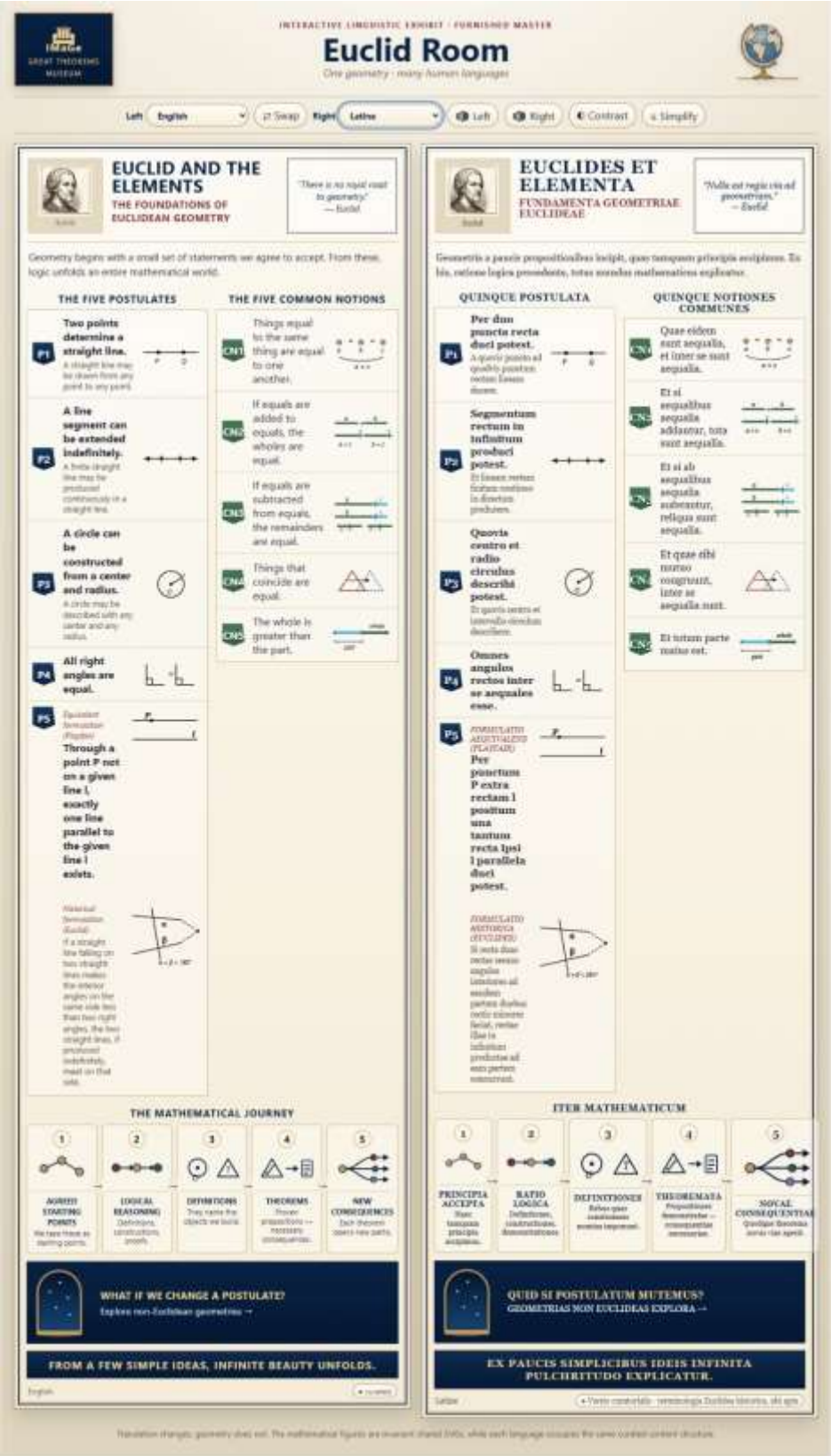
Classical Latin Annex



An annex is something more than a supplementary translation. It is a curatorial record of how a language entered the IMaGe Great Theorems Museum, including decisions, experiments, difficulties, corrections, and human observations. It is an independently valuable scholarly document.

This annex presents selected exchanges documenting significant translation and design decisions; it is not intended as a complete transcript of the development process.

To enlarge the images and improve their legibility, please use your document viewer's zoom controls.

37th year (1990-2026) of publication of
Solstice: An Electronic Journal of Geography and Mathematics
Volume XXXVII, Number 2;
Monday, December 21, 2026; 2:50 pm, Central Time
Copyright ©2026-- All rights reserved.
Institute of Mathematical Geography and the authors

Solstice: An Electronic Journal of Geography and Mathematics
Volume XXXVII Number 2
December 21, 2026

SPECIAL ISSUE: HUMAN/MACHINE COLLABORATION
Classical Latin Annex
To
IMaGe Great Theorems Museum
Sandra Lach Arlinghaus
With Collaborator and Assistant Curator IMaGe Great Theorems, Vector

Persistent University of Michigan Deep Blue Research Collection Archive, Institute of Mathematical Geography.

URL: **http://deepblue.lib.umich.edu/handle/2027.42/58219**

Cite articles as: Author name(s), Year. Title of article, *Solstice: An Electronic Journal of Geography and Mathematics*, Vol. YY, No. ZZ. Ann Arbor: Institute of Mathematical Geography.

Arlinghaus/Vector collaboration. The material in this Annex was largely composed, at Arlinghaus's direction, by Vector. Any added comments from Arlinghaus are shown with a light green background behind the text. The responsibility here, as with all other elements of this Human/Machine Collaboration, rests with the human.

Color serves as a guide to the reader. Material between lavender bars was created primarily by Vector with oversight by Arlinghaus. Material in black and white, outside those bars was created primarily by Arlinghaus. Comments by Arlinghaus within those bars has a green background.

Principal Contextual Concepts: Translation Decisions; Mathematical Content; Interface Adaptation; Testing and Corrections; Final Status.

37th year (1990-2026) of publication of
Solstice: An Electronic Journal of Geography and Mathematics
Volume XXXVII, Number 2;
Monday, December 21, 2026; 2:50 pm, Central Time
Copyright ©2026-- All rights reserved.
Institute of Mathematical Geography and the authors

Latin

Classical Latin next. Ancient Greek is ultimately the most historically profound choice for Euclid, but it deserves special handling: ideally we should distinguish **actual historically transmitted Greek wording of Euclid** from modern curatorial material that we ourselves compose in Greek. I would want to approach that almost as a textual-history exhibit within the exhibit, rather than treating Ancient Greek as simply Language No. 11.

Latin is a beautiful intermediate step. It gives us a classical language, a language enormously important in the European transmission and teaching of Euclid, and a language in which you have enough background to notice things that strike your eye or ear. It also raises fascinating translation questions: should we write newly composed Classical-style Latin throughout, or preserve historically established Latin Euclidean terminology wherever possible? I strongly favor the latter.

Then I would go **Ancient Greek**.

After those two, **isiXhosa** would be my choice for the click-language experiment. That would be a deliberately different kind of test. Its Latin orthography probably won't challenge our visual architecture much; the interesting experiment will be whether the voice system handles the click consonants represented by **c, q, x** convincingly. There I would be especially conservative about translation confidence and label native-speaker review as essential rather than merely welcome.

So my proposed expedition is:

11 · Classical Latin — transmission/history test
12 · Ancient Greek — source-language/historical-text test
13 · isiXhosa — African language + click/audio test

And I would approach Latin a little differently from our modern languages. Before translating the whole Museum prose, I'd establish a **Latin editorial rule**: historically attested Euclidean terminology where appropriate; newly composed but restrained Classical/Neo-Latin for our modern curatorial language; and no pretending that our modern “Mathematical Journey” or non-Euclidean doorway came from an ancient Latin Euclid.

That distinction could become extremely interesting to visitors.

37th year (1990-2026) of publication of
Solstice: An Electronic Journal of Geography and Mathematics
Volume XXXVII, Number 2;
Monday, December 21, 2026; 2:50 pm, Central Time
Copyright ©2026-- All rights reserved.
Institute of Mathematical Geography and the authors

So yes: **Roma next, Athens after that, then southern Africa.** 🏛️📜📐🌍

That is fascinating about your son. His linguistics background could become especially useful when we reach isiXhosa—not necessarily as a native-language reviewer, of course, but as someone who may immediately notice phonological or structural issues that neither of us would. And thirteen languages is quite a linguistic toolkit.

Now, Latin. 📜📐

I would label the menu simply **Latine**. But editorially we should call this a **Classical/Euclidean Latin rendering**: historically grounded terminology where available, restrained Latin composition for our modern Museum prose.

For the entrance I propose:
EUCLIDES ET ELEMENTA
FUNDAMENTA GEOMETRIAE EUCLIDEAE
Elementa is exactly where we want to be: not a modern translation of the English title, but the established Latin title tradition.
Our introduction requires newly composed Latin. I propose:
Geometria a paucis propositionibus incipit, quas tamquam principia accipimus.
Ex his, ratione logica procedente, totus mundus mathematicus explicatur.
The sense is: Geometry begins from a few propositions which we accept as principles. From these, as logical reasoning proceeds, an entire mathematical world unfolds.
And **explicatur** is particularly pleasing. Its literal ancestry involves unfolding/unrolling—so Latin joins our Museum's recurring metaphor almost effortlessly.
For the traditional royal-road quotation:
«Nulla est regia via ad geometriam.» — Euclides
with our modern curatorial note:
Hoc dictum Euclidi tradito more tribuitur. I would freeze the entrance block.

37th year (1990-2026) of publication of
Solstice: An Electronic Journal of Geography and Mathematics
Volume XXXVII, Number 2;
Monday, December 21, 2026; 2:50 pm, Central Time
Copyright ©2026-- All rights reserved.
Institute of Mathematical Geography and the authors

Editorial note on historical terminology: The Latin formulations presented here draw upon the historical tradition of Euclid's *Elements*, using established mathematical terminology where appropriate. They are not intended as verbatim transcriptions from any particular historical Latin edition. The distinction between historically grounded terminology and newly composed curatorial Latin is maintained throughout this Annex.

The Five Postulates

QUINQUE POSTULATA

Now something special: in the historical lines we can move closer to the traditional Latin Euclidean formulation than we did in our modern languages.

P1 — modern

Per duo puncta recta duci potest.

Historical:

A quovis puncto ad quodvis punctum rectam lineam ducere.

That infinitive construction deliberately echoes the form of the ancient postulate tradition rather than making it ordinary modern prose.

Freeze P1.

P2 — modern

Segmentum rectum in infinitum produci potest.

Historical:

Et lineam rectam finitam continuo in directum producere.

Here **lineam rectam finitam** is entirely appropriate because we are explicitly inhabiting historical Latin mathematical terminology. The conceptual discomfort we had with modern French *droite finie* simply doesn't transfer mechanically into this textual tradition.

37th year (1990-2026) of publication of
Solstice: An Electronic Journal of Geography and Mathematics
Volume XXXVII, Number 2;
Monday, December 21, 2026; 2:50 pm, Central Time
Copyright ©2026-- All rights reserved.
Institute of Mathematical Geography and the authors

Freeze P2.

P3 — modern

Quovis centro et radio circulus describi potest.

Historical:

Et quovis centro et intervallo circulum describere.

describere circulum is beautifully traditional geometrical Latin.

Freeze P3.

P4

Omnes angulos rectos inter se aequales esse.

Here I would actually let the historical formulation stand by itself. It is already perfectly intelligible Latin and has the characteristic Euclidean infinitive form.

Freeze P4.

P5 — Playfair

This, of course, cannot pretend to be ancient Euclid.

Label:

FORMULATIO AEQUIVALENS (PLAYFAIR)

Statement:

Per punctum P extra rectam l positum una tantum recta ipsi l parallela duci potest.

una tantum is our Latin member of the wonderful “exactly one” collection.

Historical Euclid

Label:

FORMULATIO HISTORICA (EUCLIDES)

37th year (1990-2026) of publication of
Solstice: An Electronic Journal of Geography and Mathematics
Volume XXXVII, Number 2;
Monday, December 21, 2026; 2:50 pm, Central Time
Copyright ©2026-- All rights reserved.
Institute of Mathematical Geography and the authors

Here I propose a readable historically flavored Latin rather than reproducing an unwieldy early-modern edition verbatim:

Si recta duas rectas secans angulos interiores ad eandem partem efficiat, quorum summa duobus angulis rectis minor sit, rectae illae, in infinitum productae, ad eam partem concurrunt.

That is compact, recognizably Euclidean Latin:

If a straight line cuts two straight lines so that the sum of the interior angles on the same side is less than two right angles, those two lines, extended indefinitely, meet on that side.

I would freeze all five postulates.

The Five Common Notions

Here Latin gives us the source of our English terminology:

QUINQUE NOTIONES COMMUNES

No need to reinvent it.

CN1

Quae eidem sunt aequalia, et inter se sunt aequalia.

This is exactly the compact Euclidean form we want.

CN2

Et si aequalibus aequalia addantur, tota sunt aequalia.

CN3

Et si ab aequalibus aequalia auferantur, reliqua sunt aequalia.

Notice **reliqua**—remainders. Our multilingual family continues.

CN4

Et quae sibi mutuo congruunt, inter se aequalia sunt.

congruunt is particularly satisfying beside our superposition miniature—and of course sits behind our modern word *congruent*.

CN5

Et totum parte maius est.

Copyright ©2026-- All rights reserved.
Institute of Mathematical Geography and the authors

Magnificent Euclidean economy:

the whole is greater than the part.

I would freeze all five.

At this point I would stop for one editorial observation. Latin has changed the character of the exercise. With French or Hindi we were translating Euclid into another contemporary language. Here we are partly **walking backward through the history of mathematical vocabulary**.

Words visitors already know begin appearing at their roots:

postulatum · definitio · demonstratio · congruere · radius · centrum · geometria

That suggests our eventual Latin translation notes could be particularly rich.

Next we would compose the explicitly modern material—the **Mathematical Journey and non-Euclidean doorway**—in restrained Latin, while marking it conceptually as *our Museum's Latin*, not historical Euclid.

So I would put **entrance + P1–P5 + CN1–CN5** into the deep freeze now. The Roman shelf is already looking rather handsome.

Yes, please keep filling the freezer. All seems very nice to me,

Yes—P4 is one of those places where Latin almost seems to remove everything unnecessary:

Omnes angulos rectos inter se aequales esse.

It has exactly the spare, axiomatic quality one hopes for. I would freeze it very firmly.

Now to the material that is explicitly **ours**, not ancient Euclid.

For **The Mathematical Journey**, my preference is:

ITER MATHEMATICUM

Iter can be a journey, path, course, or progression. It is concise, classical, and particularly appropriate to our five-stage visual sequence.

I prefer it to something like *Via Mathematica*, which risks sounding as though there is one prescribed "mathematical way."

37th year (1990-2026) of publication of
Solstice: An Electronic Journal of Geography and Mathematics
Volume XXXVII, Number 2;
Monday, December 21, 2026; 2:50 pm, Central Time
Copyright ©2026-- All rights reserved.
Institute of Mathematical Geography and the authors

Freeze **ITER MATHEMATICUM**.

1 · Starting points

PRINCIPIA ACCEPTA

Haec tamquam principia accipimus.

“Accepted principles / We accept these as principles.”

I considered *puncta initialia*, but that would be much too literal: Latin *punctum* would make our conceptual “starting points” sound geometrically like actual points.

Principia is much better.

Freeze.

2 · Logical reasoning

RATIO LOGICA

Definitiones, constructiones, demonstrationes.

This is lovely Latin mathematical vocabulary.

And **demonstrationes** rather than something modeled mechanically on English *proofs* places us squarely in the historical mathematical tradition.

Freeze.

3 · Definitions

DEFINITIONES

Rebus quas construimus nomina imponunt.

Literally:

“Definitions give names to the things we construct.”

nomina imponere—to bestow/assign names—is a very natural Latin construction and gives us another member of our wonderful multilingual “naming” family.

Freeze.

4 · Theorems

Here I would use:

THEOREMATA

rather than *propositiones*, because this Journey box is our modern conceptual category, not a claim about Euclid's own organizational terminology.

Copyright ©2026-- All rights reserved.
Institute of Mathematical Geography and the authors

Then:

Propositiones demonstratae — consequentiae necessariae.

“Demonstrated propositions—necessary consequences.”

Freeze.

5 · New consequences

NOVAE CONSEQUENTIAE

Quodque theorema novas vias aperit.

“Each theorem opens new paths.”

And once again our branching miniature tells the story.

I particularly like **novas vias aperit**. It sounds quite at home beneath that image.

Freeze the entire Journey.

The doorway

Now we have to be especially clear that this is modern Museum Latin, because Euclid certainly wasn't inviting visitors into non-Euclidean geometry!

For:

What if we change a postulate?

I propose:

QUID SI POSTULATUM MUTEMUS?

Compact, lively, and genuinely interrogative:

“What if we change a postulate?”

Then:

GEOMETRIAS NON EUCLIDEAS EXPLORA →

This is deliberately plural:

geometrias non Euclideas — non-Euclidean geometries.

And **explora** gives us exactly the Museum invitation we want.

Freeze.

37th year (1990-2026) of publication of
Solstice: An Electronic Journal of Geography and Mathematics
Volume XXXVII, Number 2;
Monday, December 21, 2026; 2:50 pm, Central Time
Copyright ©2026-- All rights reserved.
Institute of Mathematical Geography and the authors

Closing inscription

This is where Latin gives us something especially beautiful.

Our English:

From a few simple ideas, infinite beauty unfolds.

I propose:

EX PAUCIS SIMPLICIBUS IDEIS INFINITA PULCHRITUDO EXPLICATUR.

And **explicatur** returns.

At the entrance:

…totus mundus mathematicus explicatur.

An entire mathematical world unfolds.

At the exit:

…infinita pulchritudo explicatur.

Infinite beauty unfolds.

That internal echo is exactly the architectural device we've been carrying from language to language, and in Latin it is almost etymologically perfect: *explicare* carries the underlying image of unfolding.

I would freeze that inscription enthusiastically.

Translation status

Latin requires a different status label from our living languages. “Native-speaker review welcome” would be rather difficult to arrange.

I propose something like:

LATINE

Versio curatorialis · terminologia Euclidea historica, ubi apta

Meaning approximately:

“Curatorial version · historical Euclidean terminology where appropriate.”

That tells the truth about what we've constructed: part historical textual tradition, part newly composed Museum Latin.

So our complete Latin layer is now ready:

37th year (1990-2026) of publication of
Solstice: An Electronic Journal of Geography and Mathematics
Volume XXXVII, Number 2;
Monday, December 21, 2026; 2:50 pm, Central Time
Copyright ©2026-- All rights reserved.
Institute of Mathematical Geography and the authors

Entrance ✓

P1–P5 ✓

Common Notions ✓

Iter Mathematicum ✓

Doorway ✓

Closing inscription ✓

Historical/curatorial status ✓

And I think Latin has earned a slightly different place intellectually from Languages 1–10. It is not merely another contemporary linguistic rendering. It introduces a **historical transmission layer** into the Museum.

When we install it, I would nevertheless put **Latine** into the same selector for now. Later, when our language-discovery interface matures, we may decide that a small designation such as *historical language* is useful—but I would not segregate it from the others.

So: Roman shelf filled.

If you agree, the next operation is to install **Latine as Language No. 11** into a copy of Master v8, give the voice system an appropriate Latin locale if one is actually supported by the browser, and be **careful not to claim working Latin audio until we test it**. That last point is important: modern browser speech engines are much less predictable for Latin than for French, Hindi, or Japanese.

Then we'll see what Rome does to our Euclid Room.

Yes—*iter* and *principia* carry exactly the associations we want: movement through a mathematical argument rather than travel along a Roman road, and foundational starting principles with a long mathematical afterlife.

Latin is now installed as **Language No. 11** in a working copy of frozen Master v8. The historical Euclidean wording and our newly composed Museum Latin remain distinguished conceptually, and the JavaScript has been syntax-checked.

37th year (1990-2026) of publication of
Solstice: An Electronic Journal of Geography and Mathematics
Volume XXXVII, Number 2;
Monday, December 21, 2026; 2:50 pm, Central Time
Copyright ©2026-- All rights reserved.
Institute of Mathematical Geography and the authors

Open Multilingual v9 — 11 languages, now with Latine

One caution for this particular test: **the browser may or may not provide a usable Latin voice**. I have supplied the Latin language tag, but unlike German, Japanese, or Hindi, voice availability depends heavily on the device/browser. So the visual diptych is the primary test; whatever happens when you press the Latin audio button will itself be useful evidence.

I rather like the prospect of **Latine | العربية** or **Latine | 简体中文**—two millennia of transmission and an enormous cultural distance, with exactly the same little Euclidean constructions sitting beside both.

Ok. The poster looks great. Fits right in. Wonderful. Tested it against Chinese and Arabic. The voice generator however is having difficulty. It (female human-like voice) reads the Latin words as if they were American English words, in what I would say is network-standard (Michigan accent). Doesn't sound like any Latin I have ever heard. In high school, I had a native German speaker, a native Italian speaker, and a Native American English speaker all teach me Latin. Also I have, over the years, been to numerous Roman Catholic weddings and other events, both in the USA and in France. Never heard a priest or other celebrant who sounded anything like this voice. Same with listening to both Pavarotti and Trisha Yearwood sing Adeste Fidelis—accents different from each other, a bit, but nothing like the generated voice. I find the voice to be simultaneously, odd, somewhat fascinating, and offensive to my ear. I am using a current version of Google Chrome (downloaded a few days ago) on my iPhone. While I find the voice upsetting in certain ways, I think it is worthwhile keeping because the reader can watch the capability grow over time…we have pushed the voice generation to one edge—next push it a bit more with Ancient Greek and African clicks. Will add to the interest when explained in the notes.

That is a very useful failure mode, Sandy.

What you are hearing strongly suggests that Chrome/iOS is **falling back to an English voice for la**, rather than using a genuine Latin pronunciation model. That would explain the network-American sound and why the words are being interpreted as English orthography rather than as Latin. I would not treat that as "Latin audio working badly"; I would document it more precisely as **Latin voice unsupported on this device/browser, with English fallback behavior**.

37th year (1990-2026) of publication of
Solstice: An Electronic Journal of Geography and Mathematics
Volume XXXVII, Number 2;
Monday, December 21, 2026; 2:50 pm, Central Time
Copyright ©2026-- All rights reserved.
Institute of Mathematical Geography and the authors

And I agree with your instinct **not to hide it**. In this Museum, that limitation is intellectually interesting. We are not merely displaying polished successes; we are also exposing the frontier of what the system can and cannot yet do. A visitor can literally hear the difference between a language the speech engine understands and one it only pretends to understand.

I would keep Latin audio available, but add a small curatorial note.

Your own comparison across German-, Italian-, and American-taught Latin—and liturgical Latin in the U.S. and France—is especially helpful here because it makes clear that what you heard is not merely "one of several acceptable Latin traditions." Ecclesiastical Latin, reconstructed Classical Latin, and classroom traditions can differ substantially, but **American-English letter-to-sound mapping is not one of those legitimate Latin pronunciation systems**.

Audio note: On some devices, Latin may be rendered by an English fallback voice rather than a historically plausible Latin pronunciation. This is a current limitation of the speech system, not of the translation.

It preserves the historical experiment without suggesting that the speech engine's behavior is necessarily unchanged today.

There is a useful distinction here: the American-English pronunciation was directly observed, while the precise cause—fallback voice selection—was inferred rather than established by inspecting the browser's voice configuration.

That preserves the experiment without misleading the visitor.

So yes: I would freeze the **visual Latin layer**, keep the audio as an explicitly documented edge case, and then push the system further with **Ancient Greek** and later **isiXhosa**. Those two will test different limits:

- Ancient Greek: historical pronunciation ambiguity plus possible voice-support failure.
- isiXhosa: whether the speech engine can handle click consonants at all.

37th year (1990-2026) of publication of
Solstice: An Electronic Journal of Geography and Mathematics
Volume XXXVII, Number 2;
Monday, December 21, 2026; 2:50 pm, Central Time
Copyright ©2026-- All rights reserved.
Institute of Mathematical Geography and the authors

That gives the Museum a new kind of exhibit-within-the-exhibit: **the evolving boundary between linguistic representation and synthetic speech capability**.

And I like your idea that visitors can return later and hear whether that boundary has moved. That turns a limitation into a record of technological change rather than an embarrassment to be concealed.

Frozen and syntax-checked.

Latin is now preserved with its successful visual layer—and with the anomalous Chrome/iPhone speech behavior understood as part of the experiment rather than something to disguise.

Next frontier when we reopen the kitchen: **Ancient Greek**. Then perhaps we find out what the voice generator thinks a click consonant is.