LuaTEX as TEX successor

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Case summary

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I come to defend TeX, not to praise it

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- There was no computer science or laws for it in its youth
- It broke the path to tell people about computer science, and now is being judged by the laws that it helped create

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LuaTEX: Partly done, certainly doable.

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LuaTeX: Some issues appear addressable, but the solutions do not interact closely with TeX regarding the data types and structures.

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LuaTEX: Has the basics for understanding OpenType, talks with mplib, can call external programs.

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LuaTEX: Does not touch TEX's algorithms here, only taps into them. Implications of `\output`, CoCo and coroutines interesting. Does not mesh with TEX.

Task at hand

If your ultimate goal is to produce a set of files in a different format that can be produced by GhostScript, take a look at the `tightpage` option of the preview package. This will embed the page dimensions into the PostScript code, obliterating the need to use the `-E -i` options to Dvips. You can then produce all image files with a single run of GhostScript from a single PostScript file for all images at once. The `tightpage` option requires setting the `dvips` option as well.

Various options exist that will pass TEX dimensions and other information about the respective shipped out material (including descender size) into the log file, where external applications might make use of it.

The possibility for generating a whole set of graphics with a single run of LATEX, Dvips, and GhostScript increases both speed and robustness of applications. It is to be hoped that applications like LATEX2HTML will be able to make use of this package in future.

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4. The normal Output routine is called.
5. A label-like multipass mechanism resets line numbers at the start of the page.

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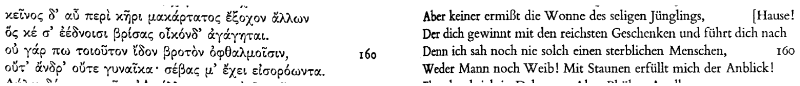
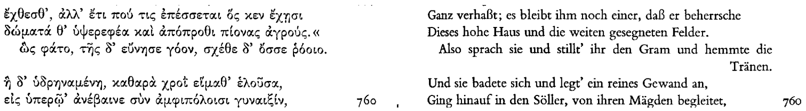
LuaTEX: Node list deconstruction/manipulation is most likely the easiest way. “Migration” is not a concept in LuaTEX, but could be interesting.

Synchronized texts. . .



κεῖνος δ' αὖ περὶ κῆρι μακάρτατος ἔξοχον ἄλλων
ὅς κέ σ' ἐέδνοισι βρίσας οἶκόνδ' ἀγάγηται.
οὐ γάρ πω τοιοῦτον ἴδον βροτὸν ὀφθαλμοῖσιν,
οὔτ' ἄνδρ' οὔτε γυναῖκα· σέβας μ' ἔχει εἰσορόωντα.

Aber keiner ermißt die Wonne des seligen Jünglings, [Hause!
Der dich gewinnt mit den reichsten Geschenken und führt dich nach
Denn ich sah noch nie solch einen sterblichen Menschen,
Weder Mann noch Weib! Mit Staunen erfüllt mich der Anblick!



ἔχθεσθ', ἀλλ' ἔτι πού τις ἐπέσσεται ὅς κεν ἔχῃσι
δώματά θ' ὑψερεφέα καὶ ἀπόπροθι πίονας ἀγρούς.«
ὣς φάτο, τῆς δ' εὔνησε γόον, σχέθε δ' ὄσσε ῥόοιο.

ἣ δ' ὑδρηναμένη, καθαρὰ χροῒ εἵμαθ' ἑλοῦσα,
εἰς ὑπερῷ' ἀνέβαινε σὺν ἀμφιπόλοισι γυναιξίν,

Ganz verhaßt; es bleibt ihm noch einer, daß er beherrsche
Dieses hohe Haus und die weiten gesegneten Felder.
Also sprach sie und stillt' ihr den Gram und hemmte die Tränen.

Und sie badete sich und legt' ein reines Gewand an,
Ging hinauf in den Söller, von ihren Mägden begleitet,

Footnotes in running paragraphs

ösen Neigungen zusammen.[d] Methodisch bedeutsam ist aber[e] wieder die G
winnung des Endpunktes <für die Gegenwart>. Dieser[f] muß in einer absolute
und endgültigen Synthese liegen, die eben deshalb nicht aus der natürlichen
ihrem Wesen nach relativistischen> Lebensbewegung [g]stammen oder hervo

a *In A folgt:* wesentlich **b** *A:* Staatsorganismen,

c–*c* *A:* zukünftige und gegenwärtige

d–*d* *A:* Dass er dabei materiell zu einer sehr konservativen, mittelalterlich ständisc
gefärbten und zugleich wieder real-politisch und national gesinnten Staatsauffa
sung kommt, ist eine Sache für sich. Auch dass die Konstruktion der Entwic
lung, die im Grunde immer nur mit einem sehr biologisch getönten Lebensb
griffe arbeitet, kein logisches Fortschrittsprinzip hat, sondern an dessen Stel
sich auf die Vorsehung beruft, ist eine der besonderen Ausführungen des Grun
gedankens. Es gibt hier nicht viel mehr als Spielereien mit völlig unzulängliche
historischen Kenntnissen.

e *A:* erst **f** *A:* Er

g–*g* *A:* mit ihrem unaustilglichen Realismus und Relativismus stammen könne

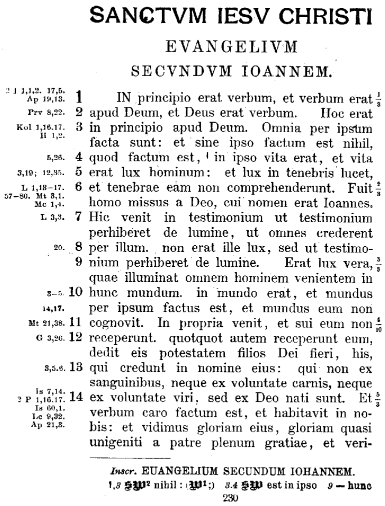
Nested footnotes

<dabei> ist, daß alles das immer nur Einzelentwicklungskreise sind[b] und daß der Fortgang zu einer universalen Verknüpfung all dieser Kreise mit dieser Me

en und Konsequenzen recht interessant, ganz abgesehen von ihrem materiellen Inhalt Hier über das Problem der Geschichtsphilosophie und des Entwicklungsbegriffes Bd I S. V und [c]97. Der[c] alles durchdringende Bewegungsbegriff I 5, 49 f., 30, 179, 251 Universalgeschichte und Vorsehung <I> 79, 147, 95 f. Zusammenfassung von Smith Montesquieu und Burke <I> 86. Mangel eines archimedischen Punktes <für Natur und (offenbarungslose) Geschichte I> 35 f. Die Tendenz des Ganzen [d]III 328: „Den Staat ideenweise (d. h. als Synthese aus Gegensätzen und intuitiv) begreifen heißt ihn für die Gegenwart beseelen, beleben, mit Religion tränken.“[d] [120] <Damit ist auch hier der Zusammenhang der Historie und der gegenwärtigen Kultursynthese scharf behauptet.> Die Ablösung Burkes durch De Bonald, Verm. Schriften[e] I 311 ff. Wichtig und interessant ist[f] der „Briefwechsel mit Gentz <1800–1829“, Stuttgart 1857. – Außerdem hat mir eine lehrreiche Berliner Dissertation von Georg Strauß über „Die Methode A Müllers in der Kritik des 19. und 20. Jahrhunderts“[121] vorgelegen>.

a–***a*** *A:* Romantiker hat dann weiterhin in die Ferne geführt, indische, persische, spanische, französische, englische Geschichte und Geistesentwicklung den Forschern als Gegenstände unterbreitet. Es ist hier nicht möglich, all dem ins einzelne zu folgen und ebenso unmöglich, die mannigfachen Fortwirkungen H. W. Riehl

Tough stuff...



SANCTVM IESV CHRISTI

EVANGELIVM

SECVNDVM IOANNEM.

1 J 1,1.2. 17,5. Ap 19,13. 1 IN principio erat verbum, et verbum erat $\frac{1}{3}$
Prv 8,22. 2 apud Deum, et Deus erat verbum. Hoc erat
Kol 1,16.17. H 1,2. 3 in principio apud Deum. Omnia per ipsum
facta sunt: et sine ipso factum est nihil,
5,26. 4 quod factum est, ˡ in ipso vita erat, et vita
3,19; 12,35. 5 erat lux hominum: et lux in tenebris lucet,
L 1,13–17. 57–80. Mt 3,1. Mc 1,4. 6 et tenebrae eam non comprehenderunt. Fuit $\frac{2}{8}$
homo missus a Deo, cui nomen erat Ioannes.
L 3,3. 7 Hic venit in testimonium ut testimonium
perhiberet de lumine, ut omnes crederent
20. 8 per illum. non erat ille lux, sed ut testimo-
9 nium perhiberet de lumine. Erat lux vera, $\frac{3}{8}$
quae illuminat omnem hominem venientem in
3–5. 10 hunc mundum. in mundo erat, et mundus
14,17. per ipsum factus est, et mundus eum non
Mt 21,38. 11 cognovit. In propria venit, et sui eum non $\frac{4}{10}$
G 3,26. 12 receperunt. quotquot autem receperunt eum,
dedit eis potestatem filios Dei fieri, his,
3,5.6. 13 qui credunt in nomine eius: qui non ex
sanguinibus, neque ex voluntate carnis, neque
Is 7,14. 2 P 1,16.17. Is 60,1. Lc 9,32. Ap 21,3. 14 ex voluntate viri, sed ex Deo nati sunt. Et $\frac{5}{3}$
verbum caro factum est, et habitavit in no-
bis: et vidimus gloriam eius, gloriam quasi
unigeniti a patre plenum gratiae, et veri-

Inscr. EUANGELIUM SECUNDUM IOHANNEM.
1,3 **𝔖𝔚**^{2} nihil : (**𝔚**^{1};) *3.4* **𝔖𝔚** est in ipso *9* — **hunc**

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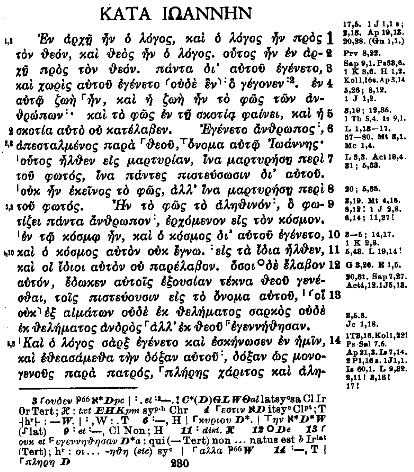

ΚΑΤΑ ΙΩΑΝΝΗΝ

1,3 Ἐν ἀρχῇ ἦν ὁ λόγος, καὶ ὁ λόγος ἦν πρὸς 1 — 17,5. 1 J 1,1 s; 2,13. Ap 19,13. 20,28. (Gn 1,1.)
τὸν θεόν, καὶ θεὸς ἦν ὁ λόγος. οὗτος ἦν ἐν ἀρ- 2 — Prv 8,22.
χῇ πρὸς τὸν θεόν. πάντα δι' αὐτοῦ ἐγένετο, 3 — Sap 9,1. Ps 33,6. 1 K 8,6. H 1,2.
καὶ χωρὶς αὐτοῦ ἐγένετο ⸀οὐδὲ ἕν⸁ ⁚ ὃ γέγονεν ⁚2. ἐν 4 — Kol 1,16 s. Ap 3,14
αὐτῷ ζωὴ ⸀ἦν, καὶ ἡ ζωὴ ἦν τὸ φῶς τῶν ἀν- — 5,26; 8,12. 1 J 1,2.
θρώπων ⁚· καὶ τὸ φῶς ἐν τῇ σκοτίᾳ φαίνει, καὶ ἡ 5 — 3,19; 12,35. 1 Th 5,4. Is 9,1.
2 σκοτία αὐτὸ οὐ κατέλαβεν. Ἐγένετο ἄνθρωπος ⁚, 6 — L 1,13–17. 57–80. Mt 3,1.
3,3 ἀπεσταλμένος παρὰ ⸀θεοῦ, ⸆ὄνομα αὐτῷ Ἰωάννης· — Mc 1,4.
ˡοὗτος ἦλθεν εἰς μαρτυρίαν, ἵνα μαρτυρήσῃ περὶ 7 — L 3,3. Act 19,4.
τοῦ φωτός, ἵνα πάντες πιστεύσωσιν δι' αὐτοῦ. — 31; 5,33.
ˡοὐκ ἦν ἐκεῖνος τὸ φῶς, ἀλλ' ἵνα μαρτυρήσῃ περὶ 8 — 20; 5,35.
3,3 τοῦ φωτός. Ἦν τὸ φῶς τὸ ἀληθινόν ⁚, ὃ φω- 9 — 3,19. Mt 4,16.
τίζει πάντα ἄνθρωπον ⁚, ἐρχόμενον εἰς τὸν κόσμον. — 8,12! 1 J 2,8. 6,14; 11,27!
ˡἐν τῷ κόσμῳ ἦν, καὶ ὁ κόσμος δι' αὐτοῦ ἐγένετο, 10 — 3–5; 14,17. 1 K 2,8.
4,10 καὶ ὁ κόσμος αὐτὸν οὐκ ἔγνω. ⁚εἰς τὰ ἴδια ἦλθεν, 11 — 5,43. L 19,14!
καὶ οἱ ἴδιοι αὐτὸν οὐ παρέλαβον. ὅσοι °δὲ ἔλαβον 12 — G 3,26. E 1,5.
αὐτόν, ἔδωκεν αὐτοῖς ἐξουσίαν τέκνα θεοῦ γενέ- — 20,31. Sap 7,27. Act 4,12. 1 J 5,13.
σθαι, τοῖς πιστεύουσιν εἰς τὸ ὄνομα αὐτοῦ, ˡ⸀οἳ 13
οὐκ⸁ ἐξ αἱμάτων οὐδὲ ἐκ θελήματος σαρκὸς οὐδὲ — 3,5.6.
ἐκ θελήματος ἀνδρὸς ⸀ἀλλ' ἐκ θεοῦ ⸀ἐγεννήθησαν. — Jc 1,18.
5,3 ˡΚαὶ ὁ λόγος σὰρξ ἐγένετο καὶ ἐσκήνωσεν ἐν ἡμῖν, 14 — 1 T 3,16. Kol 1,22! Ps Sal 7,6.
καὶ ἐθεασάμεθα τὴν δόξαν αὐτοῦ ⁚, δόξαν ὡς μονο- — Ap 21,3. Is 7,14. 2 P 1,16 s. 1 J 1,1.
γενοῦς παρὰ πατρός, ⸀πλήρης χάριτος καὶ ἀλη- — Is 60,1. L 9,32. 2,11! 3,16! 17!

3 ⸀*ουδεν* $\mathfrak{P}^{66}$ ***א*Dpc*** | ⁚ . *et* ⁚2 —. ! ***C*(D)GLWΘal*** latsy^{c}sa Cl Ir Or Tert; ℌ : *txt* ***EHKpm*** sy$^{p.h}$ Chr ***4*** ⸀*εστιν* ***אD*** itsy^{c} Cl^{pt}; T ⊣h^{r}⊢ : —***W***. | ⁚ , W : . T ***6*** ⁚ —, H | ⸀*κυριου* ***D****. | ⸆*ην* ***א*D*W*** (⸉lat) ***9*** ⁚ *et* ⁚ —, Cl Non; H ***11*** ⁚ *dist.* ℌ ***12*** ° ***De*** ***13*** ⸀*ουκ et* ⸀*εγεννηθησαν* ***D*a*** : qui (— Tert) non … natus est *b* Ir^{lat} (Tert); h^{r} : *οι* … *-ηθη* (*sic*) sy^{c} | ⸀*αλλα* $\mathfrak{P}^{66}$***W*** ***14*** ⁚ —, T | ⸀*πληρη* ***D***

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LuaTEX: Pretty much implementable with coroutines. But: data structure locality? No TEX control flow.

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- When different migrations are possible, the combination with the smallest total penalties survives.
- Line breaking is a special example of penalized breakpoints during the migration of a horizontal into a vertical list.

LuaTEX: Provides some hooks/callbacks, but those are not associated with the data itself.

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LuaTEX: TEX data structures are basically foreign.

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4. make do with less than full optimization.

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LuaTEX: No relevant hooks or concepts.

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- Avoidance of unnecessary language features.

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- TEX's grouping structure does not have a useful equivalent in Lua
- catcoded strings have no useful equivalent
- It is unclear how Coroutines and local variables will interplay between TEX and Lua.

Lua Language features

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- Numeric data type is IEEE double, strict superset of both 32bit integers and 14.16 fixpoint numbers

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Modules
: possibly nice.

Distributed human workflow

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Consequence	Move complete data and program flow to Lua. Use TEX only for processing fragments.

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TEX, the code base Pascal is current “extension language” of TEX. Move part of that to Lua? Data structures?

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- Boxes/Node list manipulation

Programming features shortlist

Feature	Lua	TeX
Scope	lexical with closures	sickly dynamic
Code execution	byte code	token list processing
Loops	nestable scopes	unnested, mouth/stomach chimera
List access	$O(lg(lg(n)))$	$O(n)$ if you are really good
Indexing	reasonable Hash, exception for numeric	bad hash particularly for numeric data
Coroutines	elegant	Coroutines?
Language design	minimalist	Language design?

And now for something completely different(?)

Ampulex compressa is a wasp that has evolved to tackle roaches, insert a stinger into their brains and disable their escape reflexes. This lets the wasp use the roach's antennae to steer the roach to its lair, where it can lay its egg in it.
The roach is no longer able to move on its own. When the egg layed on the underside of the roach hatches, the larva enters the host roach and feeds on its organs for eight days. It makes a cocoon and pupates. After 4 weeks it emerges from the roach as a full-grown wasp.
(use a search engine on "zombie cockroach").