

Type spaces

Peter Burnhill

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Typography papers 4 was edited, designed, prepared for press, and published by the Department of Typography & Graphic Communication, University of Reading.

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Debates over the ideas of 'writing' and 'typography' provide the introduction to Peter Burnhill's report on an investigation into dimensional co-ordination in typography. Consideration of the relation between writing and typography suggests another look at the infancy of printing, when the systematization that is inherent within typography was being worked out. Burnhill started this research with the clues provided by the 'risen spaces' that are occasionally visible in the printing of Aldus Manutius. From this evidence, he argues that Aldine printing was informed by a unified system of control – of type size and character proportion, as well as of the larger components of vertical and lateral measure in text-setting. These arguments are then discussed in a set of responses from colleagues who read the paper in pre-publication form. Paul Stiff's 'Spaces and difference in typography', which then follows, adds to his discussion of Burnhill a critique of some ideas of Gerrit Noordzij, which Burnhill takes as the starting point of his paper. Finally, Burnhill replies briefly to his critics.

Hoch's 'law'

The shift in our time from mechanical to electronic control in the making, storage and assembly of prefabricated characters for the reproduction of texts by printing, is prompting a closer examination of the notions 'typography' and 'writing'. A recent case is 'Type as critique' by Robin Kinross, and the response to it by Gerrit Noordzij (*Typography Papers*, no. 2, 1997). This exchange of views takes me back to a not wholly dissimilar case published some time before the advent of desktop publishing, and involving the linguist John Mountford and the typographer and teacher Ernest Hoch. In this case, the linguist is concerned to clarify the many uses of the English word 'writing', including 'print' and 'typewriting'. Hoch, as always, is appreciative of the need to sort out meanings, not in the light of some heavenly dictionary, but to ease rational discussion. Here, Hoch is critical of the linguist for not taking technical distinctions into account: 'Linguistics, divorced from technical reality, loses some of the ability to "sort out meanings"' (1968: 380)

For Hoch, the criterion for 'print' is the existence of an 'image carrier' which allows a number of near-identical images to be reproduced from it. He contends that *all* forms of print are qualitatively different from writing in that one basic respect: examination of the image carrier allows us to forecast the content of the image to be copied from it. Writing by hand or with a typewriter is different in that no amount of examination of the machine, the pen, or the brush, will reveal anything whatsoever about the content of what is to be written. Handwriting and print, he argues, are qualitatively different manifestations of writing as a medium of language. Typewriting is not an equal third manifestation, as Mountford contends.

Kinross, in his piece, seems to be at one with Hoch's law when he writes: '... typography is not writing with prefabricated letters ... This process of prefabrication abolishes writing.' (1997: 87) In view of the fact that typography was not invented to mimic handwriting but to replace it as the means for reproducing text already created, Kinross's statement is obviously true. That the early printer's pattern-maker cut punches in imitation of contemporary handwriting, including the tricks invented by the copyist to conserve writing material by getting as much as possible into the line, is strictly beside the point. He had no option. Although this required much skill and ingenuity on the part of the pattern-maker, the consequent increase in the size of the character set must have caused problems for the compositor in learning the lay of the case, in setting the matter, in correcting it and in distributing it

back to case after use. Proliferation soon turned to variety reduction, no doubt to the delight of the reader who now had no need to unravel a tiresome cats-cradle before being able to get at the meaning of the matter.

Noordzij, for his part, states: ‘The distinction between handwriting and typography as different *modes* of producing text assumes a system, the *category* of producing text, with typography and handwriting for subsets. If it is reasonable to call this category *writing*, typography is writing, just like handwriting.’ (1997: p. 89)

Given that typography is used not to create texts but to transform and multiply them by printing, Noordzij’s logic seems questionable. As with the linguist, he equates typography with letters of the alphabet, seemingly not recognizing Hoch’s image carrier as the thing which typographers are most concerned to construct. This is not to suggest that a close study of handwriting is of no value. On the contrary, handwriting is a form of drawing, and all drawing which demands close observation by the draftsman of the thing being drawn is a learning process in any field of enquiry. On the other hand, it does matter that Noordzij’s analysis would appear to limit the practice of typography to that of a specialist in well-crafted handwriting, however admirable clear handwriting may be. I suspect our electronic engineers may also see ‘typography’ simply as the specialist province of the calligraphic artist.

A feature of Hoch’s image carrier frequently ignored or treated in a cavalier manner is the use of a system of prefabricated spaces – the typographic norms as described by Froshaug (1964) – without which the prefabricated characters would make no sense. For just as the printer’s laterally adjustable mould permitted the cloning of characters of differing width, so the same mechanism could be used to cast a dimensionally structured set of non-printing types for the determination of intervals in the construction of the image carrier of less than the width of the square of the character field (the mould size or em quadrat). In the handwriting of a text, an interval is not something marked. In the typographic mode of construction, a space is a type to be selected from a structured set of similar types for the functional grouping of parts. For the typographer, out of sight can never be out of mind. This too is a qualitative difference between the practice of handwriting and the practice of typography.

As school children in the early thirties of the last century we were taught to construct sentences with a square-ended pen, rather in the manner advocated by Edward Johnston. This formed part of our education in book construction. (I think our teacher, Mr Blunt, must have been trained in the heyday of the hand-craft revival before the Great War of 1914–18.) In our work for Mr Blunt, the use of the ruler was forbidden, except for scribing straight lines. All measurements in the construction of the text, such as the distance between writing lines, the height of capital letters and lowercase vowels, had to be paced-out using multiples of the width of the square-ended pen. The structure of the work was unified by reference to this principle. I suspect that a scribe,

working before the invention of the laterally adjustable mould made him redundant, may well have used a similar system of submodular control.

Later, at printing school, we were introduced to a different system of measurement – the typographic point system – which allowed us to gauge the line-to-line dimension of the job, but was useless for gauging the intervals of concern to Mr Blunt. Such terms as ‘small face’ and ‘large face’ was the nearest we could get to being able to specify the dimensions of the printed images of character sets which were said to be the same type size. Lead may now be dead, but on that particular front, nothing seems to have changed. Although of long standing, the anomaly of not being able to state with precision the printed image size of a set of characters *relative to the line increment* has not always existed.

Aldine typographic norms

When the making of prefabricated letters and spaces for printing was an in-house activity, the master printer could decide the dimensions of the mould to be used for sizing the faces of the types to be cast from it – by reference to the maximum permissible number of lines to be set, given the page size of the job in hand. Measurement of the widths of the images of rising spaces, as these can be found without too much difficulty on pages printed by Aldus Manutius in the types specially cut for him by the pattern-maker, Francesco Griffo, in the last decade of the fifteenth century, indicates a duodecimally structured set of spacing sorts – the Aldine in-house typographic norms – the smallest increment of which was one-twelfth part of the mould body size of the type in question. Measurement of the primary dimensional attributes of the character sets cut as punches by Griffo for the company, such as the x-height and capital letter height, indicates that these were gauged by the pattern-maker in multiples of the submodular twelfth (the ‘hair’ space), which, in the case of the smallest face he fabricated for Aldus – the Latin and Greek cursive letters and the Arabic numerals made for the thirty-two-line octavo classics series – was approximately 0.333 mm. That is, a mould body size of about 4 mm. This dimension turns out to be 7.5 times the submodular twelfth of the mould size of the first venture of Aldus into the innermost secrets of the new technology of printing from prefabricated movables: the Greek primer of Constantine Lascaris of 1495, and in regard to which mould aperture Griffo was engaged to fit a Greek running hand on which the student new to Greek could model his own.

The mould sizes called for by Aldus subsequent to the Lascaris job, such as those of the renowned roman-styled Latins cut for the composition of Bembo’s *De Aetna*, the other Greeks he made for Aldus, and the famed italic of the octavo classic series, were also multiples of the ‘hair’ space of the Lascaris mould aperture. It appears that the Aldine system of dimensional control functioned at every level of order, from the orchestration of the work of compositors at page level down to that of character face sizing.

Used in combination, the Aldine typographic norms provided a unified system of dimensional control, seemingly not attainable when typesetting became an independent industry and began to focus on the need for standardized body sizes to facilitate the sale of cast types to printing houses generally. It is my hunch that the anomaly of not

being able to specify face size stems from that time. Today, electronic systems may help us to catch up with Aldus in that regard.

How Griffo transferred measurements from the scale to the face gauge must remain a matter for speculation. I suspect he used the required combination of spacing sorts as a feeler gauge in his fashioning of face gauges prior to punchcutting, perhaps as I suggest here:

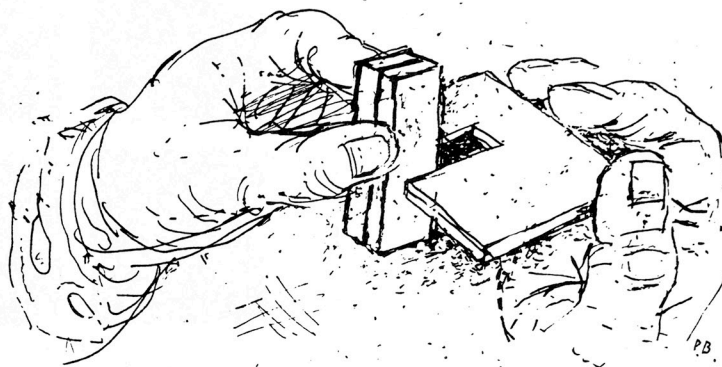


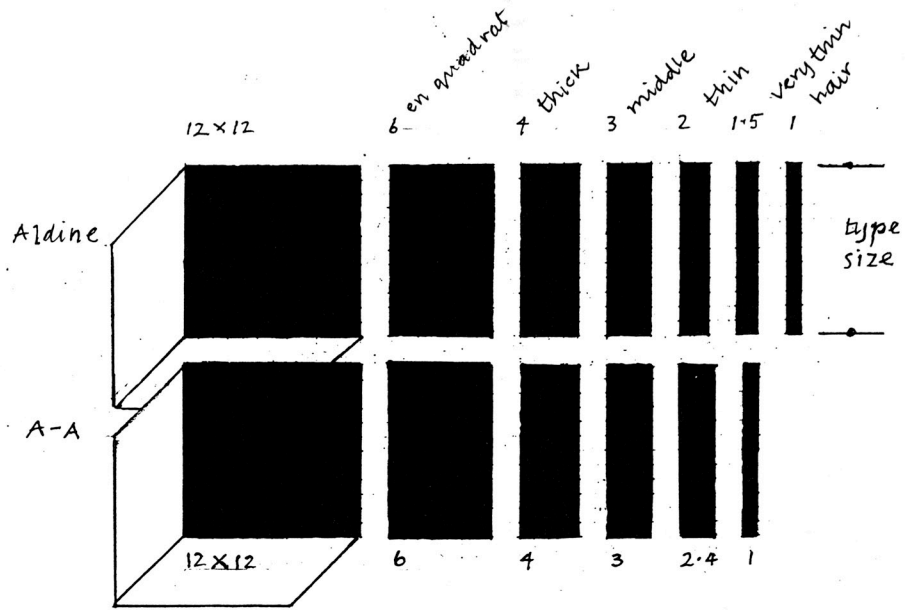
Figure 1. Using spacing sorts as a feeler gauge in the fabrication of face gauges. A drawing by the author based on this assumption.

The Aldine in-house norms seem to have been slightly different from our erstwhile Anglo-American and Didot norms as experienced by an older generation of today's typographers and printing-trade workers (figure 2). The Anglo-American 'thin' space was one-fifth of the em quadrat, whereas the Aldine system was purely duodecimal, the Aldine 'thin' space being one-sixth part of the em square. It also included what I have called a 'very thin' space (8 to em) which falls between the 'thin' (6 to em) and the 'hair' space (12 to em). The duodecimal system is factorially rich when compared with the factorially poverty-stricken decimal system. Twelve can be divided by two several times, and by three: the latter is especially useful given the three-storey structure of our writing system, with its upper, middle and lower levels for the accommodation and alignment of parts.

The Aldine in-house norms, as realized in the form of a structured set of metal spacing sorts, could be combined between thumb and forefinger to give the following scale of dimensional reference:

- $\frac{1}{12}$ hair space
- $\frac{2}{12}$ thin space ($\frac{1}{6}$)
- $\frac{3}{12}$ middle space ($\frac{1}{4}$)
- $\frac{4}{12}$ thick space ($\frac{1}{3}$)
- $\frac{5}{12}$ middle space + thin space
- $\frac{6}{12}$ en space ($\frac{1}{2}$)
- $\frac{7}{12}$ thick space + middle space
- $\frac{8}{12}$ two thick spaces ($\frac{2}{3}$)
- $\frac{9}{12}$ en space + middle space ($\frac{3}{4}$)
- $\frac{10}{12}$ en space + thick space ($\frac{5}{6}$)
- $\frac{11}{12}$ two thick spaces + one middle space
- $\frac{12}{12}$ two en spaces or one em space, etc

The addition of a 'very thin' space of 1.5 twelfths of the em quadrat – that is, one half of a middle space, or one eighth of the em quadrat – would provide a basic increment of $\frac{1}{24}$ of the type's body size. Spaces of 1.5 twelfths of the em quadrat can be found in the composition of Aldine pages.



The term 'character field' as used here refers to the rectangle defined by the mould aperture of the aperture, fixed in the vertical dimension but variable in the horizontal.

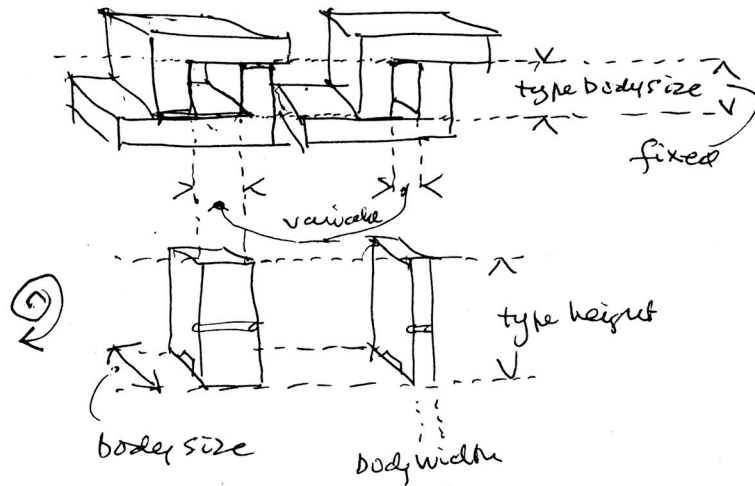


Figure 2. Comparison of Aldine and Anglo-American typographic norms, with diagrams of the adjustable mould. From the author's working notes.

Although Griffo could not use a pen to measure his punches, nevertheless, it was the tool (the mould) from which his letters sprang fully formed, like Venus rising from the sea, which provided the scale of dimensional reference for face gauging. It would be nice if Gerrit Noordzij and other digital pattern-makers could follow Griffo's example and provide today's typographers with a manageable and unified system of dimensional control. For although the work that Griffo did for Aldus set the stage for the future development of the Greeks, the romanized Latins and the italic types of letter which we know so well today, the unified system of dimensional control used in-house by the company, and applied at every level of linguistic order, including character image sizing, has still to be properly realized.

References

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- Kinross, R. 1997. Type as critique, *Typography Papers*, no. 2, pp. 77–97
- Mountford, J. 1968. "Writing" and "alphabet", *The Journal of Typographic Research*, vol. 2, no. 3, pp. 221–32
- Noordzij, G. 1997. Reply to Robin Kinross, *Typography Papers*, no. 2, pp. 89–90

The following notes, in the form of annotated enlargements of Griffo's work for Aldus, and to be published more fully as a book (*Griffo's grid*), may serve to illustrate something of the modular co-ordination of the Aldine image carrier.

The examples reproduced here from photocopies are taken from the following books:

- Constantinus Lascaris, *Erotemata*, 1495 (quarto), [British Library copy BL C2.91]: figure 3.
- Pietro Bembo, *De Aetna*, 1496 (quarto), [British Library copy BL 99289]: figure 4.
- Ovid, *Metamorphoseos*, 1502 (octavo), [Michael Twyman's copy]: figures 5, 8.
- Seneca, *Naturalium quaestionum libri vii*, 1522 (large octavo), [Peter Burnhill's copy]: figures 6, 7.

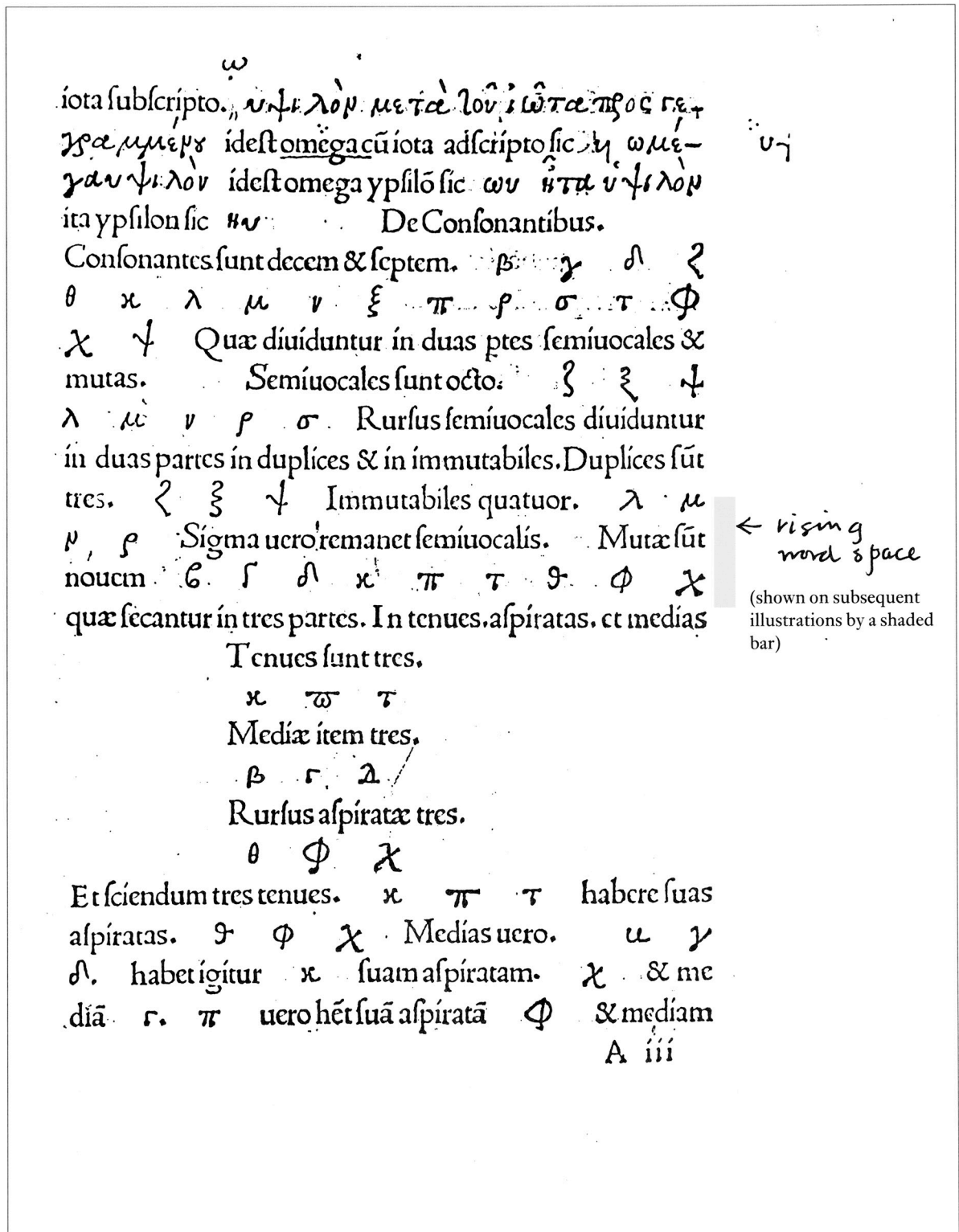


Figure 3. Lascaris, 1495. Actual size / Enlarged to 400 per cent on facing page. This, Griffio's first Greek, was constrained by the mould size of an extant set of Latins selected for the Latin text of this two-language grammar. His attempt to imitate a Greek running hand required as many as 1400 parts to be stored in the type case. With his fourth Greek, a policy of variety reduction produced a character set numbering about a quarter of that number, and far less taxing for the reader and the compositor.

400%

□ = 0.527²mm.

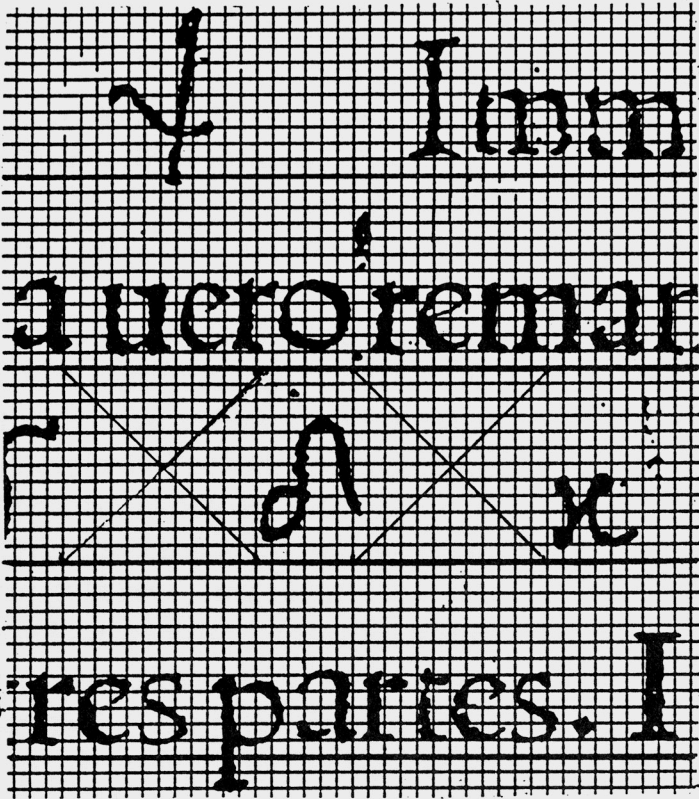
n.b.

rising word space (hair space), 1 unit.



cap. ht
7 units

line
inc.
12 units



type body
size
6.3mm, approx.

n.b.
low
base
line
providing
extra space
above Greek
capitals for
housing
diacritics.

x-ht. 4 units

↑
down kerning 'p'

n.b. different cap. I's.
The top one belongs to the
roman set, the other to
the Greek set.

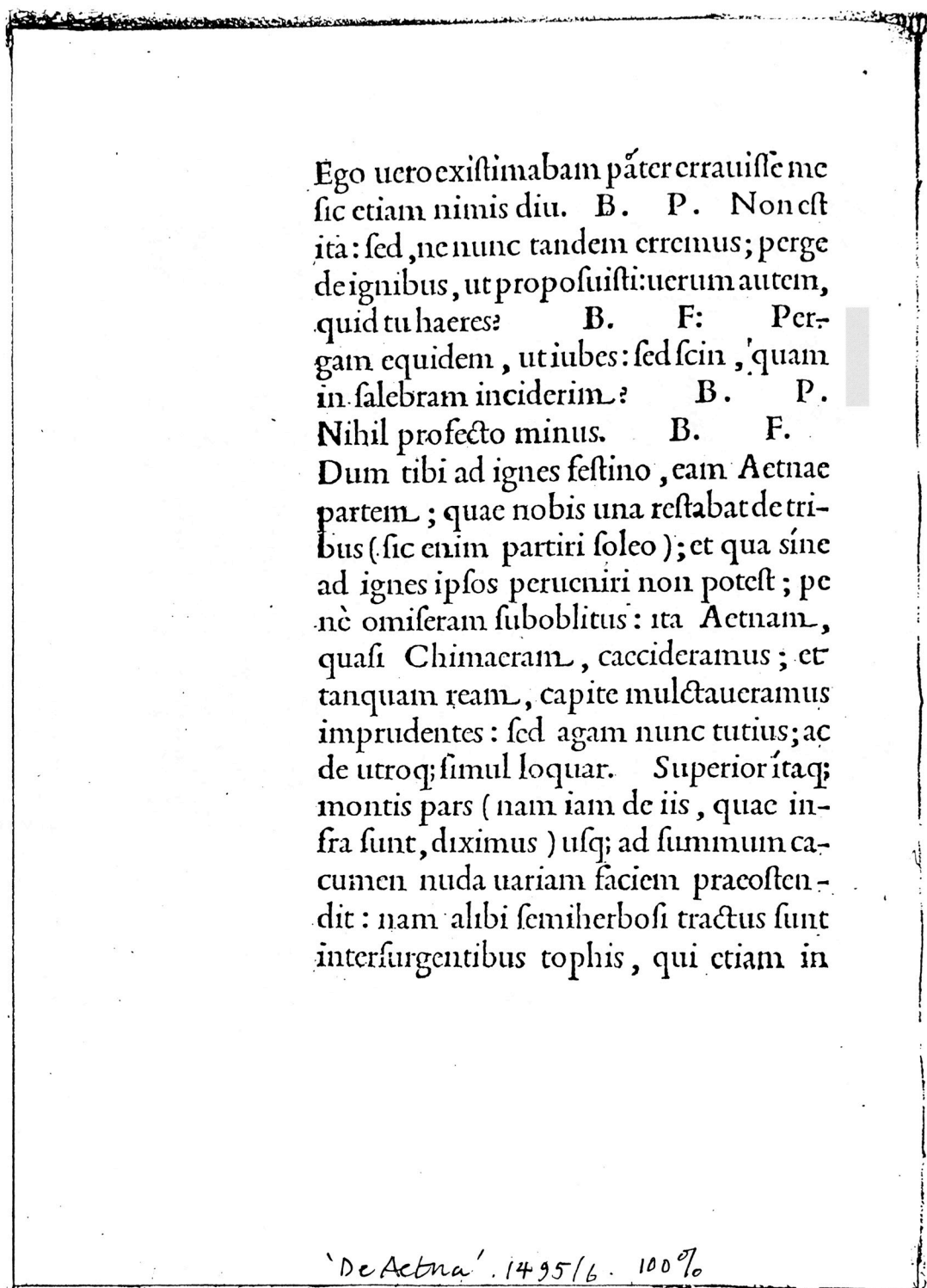


Figure 4. *De Aetna*, 1496. Actual size / Enlarged to 400 per cent on facing page.

400%

hairspace, limit
↓

erum autem,

F: Per-

type
body
5.8
mm.

dscin, quam

3 1/2
5
3 1/2

B. P.

7
3 1/2

B. F.

12

, eam Aetnae

12

restabat detri-

8
3 1/2

METAMOR.

V i s a q; cauſatur. ſed iam conſumpſerat omnem
 M ateriam ficti. dilataq; tempora tædæ
 I nſtiterant. unusq; dies reſtabat. at illa
 C rinalem capiti uittam, natæq; ſibiq;
 D etrahit. et paſſis aram complexa capillis.
 I ſi, P aratonium, Mareoticæq; arua, P haronq;
 Q uæ colis. et ſeptem digeſtum in cornua Nilum.
 F er precor (inquit) opem, noſtroq; medere timori.
 T e dea, te quondam, tuæq; hæc inſignia uidi,
 C unctaq; cognoui, ſonitum, comitesq; ſacæq;
 S iſtrorum, memoriq; animo tuo iuſſa notæui.
 Q uod uidet hæc lucem. q̄ non ego punior ipſa.
 C onſilium, monitumq; tuum eſt. miſerere duarum.
 A uxilioq; inua. lachrymæ ſunt uerba ſecutæ.
 V iſa dea eſt mouiſſe ſuas, et mouerat, aras.
 E t templi tremuere fores. imitataq; Lunam
 C ornua fulſerunt. crepuitq; ſonabile ſiſtrum.
 N on ſecura quidem. fuiſto tamen omne læta
 M ater abijt templo. ſequitur comes I phis euntem.
 Q uam ſolite eſt maiore gradu. nec candor in ore
 P ermanet. et uires augetur. et acrior ipſe eſt
 V ultus. et incomptis breuior meſſura capillis.
 P luſq; uigoris a deſt, habuit quam ſœmina. nã quæ
 F œmina nuper eras. puer eſ. date munera templis.
 N ec timida gaudente fide. dant munera templis,
 A ddunt et titulum, titulus breue carmen habebat.
 V ota p̄. er ſoluit. quæ ſœmina uouerat I phis.
 P oſtera lux radijs totum patefecerat orbem,
 C um V enus, et I uno, ſociuſq; H ymenæus ad ignes
 C onueniunt. potiurq; ſua puer I phis I anthe.

LIB. X.

P. OVIDII NASO. METAMOR.
LIBER DECIMVS.

N de per immenſum croceo uelatus
 amictu
 A ethera digreditur. Ciconumq; H y-
 menæus ad oras

T endit. et Orphei a nequicquam uoce uocatur.
 A ſſuit ille quidem. ſed nec ſolemnia uerba.
 N ec lætos uultus. nec felix attulit omen.
 F ax quoq; quam tenuit lachrymoſo ſtridula fumo
 V ſq; fuit. nullosq; inuenit motibus ignes.
 E xitus auſpicio grauior. nam nuptæ per herbas
 D um noua Naiadum turba comitata uagatur.
 O cidit, in talum ſerpentis dente recepto.
 Q uam ſatis ad ſuſpas poſt, quam Rhodopeius auræ
 D eſſeuit uates. ne non tentaret et umbras.
 A d ſtygia Tænaria eſt auſus deſcendere porta.
 P erq; lænes populos. ſimulacræq; ſuncta ſe pulcro
 P erſephonem adijt. in amœnaq; regna tenentem
 V mbrarum dominum. pulſisq; ad carmina nervis,
 S ic ait. o poſiti ſub terra numina mundi.
 I n quem decidimus quidquid mortale creamur.
 S i licet. et falſi poſitis ambagibus oris
 V era loqui ſinitis. non huc ut opaca uiderem
 T artara, deſcendi. nec uti uilloſa Colubris
 T erna Meduſæi uincirem guttura monſtri.
 C auſa uiæ eſt coniux. inquam calcata, uenenum.
 V iſpera diſſudit. creſcentesq; abſtulit annos.
 P oſſe pati uolui. nec me tentariſſe negabo.

q ii

Figure 5. Ovid, 1502. Actual size / Enlarged to 800 per cent on facing page.

cap. ht. 6

line inc. 12

800%

3 1/2

5

3 1/2

type size 12

hair space (submodular 1/12th of type size)

1 unit (0.333 mm)

ovidii 'Metamorphoseos' 1502

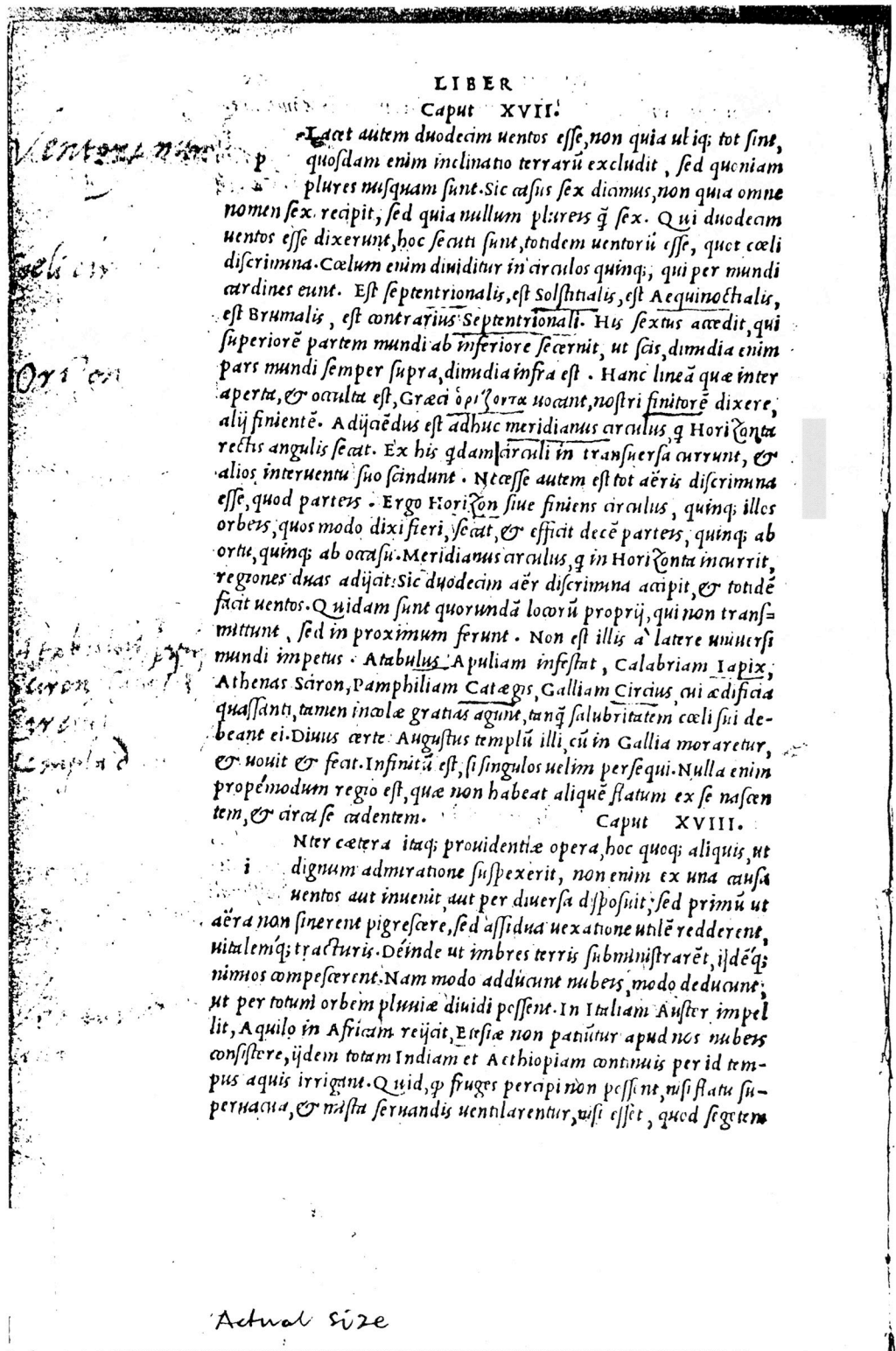
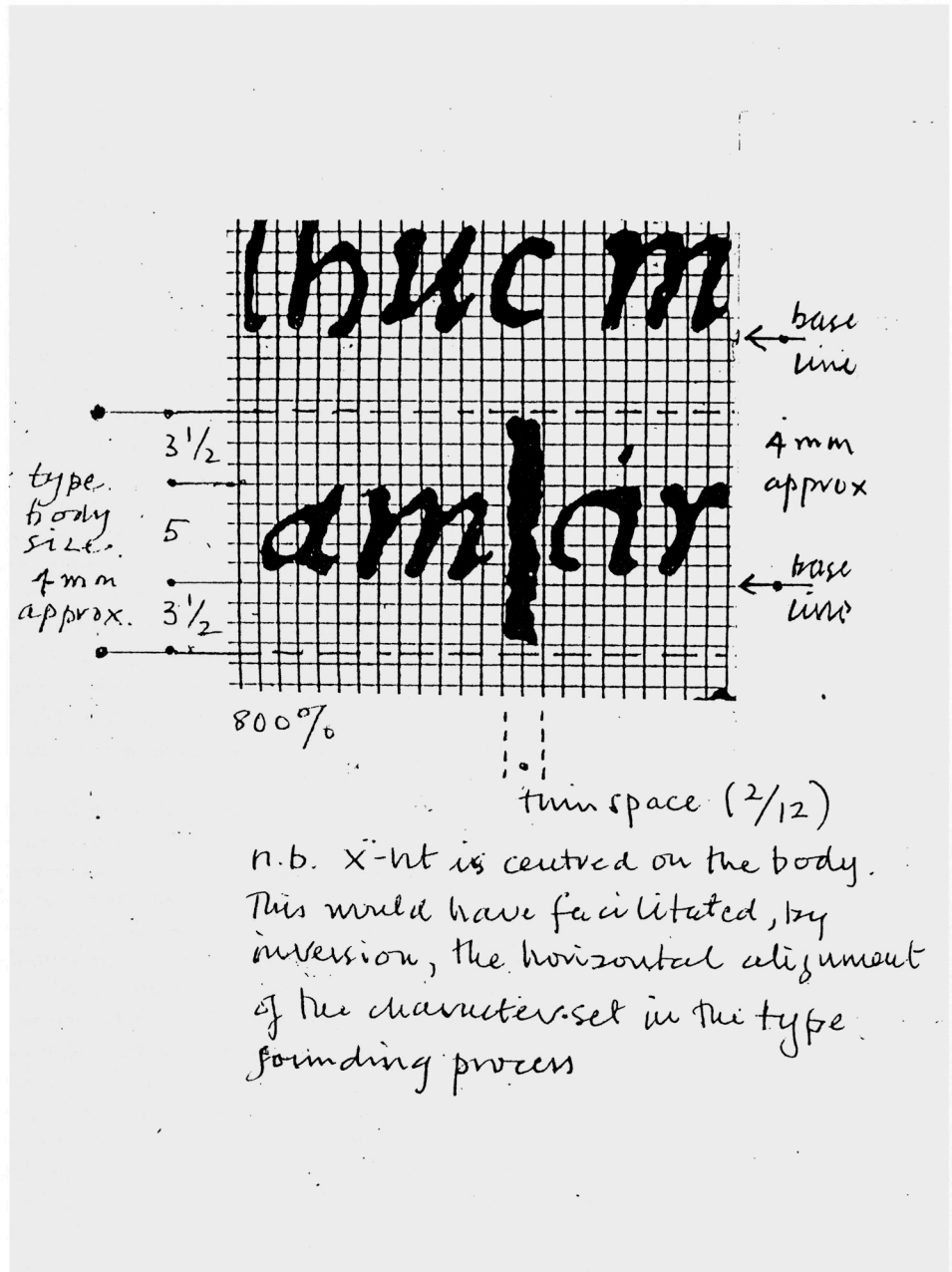


Figure 6. Seneca, 1522. Actual size / Enlarged to 800 per cent on facing page.



SEXTVS

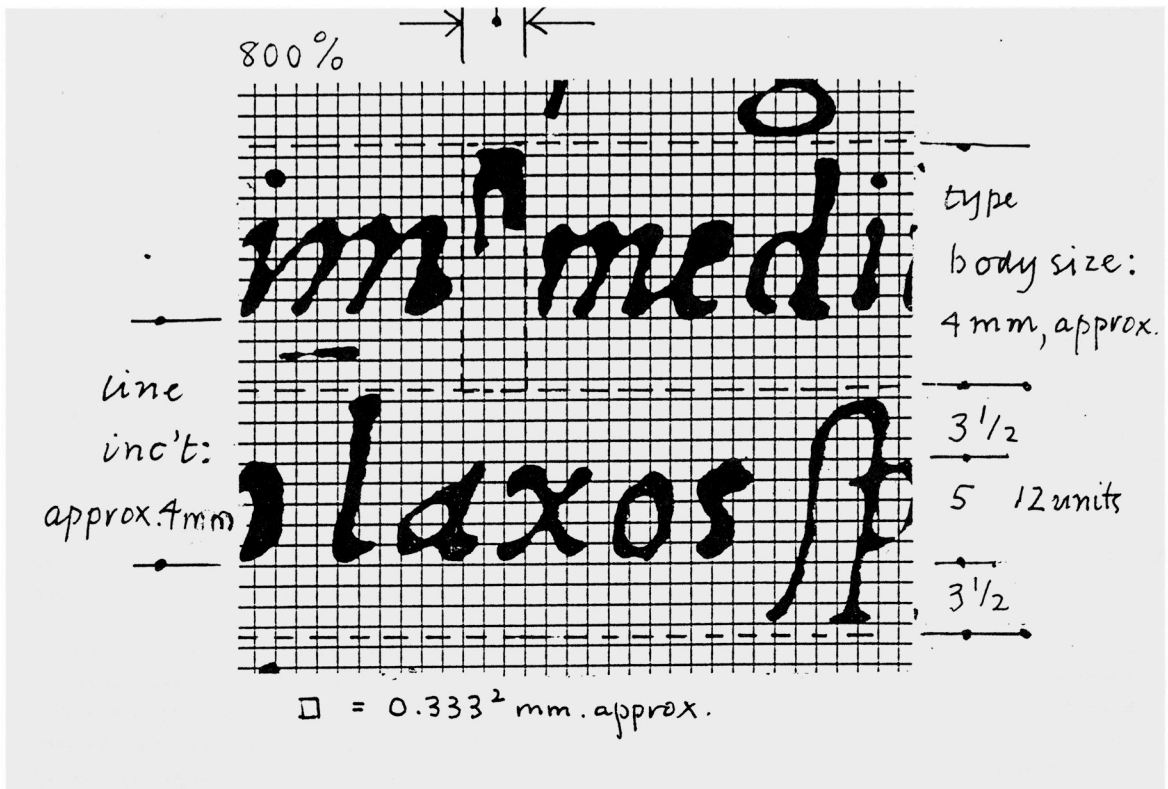
55

incredibile est. Nam in nostris quoque corporibus cutis spiritum respuit, nec est illi introitus, nisi per quem trahitur, nec consistere quidem a nobis receptus potest, nisi in laxiore corporis parte. Non enim inter nervos pulsat, sed in uisceribus, et patulo interioris partis recessu commoratur. Idem de terra suspicari licet, uel ex hoc, quod motus non in summa terra, circa uel summa est, sed subter et ab imo. Huius indicium est, quod altitudinis profundae maria iactantur, motus scilicet his, supra quae fusa sunt. Ergo uerisimile est terram ex alto moueri, et illic spiritum in caernis ingentibus concipi. Immo (inquit) caeu cum frigore inhorruimus, tremor sequitur, sic terras quoque spiritus extrinsecus accedens quassat. Quod nullo modo potest fieri. Algere enim debet, ut idem illi accidat, quod nobis, quos externa causa in horrorem agit. Accidere autem terrae simile quiddam nostrae affectionis, sed non ex simili causa concesserim. Illam interior et altior iniuria debet impellere. Cuius rei argumentum uel maximum hoc potest esse, quod cum uehementi motu ad aperta ingenti ruina solum est, totas nonnunquam urbes et recipit hiatus ille, et abscondit. Thucydides ait, circa Peloponnesiaci belli tempus Atalantem insulam aut totam, aut certe maxima ex parte superfusam. Idem Sidone accidisse Possidonio crede. Nec ad hoc testibus opus est. Meminimus enim terris interno motu diuulsis, loca disiecta, et campos interisse. Quod iam diu quam admodum existimem fieri.

Caput XXV.

Vm spiritus magna uis in uacuum terrarum locum penitus applicuit, coepitque rixari, et de exitu cogitare, latera ipsa, inter quae latet, saepius percutit, supra quae urbes interdum sitae sunt, haec nonnunquam adeo concutuntur, ut aedificia superposita procumbant. Nonnunquam in tantum, ut parietes, quibus fertur omne regimen caui, decidant in illum subteruacantem locum, totaeque urbes in immensam altitudinem uergant. Si uelis credere, aiunt aliquando Ossam Olympo cohaesisse, deinde terrarum motu recessisse, et scissam unius magnitudinem montis in duas partes. Tunc effugisse Peneion, qui paludes, quibus laborabat Thessalia, sitauit, abductis in se, quae sine exitu stagnauerant, aquis. Ladon flumen inter Elim et Megalempolim medius est, quem terrarum motus effudit. Per hoc quid probo, in laxos specus (quid enim aliud appellem loca uacua sub terris) spiritum conuenire. Quod nisi esset, magna terrarum spatia commouerentur, et una multa titubarent. Nunc exiguae partes laborant, nec unquam per ducenta milia mo-

Figure 7. Seneca, 1522. Actual size / Enlarged to 800 per cent on facing page.



λανκοθής· πλώ λανκοθών·
86.
L euatheca · leucothean ·
ή λανκοθία· πλώ λανκοθίαν·
99.
L euarppus · leucarppos ·
leucarpon · ὁ λυκίππος·
ἔν λυκίππος· 194.
L ibye · libyēs · libyēn ·
ή λιβύη· τῆς λιβύης πλώ λι
βύην· 35· et 77.
L ibycus · libycā · libycum ·
ὁ λιβυκός· ή λιβυκή· ἔν λι
βυκόν· 101.
L icetus et licetos · liceton ·
ὁ λίκιτος· ἔν λίκιτον· III
L ilybaeon · ἔν λιβύβαιον·
120.
L imniacē · limniacēs · li
mniacēn · ή λιμνιακή·
τῆς λιμνιακῆς· πλώ λιμνια
κήν· ἔν limnes illud
Ouidij libro .5. Quem
flumine Gange Edita li
mniacē vitreis peperis
se sub undis Creditur ·
Sic interpretatur · ὄν ή
τοῦ ποταμοῦ γάγγου θ· γά
τηρ λιμάτη ὑπὸ τοῖς ὕελοι
ἔσιν ὕδασι ζεζενηκίται

πισάεται· 109.
L iriōpe · liriōpes · liriōpen
ή λειριόπη· τῆς ληριόπης·
πλώ ληριόπην· 68.
L yaeus et lyaeos · lyaeon ·
ὁ λυαῖος· ἔν λυαῖον· 81.
L ysaon · ἔν λυκαῖον· 8.
L ysaon · lycanios · lycanias
ὁ λυκάων· τοῦ λυκάωνος· ἔ
λυκάονα· 7.
L ysaonius · lycanōia · lycā
onium · ὁ λυκαῖνιος· ή λυ
καῖνία· ἔν λυκαῖνιον· 6.
L ycabas · lycābantos · lycā
banta · ὁ λυκάβας· τοῦ λυ
κάβαντος· ἔν λυκάβαντα·
77.
L ysāta · lycātan · ή λυκί =
σκ· πλώ λυκίσκην· 64.
L ysortas · ὁ λυκόρμας· 35
L ysus · lycia · lycium ·
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Figure 8. Ovid, 1502. Actual size / Enlarged to 300 per cent on facing page.

column width (in metal) 9 ems of the type size → 9 ems

thin space + middle space

middle piece

4 1/2

4

3 1/2

2 1/2

6 5

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em quad

sub molar twelfths

em quad

middle space

thick space

middle space

300%

Ovidii 'Metamorphoseon', 1502 sig. dii MT's copy