s dissecting a confusing group of species called *Polyommatus* blues. He developed forward-thinking ways to classifying the butterflies, based on differences in their genitalia. He argued that what were thought to be closely related species were actually only distantly related.

At the end of a 1945 paper on the group, he mused on how they had evolved. He speculated that they originated in Asia, moved over the Bering Strait and headed south all the way to Chile.

Allowing himself a few literary flourishes, Nabokov invited his readers to imagine "a modern taxonomist straddling a Wellsian time machine." Going back millions of years, he would end up at a time when only Asian forms of the butterflies existed. Then, moving forward again, the taxonomist would see five waves of butterflies arriving in the New World.

Nabokov conceded that the thought of butterflies making a trip from Siberia to Alaska and then all the way down into South America might sound far-fetched.

But it made more sense to him than an unknown land bridge spanning the Pacific. "I find it easier to give a friendly little push to some of the forms and hang my distributional horseshoes on the nail of Nome rather than postulate transoceanic land-bridges in other parts of the world," he wrote.

When *Lolita* made Nabokov a star in 1958, journalists were delighted to discover his hidden life as a butterfly expert. A famous photograph of Nabokov that appeared in *The Saturday Evening Post* when he was 66 is from a butterfly's perspective. The looming Russian author swings a net with rapt concentration. But despite the fact that he was the best-known butterfly expert of his day and a Harvard museum curator, other lepidopterists considered Nabokov a dutiful but undistinguished researcher. He could describe details well, they granted, but did not produce scientifically important ideas. Nabokov's reputation as a scientist languished until the 1990s.

By arrangement with the New York Times

UNPUBLISHED AND UNCOLLECTED WRITINGS

# Nabokov's

BUTTERFLIES

New Translations  
from the Russian by

DMITRI NABOKOV

Edited and Annotated by  
BRIAN BOYD  
and ROBERT MICHAEL PYLE

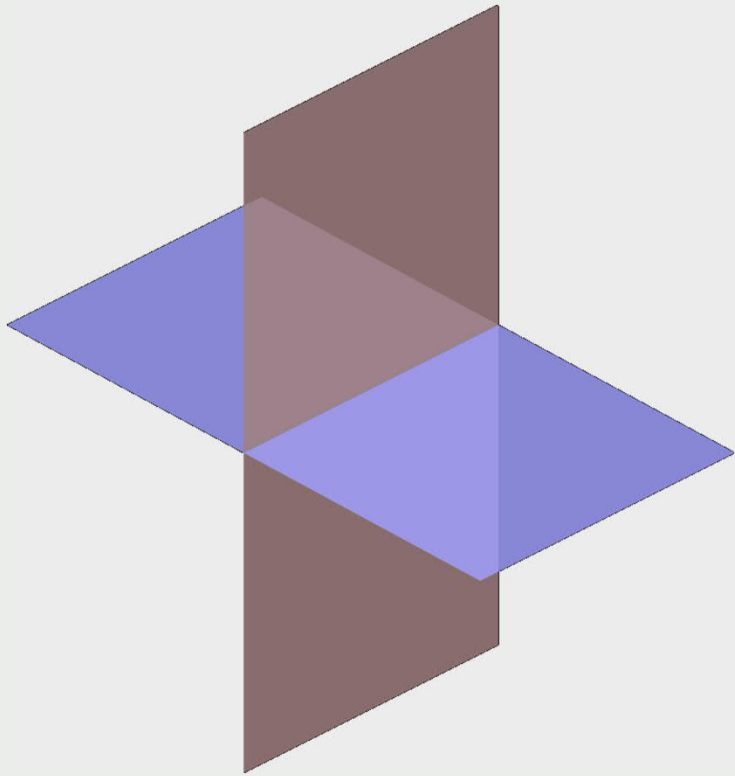


## VN: His Life in Science

# VN's Artistry: Some Stylistic Points



- Watermark of High Literary Style
- Patterned Imagery
- Multi-layered Structure

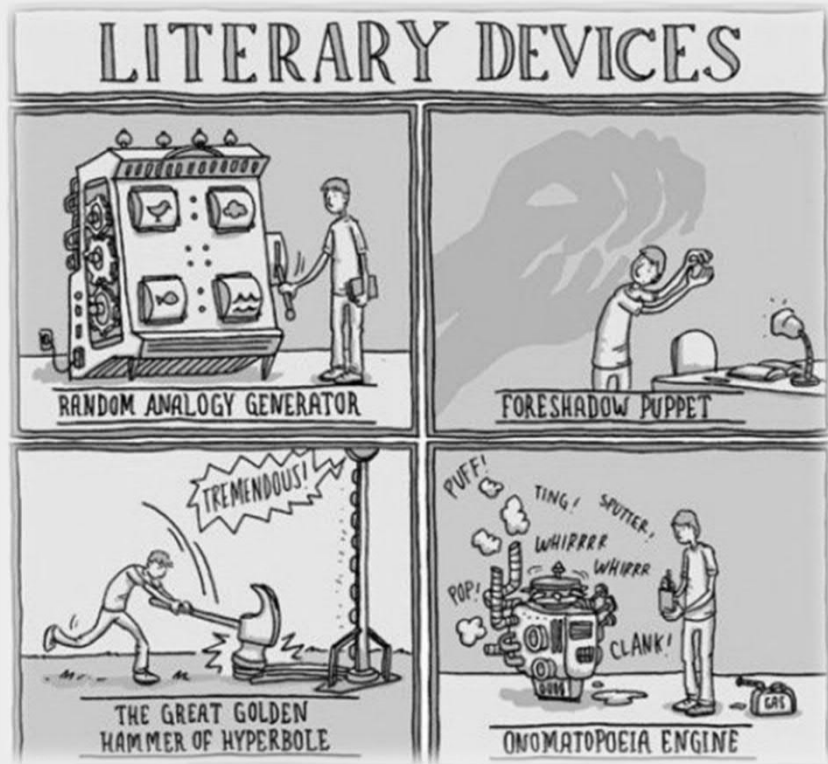


## A Cue from VN

“Literature, real literature, must not be gulped down like some potion which may be good for the heart or good for the brain—the brain, that stomach of the soul. Literature must be taken and broken to bits, pulled apart, squashed—then its lovely reek will be smelt in the hollow of the palm, it will be munched and rolled upon the tongue with relish; then, and only then, its rare flavor will be appreciated at its true worth and the broken and crushed parts will again come together in your mind and disclose the beauty of a unity to which you have contributed something of your own blood.”

— Lectures on Russian Literature, 1981





# QUESTION



Can Literature be studied by examining the knowledge embodied by a certain class of entities that an author explicitly or implicitly refers to in a body of work?

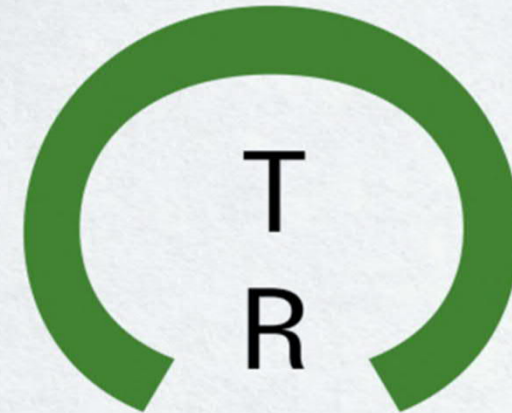
The Broader Problem

hidden



nabokov

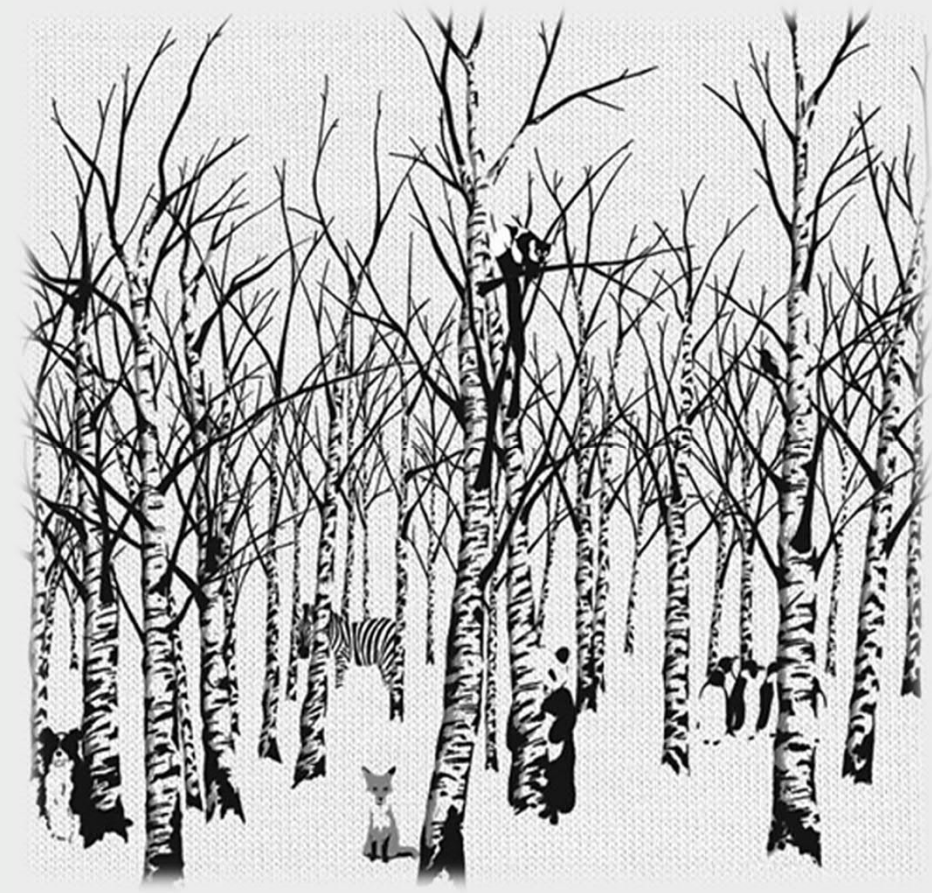
# NABOKOV'S SECRET



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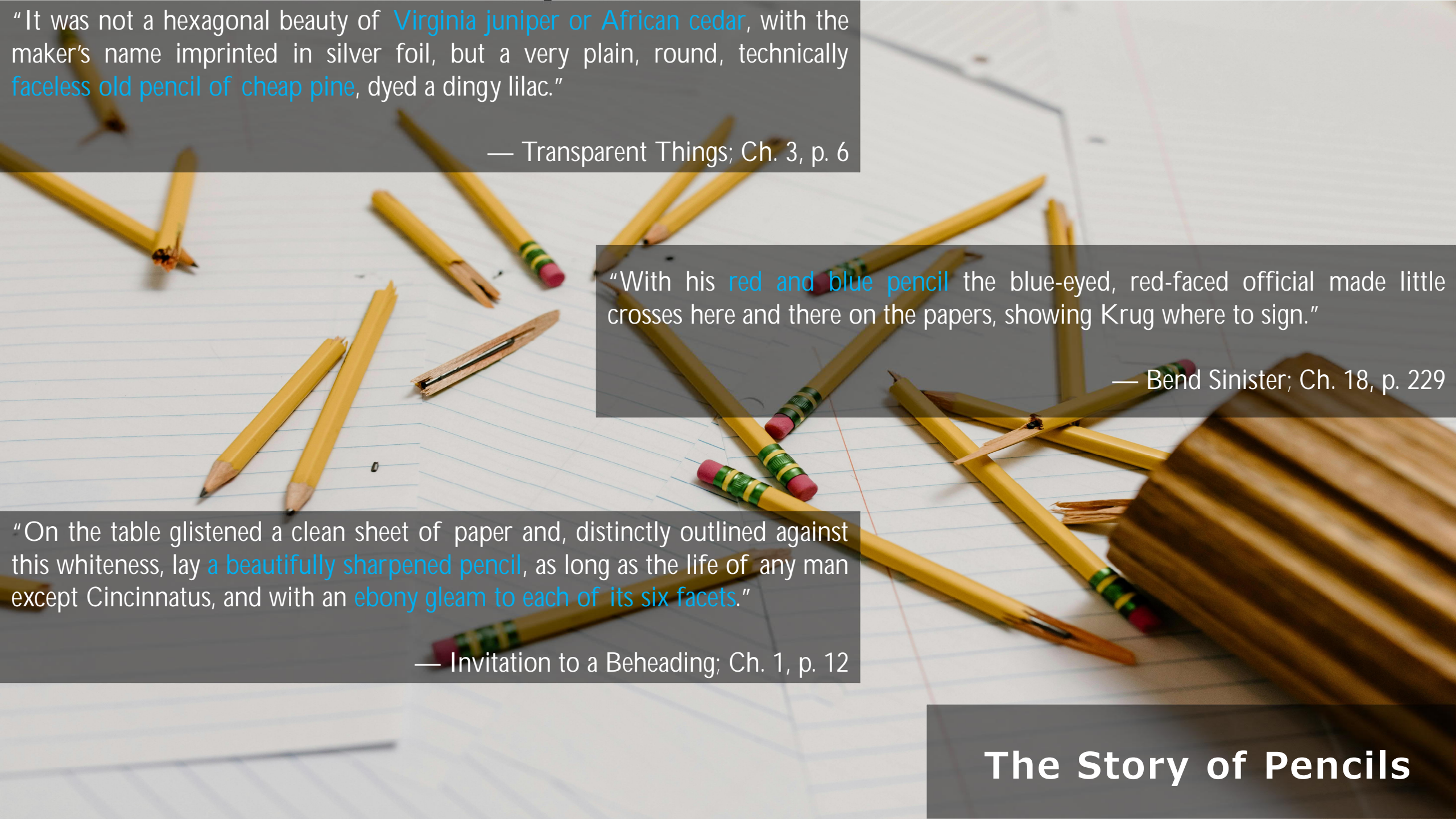
Stephen H. Blackwell



## VN's Style: Hidden in Plain View I

“There the lank, fifteen-year-old lad I then was, sought shelter during a thunderstorm, of which there was an inordinate number that July. I dream of [my pavilion](#) at least twice a year....It hangs around, so to speak, with the unobtrusiveness of an artist's signature. I find it clinging to a corner of the dream canvas or cunningly worked into some ornamental part of the picture. At times, however, it seems to be suspended in the middle distance, a trifle baroque, and yet in tune with the [handsome trees, dark fir and bright birch, whose sap once ran through its timber](#). Wine-red and bottle-green and dark-blue lozenges of stained glass lend a chapel-like touch to the latticework of its casements.”

— Speak, Memory; Ch. 11, p. 215



“It was not a hexagonal beauty of [Virginia juniper or African cedar](#), with the maker’s name imprinted in silver foil, but a very plain, round, technically [faceless old pencil of cheap pine](#), dyed a dingy lilac.”

— Transparent Things; Ch. 3, p. 6

“With his [red and blue pencil](#) the blue-eyed, red-faced official made little crosses here and there on the papers, showing Krug where to sign.”

— Bend Sinister; Ch. 18, p. 229

“On the table glistened a clean sheet of paper and, distinctly outlined against this whiteness, lay [a beautifully sharpened pencil](#), as long as the life of any man except Cincinnatus, and with an [ebony gleam to each of its six facets](#).”

— Invitation to a Beheading; Ch. 1, p. 12

**The Story of Pencils**

“Near that streetlight [veined lime-leaves](#)  
masquerade in chrysoprase...”

— The Gift; Ch. 3, p. 156

“A bench stands under [the translucent tree.](#)”

— The Gift; Ch. 3, p. 157

“Within [the linden’s bloom](#) the streetlight  
winks.”

— The Gift; Ch. 3, p. 176

“The pseudo-Parisian character of [Unter-  
den-Linden.](#)”

— The Gift; Ch. 5, p. 359



## The Story behind Place-Names

Unter den Linden is a boulevard in the central Mitte district of Berlin, Germany. It is named after the linden trees that line the grassed pedestrian mall on the median and the two broad carriageways. The avenue links numerous Berlin sights, landmarks, and rivers for sightseeing.



## VN's Style: Hidden in Plain View II

**Source:** One of the largest *Q. robur* trees near St. Petersburg

“I was given a tremendously invigorating shock....Between them, as they evenly progressed, I strutted, and trotted, and strutted again, from [sun fleck to sun fleck](#), along the middle of a path, which I easily identify today with [an alley of ornamental oaklings](#) in the park of our country estate, [Vyra, in the former Province of St. Petersburg, Russia...](#) My father, let it be noted, had served his term of military training long before I was born, so I suppose he had that day put on the trappings of his old regiment as a festive joke. To a joke, then, I owe [my first gleam of complete consciousness](#)—which again has recapitulatory implications, since the first creatures on earth to become aware of time were also the first creatures to smile.”

— Speak, Memory; Ch. 1, p. 22



## Trees, Trees, Everywhere

“Yes, that was Coppée and now comes the cousin,” said Van, and he recited:

“Their fall is gentle. The [leavesdropper](#)  
Can follow each of them and know  
The [oak tree by its leaf of copper](#),  
The [maple by its blood-red glow.](#)”

“Pah!” uttered the versionist.

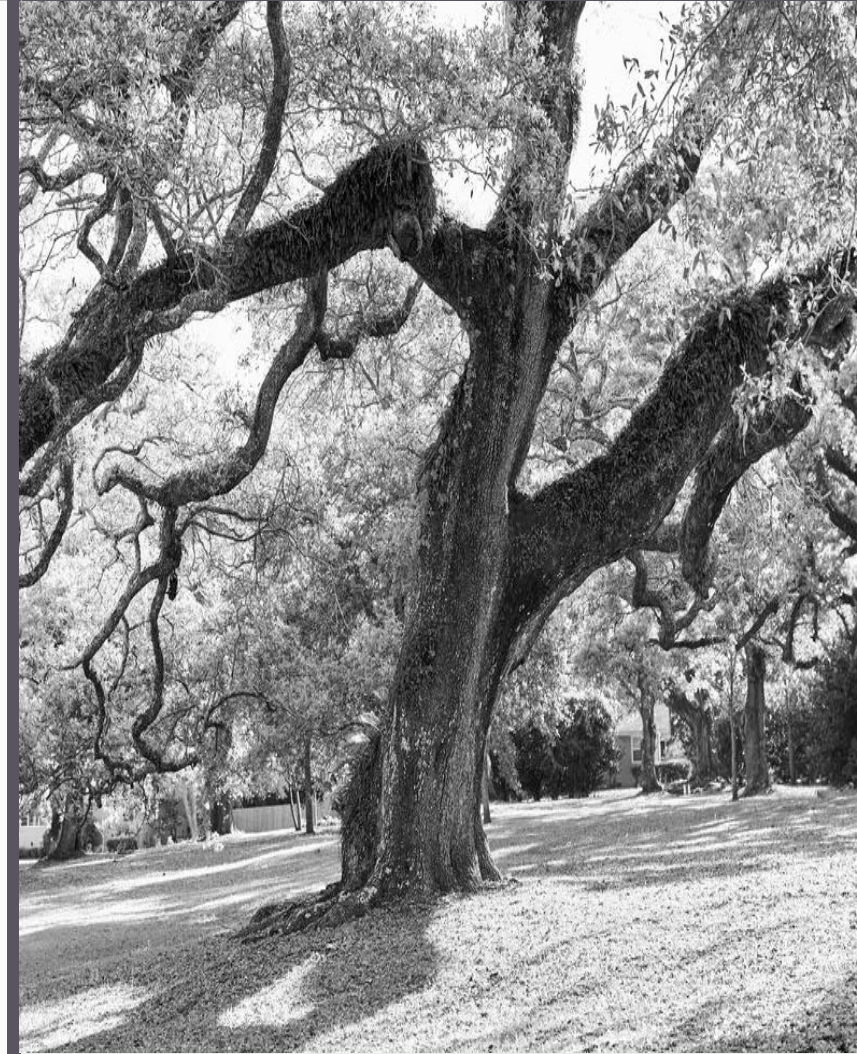
“Not at all!” cried Demon. “That ‘[leavesdropper](#)’ is a splendid *trouvaille*, girl.”

— Ada; Pt. 1, Ch. 20, p. 127

# VN's Interconnected Worlds

“It was as if someone, having seen a [certain oak tree](#) (further called [Individual T](#)) growing in a certain land and casting its [own unique shadow on the green and brown ground](#), had proceeded to erect in his garden a prodigiously intricate piece of machinery which in itself was as unlike that or [any other tree as the translator's inspiration and language](#) were unlike those of the original author, .... when completed, cast a shadow exactly similar to that of [Individual T](#)—the same outline, changing in the same manner, with the [same double and single spots of suns rippling](#) in the same position, at the same hour of the day.”

— Bend Sinister; Ch. 7, p. 119





some reason one of them was barefoot), and placed in odd, resultant and at the same time wary poses beneath the strikingly funny foliage of a squarely trimmed linden tree in which hid the bird, perhaps the one that had escaped from my shoemaker's cage. I was obscurely thrilled by Romanov's strange, beautiful, yet venomous art; I perceived in it both a forestalling and a forewarning: having far outdistanced my own art, it simultaneously illuminated for it the dangers of the way. As for the man himself, I found him boring to the point of revulsion—I could not stand his extremely rapid, extremely lisping speech, accompanied by a totally irrelevant, automatic rolling of his shining eyes. "Listen," he said, spitting at my chin, "why don't you let me introduce you to Margarita Lorentz—she has told me to bring you over some night to come, we hold little soirées at the studio—you know, with music, sandwiches, red lampshades—a lot of young people of the Polonski girl, the Shidlovski brothers. Zina Mertz. . . . These names were unknown to me; I felt no desire to evenings in the company of Vsevolod Romanov, nor did I hug-faced wife interest me in any way—so not only did I accept the invitation, but since that time I began avoiding the young vegetable's heart throbs!) or else a sepulchral claimed "Blumenerde!" The thump of rugs being sometimes joined by a hurdy-gurdy, which was painted mounted on squalid cart wheels, with a circular design depicting an idyllic brook, and cranking now with a bow with his left, the sharp-eyed organ-grinder invited now "O sole mio." That sun was already inviting square. In its garden a young chestnut tree, still lone and therefore supported by a stake, suddenly flower bigger than itself. The lilacs, however, within one night, which they finally made up their minds to wear under the benches, they encircled the bushes. In a quiet lane behind the church, their petals on a gray June day, and the

in zigzags, that now the first bend had been passed, and that his life had turned at the instant his mother summoned him from the cypress avenue to the terrace and said in a strange voice, "I have received a letter from Zilanov," then continuing in English, "I want you to be brave, very brave—it is about your father—he is no more." Martin turned pale and smiled a bewildered smile. Then he roamed for a long time in Vorontsov Park, repeating now and then an infantine nickname he had once bestowed on his father, and trying to imagine—and imagining with a certain warm, dreamy cogency—that his father was beside him, in front, behind, under that cedar over there, there on that sloping lawn, nearby, far off, everywhere.

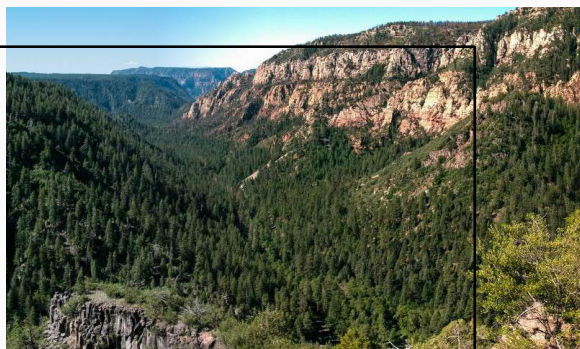
It was hot, even though a rainstorm had raged a short time before. Blowflies buzzed around the glossy medlar shrubs. An ill-tempered black swan floated in the pool, moving from side to side its bill which was so crimson that it seemed painted. Petals had fallen from the almond trees, and stood out pale on the dark earth of the damp path, like almonds in gingerbread. Not far from some enormous cedars of Lebanon grew a lone birch tree, with that particular slant to its foliage that only a birch has (as if a girl had let her hair down on one side to be combed, and stood still). A zebra-striped swallowtail glided past, its tails extended and joined. The sparkling air, the shadows of the cypresses (old trees, with a rusty cast, their small cones half-hidden under their cloaks); the black glass of the pool, where concentric circles spread around the swan; the radiant blue into which serrated Mount Petri rose wearing a broad belt of karakul-like pine—everything was permeated with agonizing bliss, and it seemed to Martin that somehow his father played a part in the distribution of shadow and shine.

"If you were twenty instead of fifteen," said his mother

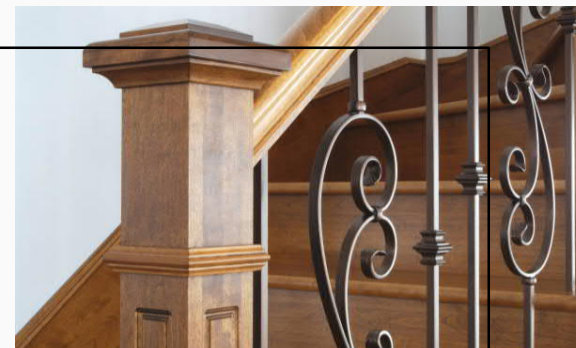
"No, I don't want anything at all," he said, and sat down at the kitchen table with an awful sigh. She sat down next to him and opened one of the magazines she had bought. "We are going to look at some pictures, Timofey." "I do not want, John. You know I do not understand what is advertisement and what is not advertisement." "You just relax, Timofey, and I'll do the explaining." "Oh, look—I like this one. Oh, this is very clever. We have here a combination of two ideas—the Desert Island and the Girl in the Puff. Now, look, Timofey—please"—he reluctantly put on his reading glasses—"this is a desert island with a lone palm, and this is a bit of broken raft, and this is a shipwrecked mariner, and this is the ship's cat he saved, and this here, on that rock—" "Impossible," said Pnin. "So small island, moreover with palm, cannot exist in such big sea." "Well, it exists here." "Impossible isolation," said Pnin. "Yes, but— Really, you are not playing fair, Timofey. You know perfectly well you agree with Lore that world of the mind is based on a compromise with reservations," said Pnin. "First of all, logic—" "Right, I'm afraid we are wandering away from our e. Now, you look at the picture. So this is the and this is the pussy, and this is a rather wistful hanging around, and now look at the puffs the sailor and the pussy." "omb explosion," said Pnin sadly. "all. It is something much funnier. You see

And much, much, more!

# Tree Uses



Setting of a Story



Functional Uses



Meta Objects

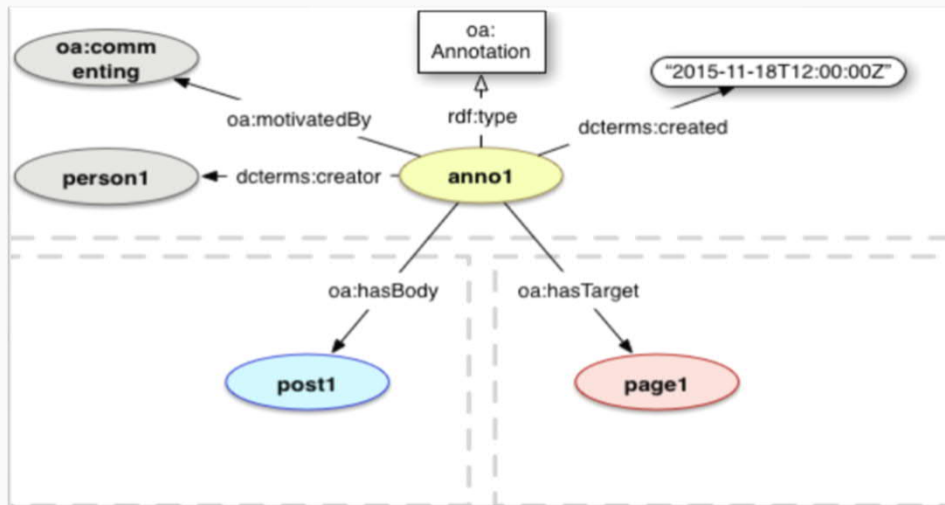
# The Case for

# Knowledge Graphs

“a graph of data intended to accumulate and convey knowledge of the real world, whose nodes represent entities of interest and whose edges represent relations between these entities.”

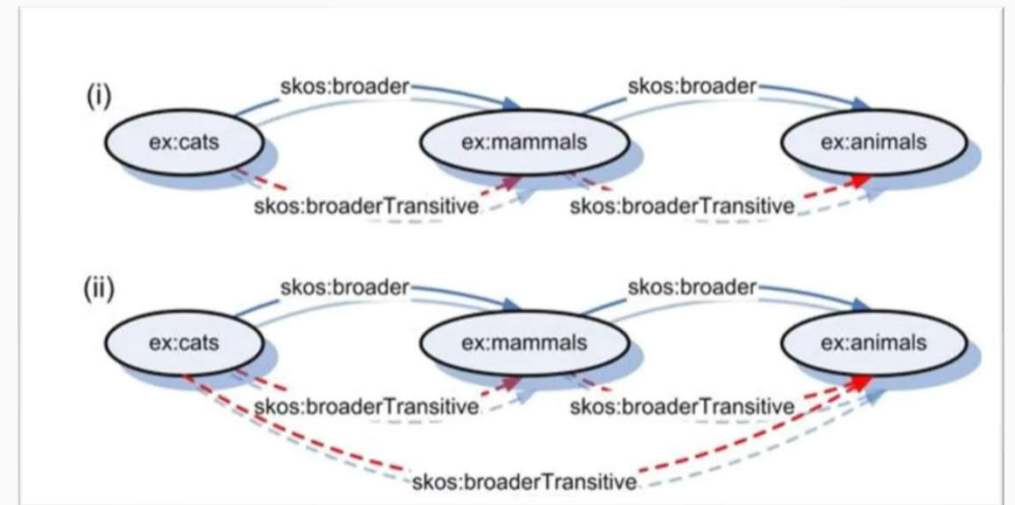


# Tree Annotation Vocabulary (TAV)



**Open Annotation Model**

<http://www.w3.org/ns/oa>



**SKOS**

<http://www.w3.org/2004/02/skos/core#>

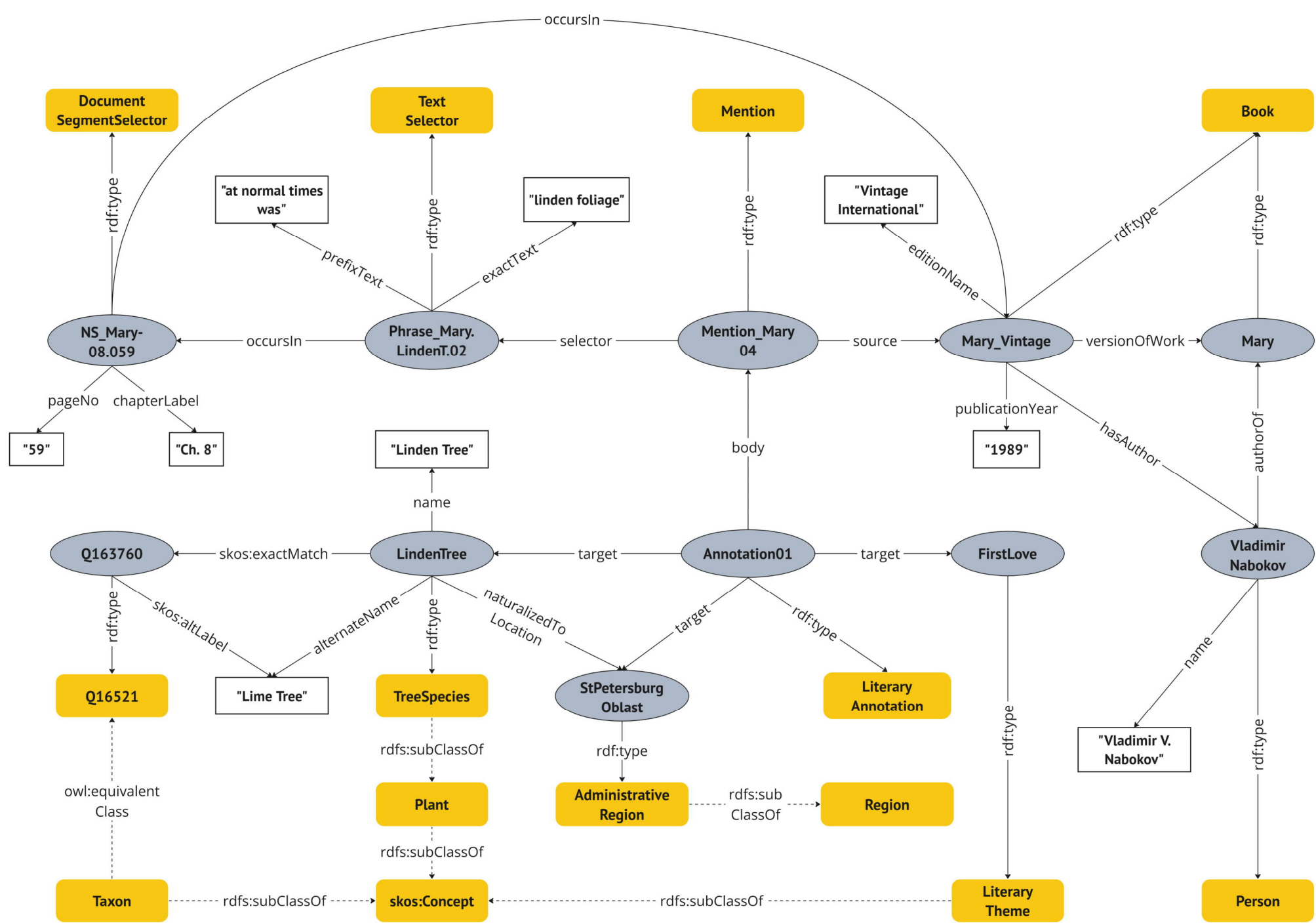


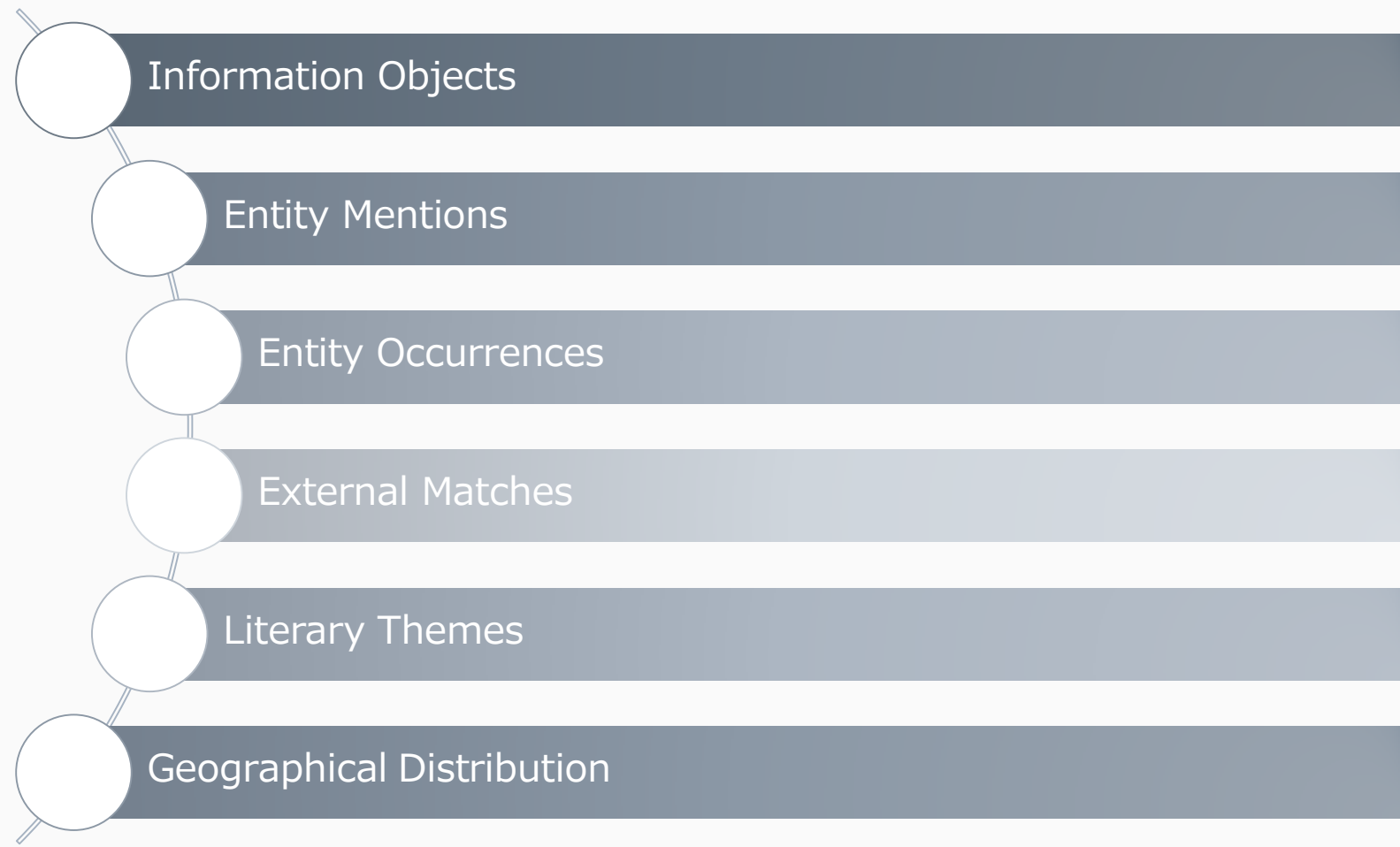
“And when the whole surface had turned a ridiculous lilac color and Mary’s fingers looked as if she had just been picking bilberries, Ganin, turning away and staring hard through narrowed eyes at a yellowy-green, warm, flowing something which at normal times was **linden foliage**, announced to Mary that he had been in love with her for a long time.”

— Mary, Ch. 8, p. 59

## An Example

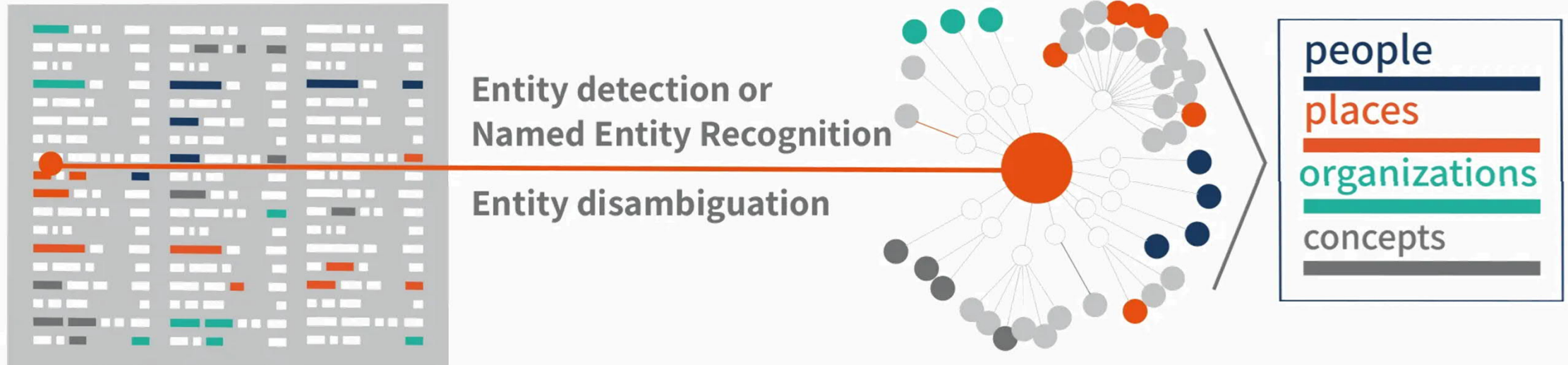
<https://w3id.org/tav>





## TAV: Features

# Tree-ID: Where is it?



Identification and collection of tree-like entities from the Nabokovian corpus and present them as an annotated dataset.





— LIVING WORLD —

# What makes a tree a tree?

Despite numerous studies and 30-plus genomes under their belts, scientists are still struggling to nail down the defining traits of these tall, long-lived, woody plants

By [Rachel Ehrenberg](#) | 03.30.2018

The great bristlecone pines are the poster children for tree longevity. They live thousands of years, growing high in California's White Mountains, where they avoid fire and many pests.

CREDIT: CHAO YEN

**“Trees can be thought of as verbs, rather than nouns- tree-ing, or tree-ifying. It’s a strategy, a way of being, like swimming or flying, even though to our eyes, it’s happening in very slow motion.”**

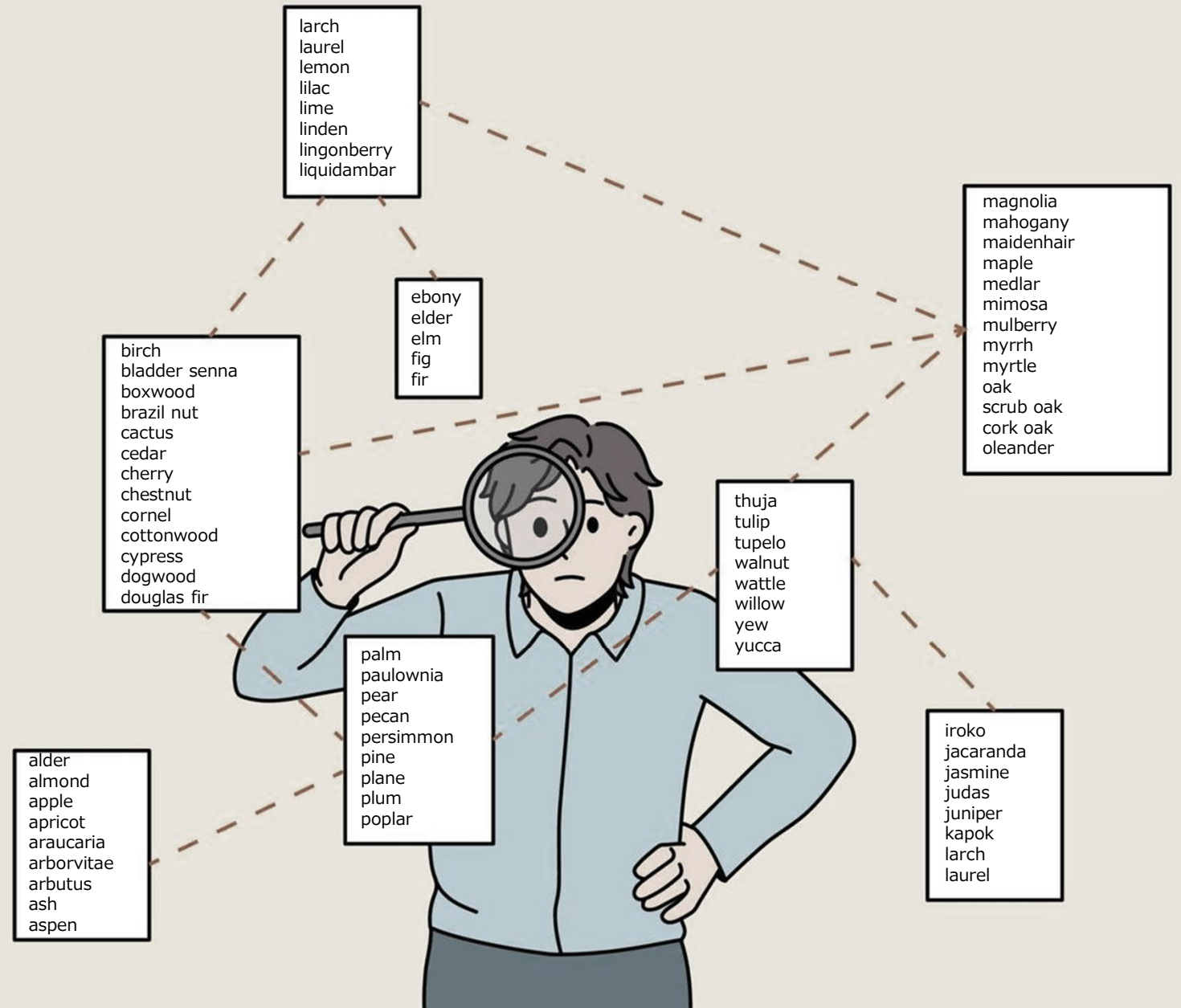
# Gazetteer Approach

## ❖ Wikipedia List of Trees

## ❖ Book Indexes

- The Secret Life of Trees
- Nabokov's Secret Trees

/[r]eg.ex/



Disguised Mentions

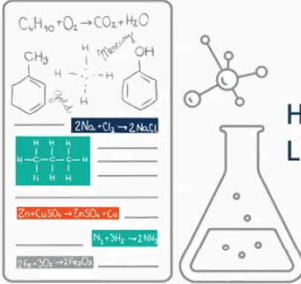
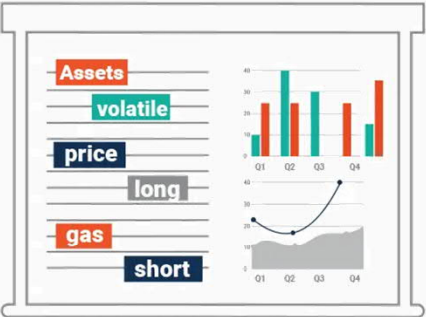
Multilingual Echoes

Entity Coreferences

## The Trouble with Entities

# Tree-ID: What is it?

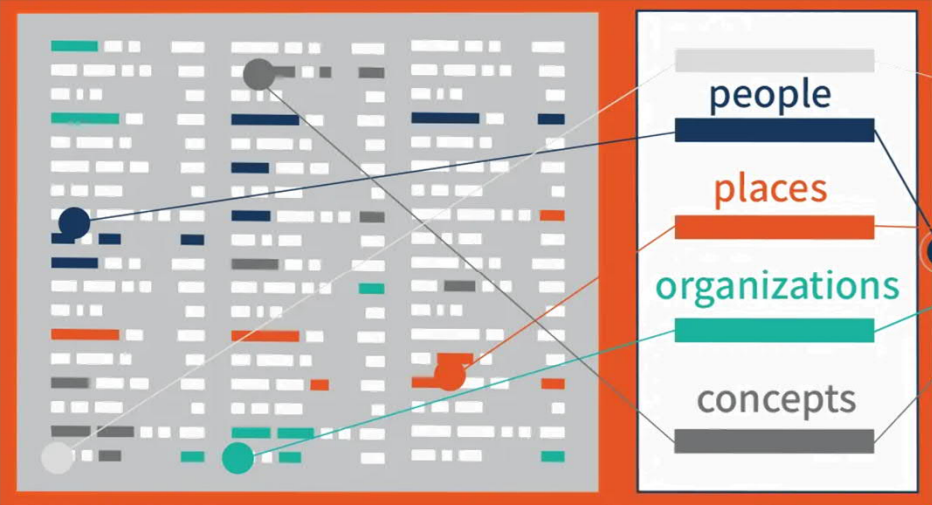
## FINANCIAL SERVICES



## HEALTHCARE & LIFE SCIENCES

## INDUSTRY

Vienna To Zurich	349 km
Train companies SNCF   TGV INOUI	TGV, SNCF   TGV Lyria
	3000 passengers per day



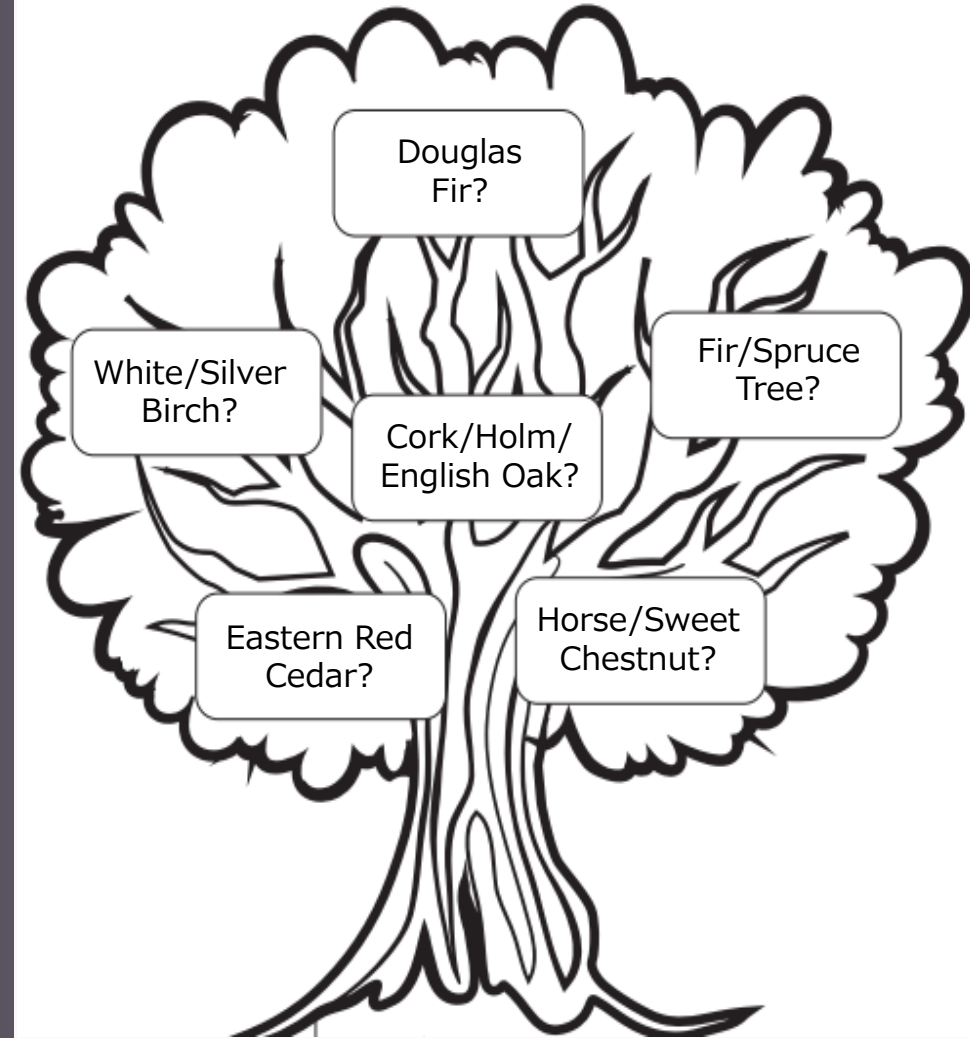
Entity linking is crucial for identifying the specific entities

# Botanical Identity

Broad Match

Exact Match

Close Match



# Every Tree in its Right Place

“He would forget his cigarette case [under a larch](#), which he was some time in learning to distinguish [from a pine](#).”

— The Gift; Ch. 4, p. 289

“...this deficiency of botanical knowledge was immediately made up by a “generalization” when he maintained with the conviction of an ignoramus that “they [\[the flowers of the Siberian taiga\]](#) are all just the same as those which bloom all over [Russia!](#)”

— The Gift; Ch. 4, p. 244



# Tree KB: Wikidata



- Main page
- Community portal
- Project chat
- Create a new Item
- Recent changes
- Random Item
- Query Service
- Nearby
- Help
- Donate

- Lexicographical data
- Create a new Lexeme
- Recent changes
- Random Lexeme

#### Tools

- What links here
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## Larix sibirica (Q754765)

species of plant

[edit](#)

Larix sibirica | Siberian Larch

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Language	Label	Description	Also known as
English	Larix sibirica	species of plant	Larix sibirica Siberian Larch
Hindi	No label defined	No description defined	
Bangla	No label defined	উদ্ভিদের প্রজাতি	
Telugu	No label defined	No description defined	

[All entered languages](#)

### Statements

instance of

[taxon](#)

[edit](#)

[0 references](#)

[+ add reference](#)

[+ add value](#)

# Tree KB: DBpedia



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## About: [Larix sibirica](#)

An Entity of Type: [plant](#), from Named Graph: <http://dbpedia.org>, within Data Space: <dbpedia.org>

*Larix sibirica*, the Siberian larch or Russian larch, is a frost-hardy tree native to western Russia, from close to the Finnish border east to the Yenisei valley in central Siberia, where it hybridises with the Dahurian larch *L. gmelinii* of eastern Siberia; the hybrid is known as *Larix × czekanowskii*.



Property	Value
<a href="#">dbo:abstract</a>	<ul style="list-style-type: none"><li><i>Larix sibirica</i>, the Siberian larch or Russian larch, is a frost-hardy tree native to western Russia, from close to the Finnish border east to the Yenisei valley in central Siberia, where it hybridises with the Dahurian larch <i>L. gmelinii</i> of eastern Siberia; the hybrid is known as <i>Larix × czekanowskii</i>. (en)</li></ul>
<a href="#">dbo:thumbnail</a>	<ul style="list-style-type: none"><li><a href="wiki-commons:Special:FilePath/Siberian-larch.jpg?width=300">wiki-commons:Special:FilePath/Siberian-larch.jpg?width=300</a></li></ul>
<a href="#">dbo:wikiPageExternalLink</a>	<ul style="list-style-type: none"><li><a href="http://www.pinetum.org/cones/mpfcones.htm">http://www.pinetum.org/cones/mpfcones.htm</a></li><li><a href="https://arboretum.harvard.edu/plants/image-search/%3Fkeyword=Larix+sibirica&amp;submit=Search">https://arboretum.harvard.edu/plants/image-search/%3Fkeyword=Larix+sibirica&amp;submit=Search</a></li><li><a href="https://web.archive.org/web/20060928001435/http://www.conifers.org/pi/la/sibirica.htm">https://web.archive.org/web/20060928001435/http://www.conifers.org/pi/la/sibirica.htm</a></li></ul>



# Kinds of Tree



*Fig*



*Hazel*



*Shagbark Hickory*



*Holly*



*Ginkgo*



*Honeysuckle*



*Hornbeam*



*Horse Chestnut*

# Tree Kinds



*Oleander*



*Paulownia*



*Siberian Pea Tree*



*Peach*



*Date Palm*



*Pear*



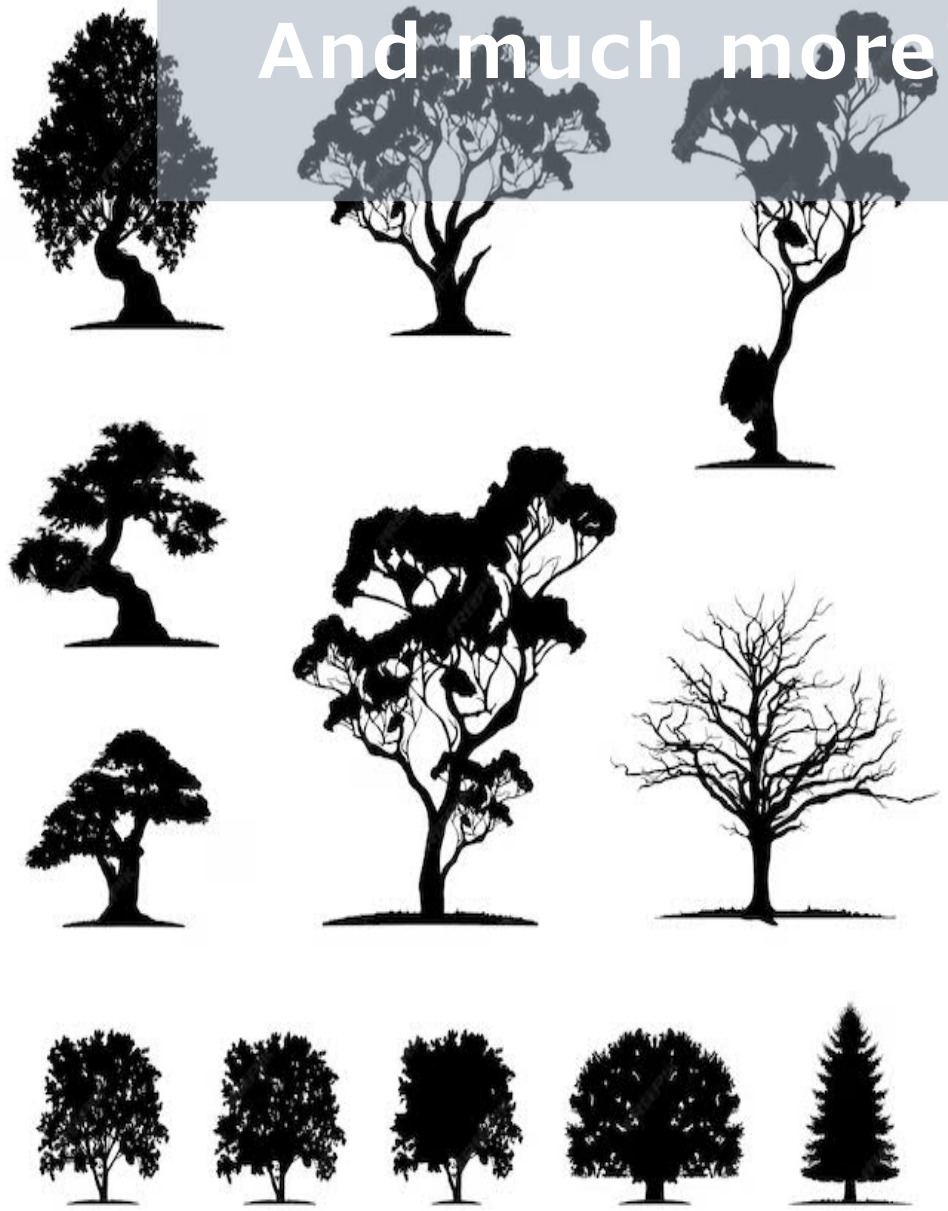
*Arolla Pine*



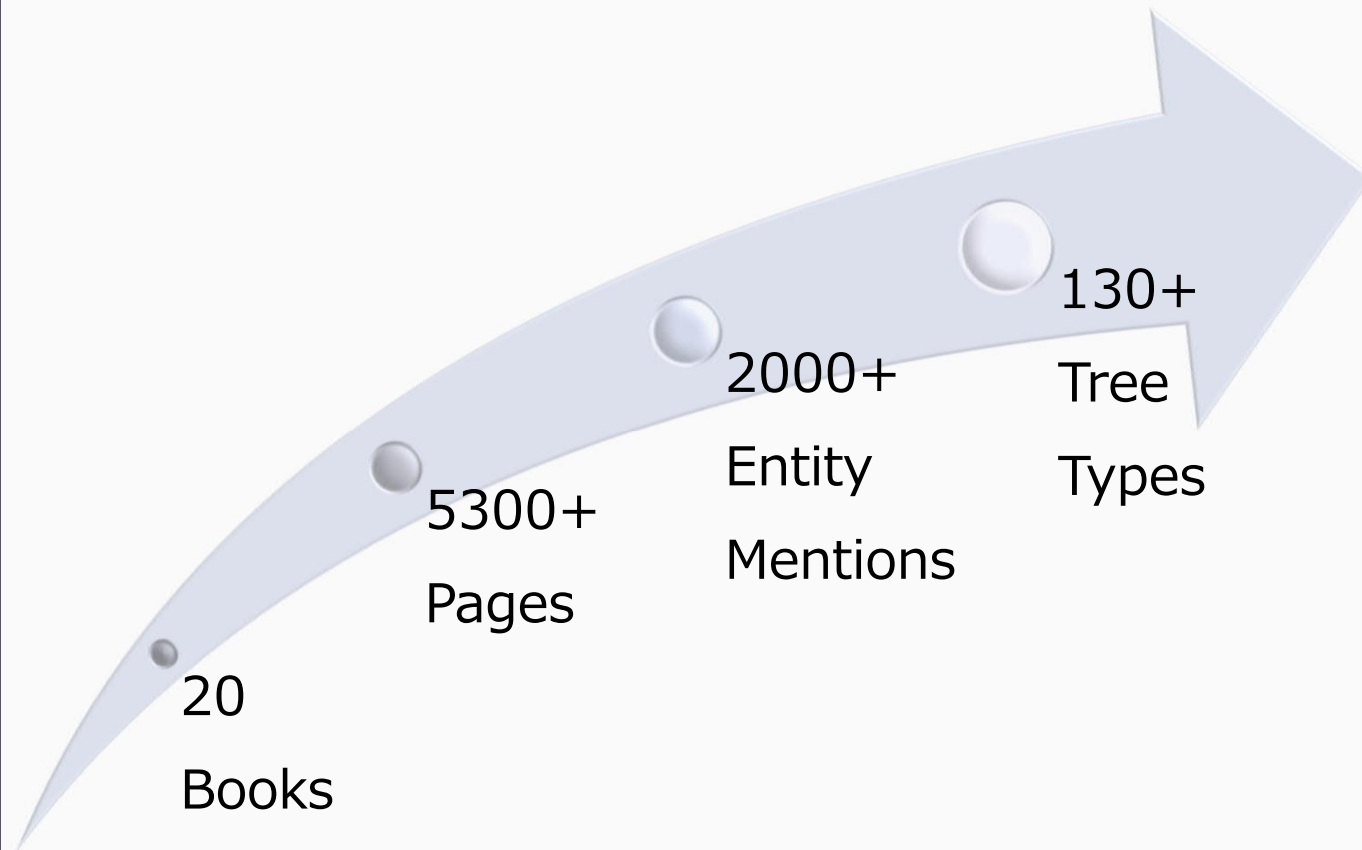
*Ponderosa Pine*



And much more!



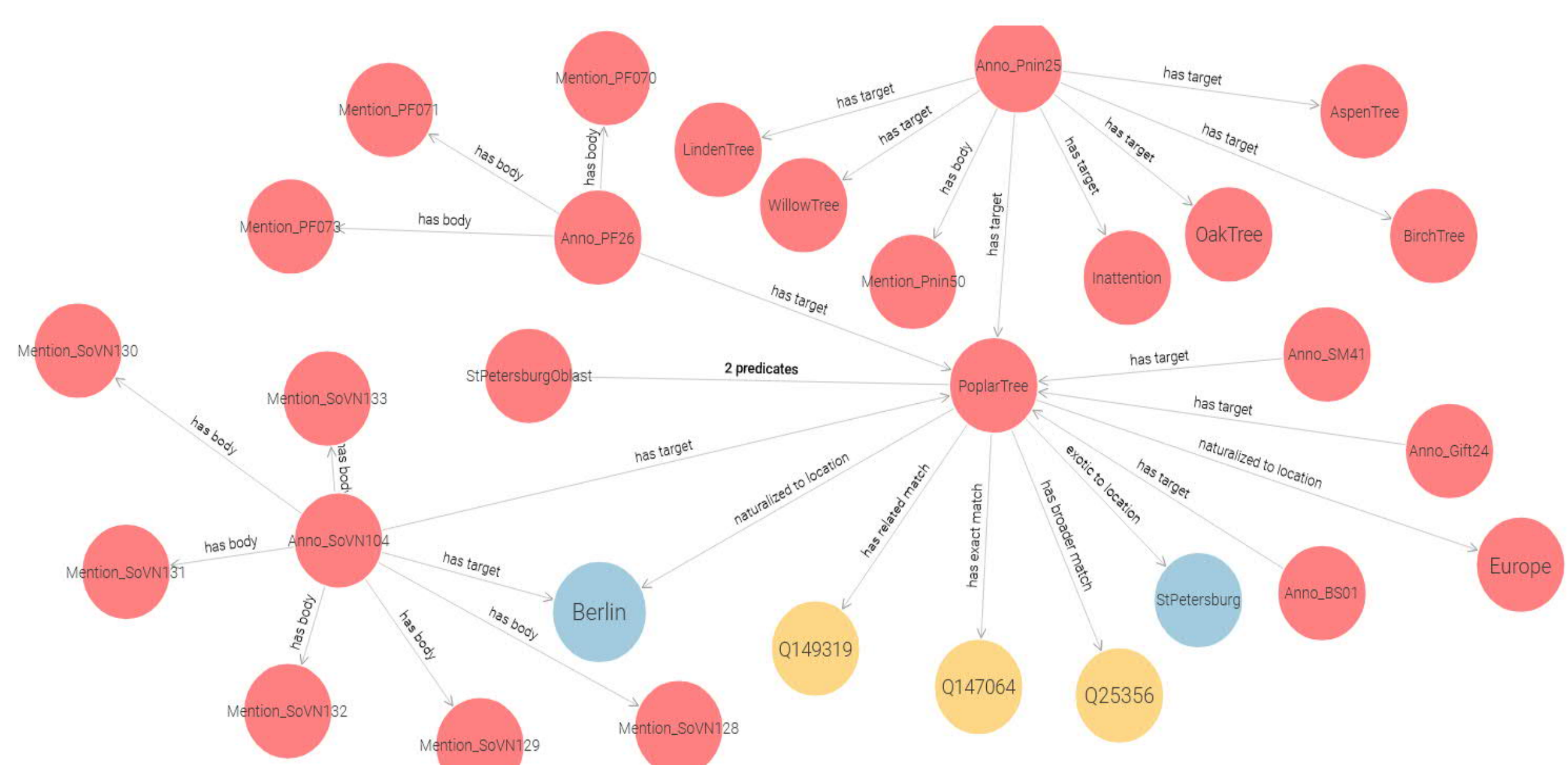
# Results: Treeific Data



- Textual Occurrence
- Geographic Locations
- Literary Themes
- References to Artworks

# Results: Illustrative Benchmarking

<b>System</b>	<b>Precision</b>	<b>Recall</b>	<b>F1 Score</b>
ChatGPT-4	98.5%	89.6%	93.9%
Gemini	97.8%	88.3%	92.8%
Llama-3.1	98.6%	92.2%	95.3%



Source: Ontotext's GraphDB

# Results: A Snippet of Tree-KG

<https://doi.org/10.5281/zenodo.13382194>

# Take Aways

- A Network Analysis of Trees
- References to Artworks
- Connecting to the LOD Cloud
- A Scalable Approach
- KGs + LLMs = Literary Interpretation?



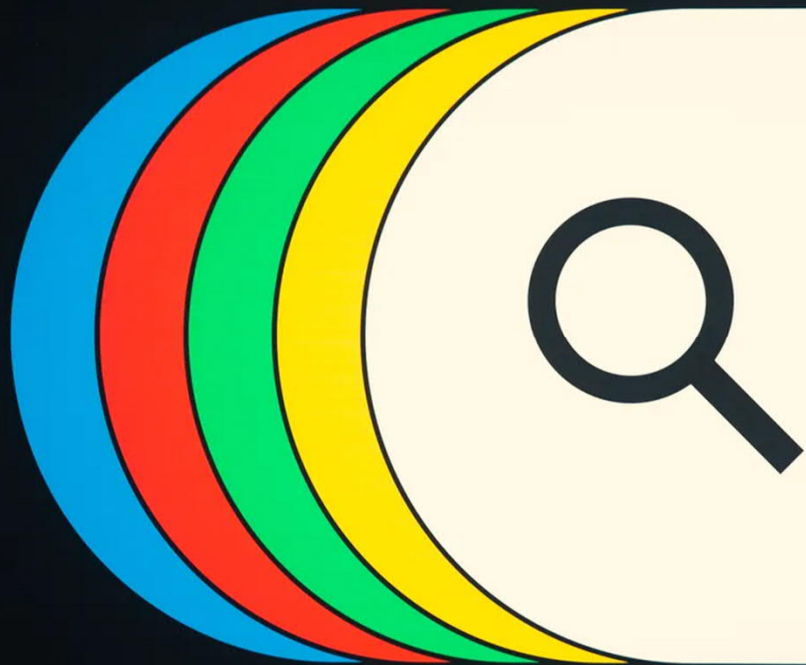
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**THANK YOU**

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questions