Peter Burnhill
Type spaces

published by Hyphen Press, London, 2003

Type spaces

Peter Burnhill

Type spaces

in-house norms in the typography of Aldus Manutius

Hyphen Press . London

Published by Hyphen Press, London, in 2003

The book was designed by Peter Burnhill, Stafford, and Robin Kinross, London.
The text was typeset and made into pages by Robin Kinross in QuarkXPress.
This text was output in the typeface ITC Charter, designed by Matthew Carter.
Illustrations were scanned by Robin Kinross. The book was printed in the Netherlands by Drukkerij SSN, Nijmegen, and bound by Handboekbinderij Mathieu Geertsen, Nijmegen.

ISBN 0–907259–19–7

www.hyphenpress.co.uk

For Ruth and Sonia who put up with 'damn design' for so long and so long

Contents

Acknowledgements

The need to ponder typographical detail in an extended and relaxed way is not always possible in a rare-books reading room. There, photocopying is not normally under the control of the student. In addition, the handling of treasure to make detailed measurements is, understandably, not always welcomed by library staff. I am therefore grateful to Michael Twyman for the extended loan of an Aldine Ovid. I have also inspected copies of Aldine editions in the British Library and Reading University Library. Many thanks to James Mosley, former Librarian of the St Bride Printing Library, London, for help through personal correspondence. I am especially grateful to Graham Stevens and to Chris Butcher, the typographer-librarian at Stafford College, for their invaluable help in the preparation of computer-drawn reference grids and other aids to measurement; and to my editor and typesetter Robin Kinross, for his patience, criticisms, and good sense. Finally, my thanks to colleagues Alan May, John Burgess, and John Cole, and to past students and friends of the Design Department, Stafford College, for their inspired and energetic boot-strapping over a quarter of a century.

Ownership of books illustrated is given on p. 13, and elsewhere by these codes:
BL: British Library
RUL: Reading University Library
Thanks go to these two institutions for provision of the working copies of the Aldine pages reproduced here.

Thanks also to: Walter Wilkes at the Technische Hochschule Darmstadt, publisher of the edition of the *Manuel Typographique,* from which the Fournier images have been taken; the estate of Anthony Froshaug, for the copy of the homage to Aldus.

Systems of grouping and division are a more basic and durable feature of a given metrological system than are the absolute values of its measures.
Witold Kula, *Measures and men*, 1986

… it is not merely the shapes of the letters and the manner of making them that requires study but also their size, the spacing between lines, the size and proportion of the printed page …
B. L. Ullman, *The origin and development of humanistic script*, 1960

To mention both typographic, and in the same breath/sentence, grids, is strictly tautologous. The word typography means to write/print using standard elements; to use standard elements implies some modular relationship between such elements; since such relationship is two-dimensional, it implies the determination of dimensions which are both horizontal and vertical.
Anthony Froshaug, 'Typography is a grid', 1967

Introduction

The typography of Aldus Manutius has been of enduring interest to designers and historians. In particular, the printed images of the letters cut as punches, probably by Francesco Griffo of Bologna, to the sizes called for by Aldus at Venice in the last decade of the fifteenth century, have been scrutinized by workers bent close over letterform styles, their classification and attribution. Of these, the Greek- and Latin-script cursive styles of letter, introduced by Aldus as suitable for printing classical texts, have been subject to search by historians for the specific styles of handwriting on which Griffo may have been required by Aldus to ground his interpretations, perhaps to endow them with authority as standards long before such a notion became institutionalized.

As a typographer and teacher, not a historian, my interest in Aldine typography lies less in the styles in which his letters were dressed than in his use of spaces to convey visually the intrinsic structure of the language. Although my pre-war art education had had 'The History of Styles' as a required area of study, which included Renaissance lettering, and calligraphy – as this had been developed in the wake of the invention of printing from prefabricated types and spaces – my first chance to look closely at the typographic construction of Aldine pages, free of the heavy breathing of a rare-books reading room, came in 1957 when I found an Aldine Seneca in a local second-hand bookshop.

I was attracted to the work, not by the italic characters in which the book was composed, nor by the technical quality of the printing, which was rather poor, but by the use of the simplest of all possible means – one size of type – to create a close correspondence between the hierarchical order of the work and the spaces selected to define that structure at its differing levels: from the space between words at the level of a phrase, to the grouping of parts at the level of the document as a whole. Although the text had obviously been planned with rubrication in mind, that work had been left undone with no detriment to structural integrity. Even though I could read neither Greek nor Latin, the one-to-one relationship between the two dissimilar systems – the linguistic and the spatial – was unmistakable. The job needed no additional variables by way of colour or letterform sizes to help the reader to chart a self-selected course through the seas of Seneca. The

Seneca edition served to overturn the cart on which the apples of my pre-war art education had been piled, geometrically.

At the time of finding the Seneca, I had little experience of the detail of the system of typographic measurement, such as the subdivision of the type size – the em quadrat – associated with the hand-composition of founder's type, or the set values and spacing sorts of mechanically engineered composition systems. As a consequence, I was not at first curious about the actual structure of the system of measurement – the typographic norms – used by Aldus to orchestrate the labours of his editorial assistants, compositors and pressmen; nor of the principles of spacing that had earned him the accolade as bearer of the palm of printing, as this had been awarded by the writing masters – the language teachers – of the day (see the side-note). Furthermore, histories of printing technology had left the impression that printers – working before the divorce of typefounding from the printing trade, to become a separate industry – had contrived to put types and spaces together without reference to a system of measurement.

Later, it became clear that Aldus must have commanded a very refined system of dimensional control, long before manufacturers of types and spaces for sale to the printing trade sought to regularize type body sizes (mould sizes) on the grounds of providing printers with more technically efficient work methods. It also became clear that Aldus's scale of dimensional values was a function of the type-casting system, not the consequence of the diktat of some external ruler, such as the King's foot, 'Madame Guillotine', or some other unrelated unit of measurement determined for their own use by a local guild of metalworkers. This is not to suggest that the laterally adjustable mould with its sub-structures, such as registers and stops for the positioning of matrices, came into existence fully fledged, with no precursor in late-medieval or early Renaissance technology. Nor is it to suggest that Aldus was the father of this system. My guess is that in-house typographic norms had been around since Gutenberg sorted mechanized script into sub-sets by reference to common character widths – say, no more than five or six groupings in all – then constructed a set of fixed-width moulds to suit. If so, then the spacing sorts cast from such moulds would vary in width, in correspondence with the sub-sets of character width (a printing type being a space with a letter cast on top).

It is noticeable that Gutenberg's mechanical-looking letters needed little if anything by way of side-bearings to set one letter off from its neighbours in the context of a word. I suspect that the

'Since up to now the palm in the art of printing has, by general consent, been awarded to Aldus Manutius, I will follow him and state that the space he left when the first five symbols are inserted in the text, should be twice that which we have left between words where no punctuation mark intervenes. As for the last symbol, you should leave a space double that which we have given to the other five symbols – or at least a third more, as we find in the practice of Aldus Manutius.'

Thus the writing master Juan de Yciar with Juan de Vingles, writing around 1530 ('Concerning the proportions which should be observed when writing'). Here the printer, not the scribe, is seen as the standard bearer. From Osley (1980, p. 145).

Der Schriftgießer (The typefounder) (Jost Amman, woodcut, 1568). Carter (1969, p. 18) questions the reliability of this as regards the 'pyramidal things' on the shelf and in the caster's hand. Alan May, in conversation with me, has tentatively suggested that these could be fixed-width moulds: precursors of the laterally variable mould. However, more recent research by Stan Nelson and others has now convinced him that these 'pyramidal things' are adjustable as to character width.

development of the more complex, laterally adjustable mould with its attachments was in part a solution to such problems as the need to provide slightly differing side-bearings for the rounder, roman-styled lowercase characters, so as to achieve the snug fitting required to define word images; and, possibly, for casting combinations of two and three characters on a common body, as commonly found in the Greek and Latin cursive character sets made by Griffo at the call of Aldus. Certainly, the laterally adjustable mould would have speeded up the casting of types.

Be all this as it may, what matters about the structure of Aldine in-house norms was their combinatorial potential when used isomorphically by Aldus; and by his type designer, Griffo, to proportion the primary dimensional attributes of the character sets he cut for the firm, as these notes seek to show.

Alan May comments:
'Character fit was normally achieved by adjusting the width of the matrix – by filing if too wide or by "botching" if too thin. Even after adjustable registers were acquired, this was done so that subsequent castings would match those produced at the justifying stage.'

In the early days of printing, type sizes (mould sizes) were identical with the base-line to base-line (line-increment) of the job for which the type had been specifically made to print, there being no 'leading' at the time for increasing the space between lines of continuous text, other than by casting types from a mould larger in its body-sizing component than the mould for which the letters had been dimensioned to fit in the first instance. Clearly, knowledge of the proposed line-increment of a job, relative to the maximum permissible number of lines per page, was a precondition of type design and punchcutting at this time in the development of typography. It is one of the arguments of this essay into Aldine norms that the line-increment (mould size) determined for the text provided the punchcutter with his scale of values for gauging the grosser dimensional attributes and ratios of a projected set of characters, without compromising judgement in the treatment of lower order detail, such as the thickness of strokes and the treatment of serifs.

Measurement indicates that Griffo used the same system of dimensional reference for character face proportioning as that used by Aldus to define the functional grouping of parts at higher levels of linguistic order. These notes begin an examination of this relationship as it may be gleaned from the pages that Griffo's letters were specifically sized to print. In other words, as distinct from pages printed from his types as cast from moulds larger in the body than the mould size / line-increment initially selected by Aldus for the composition of the job in hand. New typefaces at this time were made-to-measure.

In a letter to me (13 February 1997) James Mosley wrote: 'I think you are right. Leading of text matter for aesthetic reasons is largely an 18th-century (and later) habit, and although there are rare instances of line-spacing in early printed books, apparently to bulk out a short text, the spacing involved is generally considerable, amounting to the whole body size.

Cast leads are referred to by Pierre Simon Fournier (*Manuel typographique*, vol. I, 1764), and also by T. C. Hansard (*Typographia*, 1825). In the later 18th century, the practice also developed of casting types on a larger body than that for which they were cut, Pica on English, for example. My observations of printing in earlier centuries suggests that the founders generally cast types to fit the body very tightly, and that printers used them without leading. Some of Plantin's pages have ascenders touching the descenders from the line above. Sometimes, of course, a printer or founder may not have had a mould to fit a specific set of matrices, in which case there may appear to be some line-spacing.'

With these constraints in mind, particular reference will be made to the typography of the first and last of the jobs that Griffo did for Aldus Manutius before handing in his cards in 1502. These were: a lowercase Greek running-hand for the Greek text of the bilingual Greek grammar of Constantine Lascaris (the *Erotemata*), as supplemented and edited by Aldus and manufactured by the printer, Andrea Torresani, in 1495; and the character sets needed to fit the thirty-two line page of the projected octavo classics series which began publication in 1501, and which comprised Greek and Latin running hands with a common set of Roman-styled capitals, and a set of Arabic numerals. In addition, reference will be made to the control system of the renowned roman-styled Latins cut by Griffo for Bembo's *De Aetna* of 1495/6, and to the second and third of his Greeks. (The first and fourth Greeks being those of the Lascaris primer and the octavo classics series, respectively.)

For a detailed account of the processes entailed in cutting punches, see Smeijers (1996).

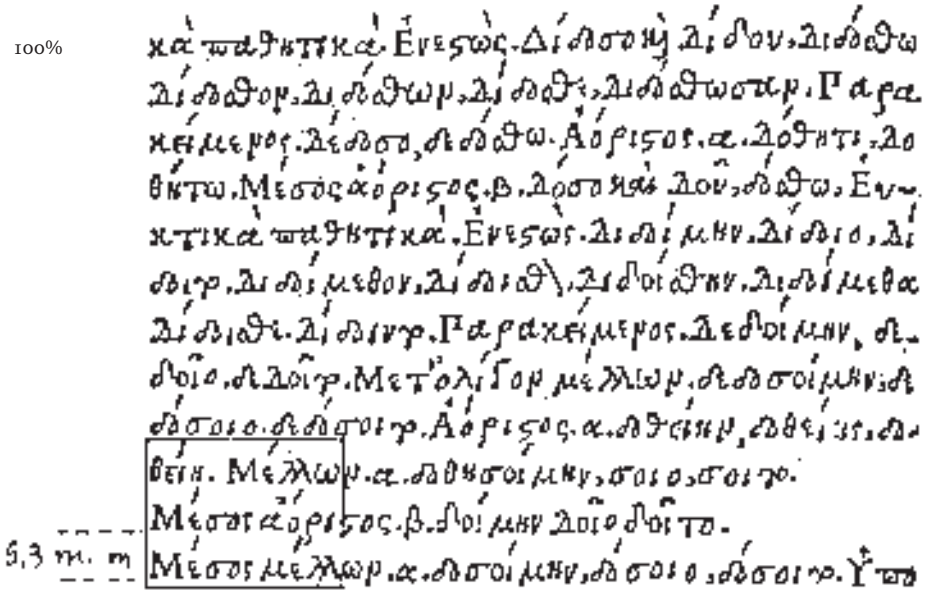
My primary concern is to put the case that the Aldine typographic norms provided a unified system of dimensional reference for use on both axes of the page and at every level of order. Of secondary interest to me is the notion that the mould sizes/line-increments called for by Manutius following his first major experience of typographic design – the production of the Lascaris primer of 1495 – were gauged by reference to a scale of dimensional values derived from combinations of the spacing sorts of the Lascaris types. An early venture of Aldus into printing, this primer also served to introduce this grammarian – at the age of forty – to the innermost secrets of the new technology: its measuring device, the laterally variable mould.

I will also suggest that the mould used for the first casting of the Lascaris types not only sired subsequent mould sizes called for by Aldus but that it may also have fathered the name-designated type sizes of subsequent centuries. In the early part of the sixteenth century, throughout Europe, there was interest – to say nothing of downright forgery – in both the literary content and the typographic syntax of Aldine publications, especially the forty-seven titles of the standardized octavo series. Here are obvious grounds for a link between the Aldine system and the system of type sizes that appeared later.

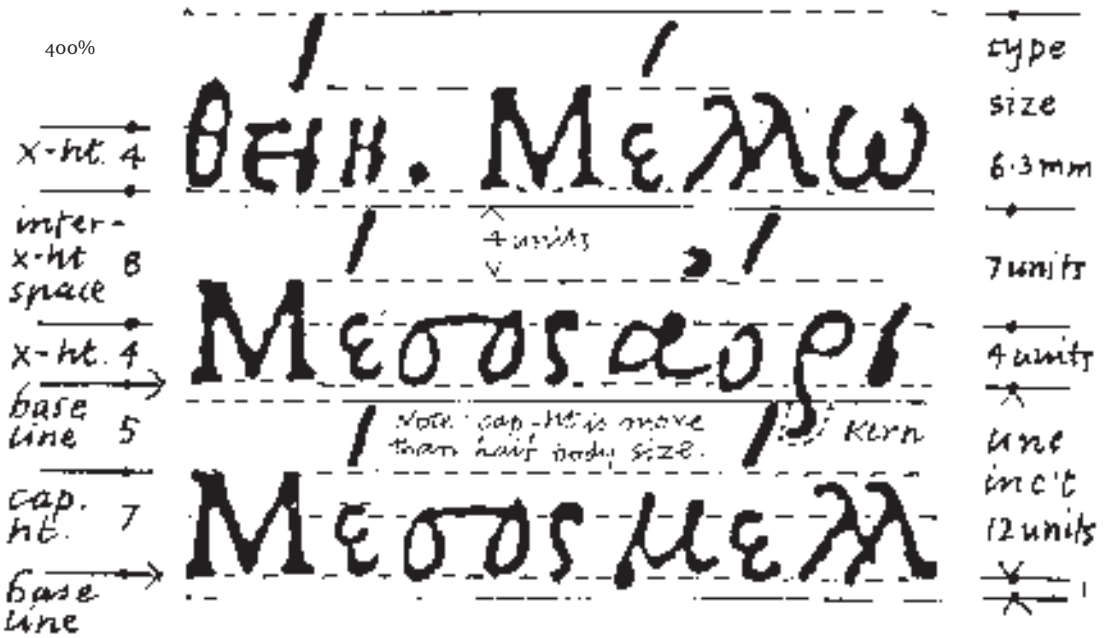
The term 'black art' is often used to refer to secrecy in the methods used by the early printers. Mathematics was also known as the 'black art' associated with the devil's work, as evidenced by the mathematician's ability to predict the future in respect of such events as an eclipse. At a more mundane level, the sliding mechanism of the two halves of the printer's type-casting mould for proportioning the widths of spacing material and the various widths of Latin letter, is not so very different in principle from the short scale sliding on a graduated scale to give fractional readings, as invented by the Burgundian, P. Vernier (c. 1580–1637). I am grateful to my colleague Alan May for this observation.

The following notes show the relative proportions of the major dimensional attributes of Griffo's character sets: within a set, between sets of differing type body size, and between Greek and Latin sets of the same and different type sizes.

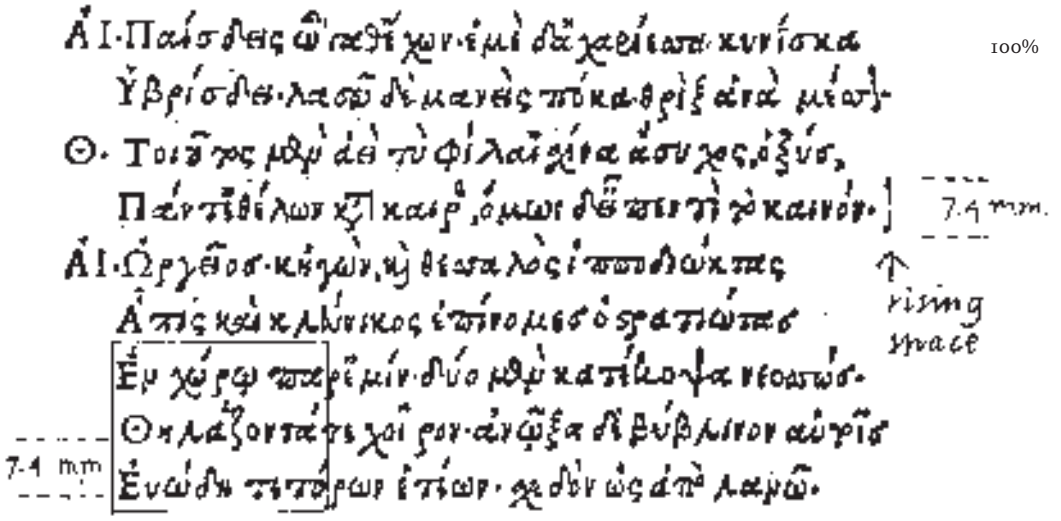
100%

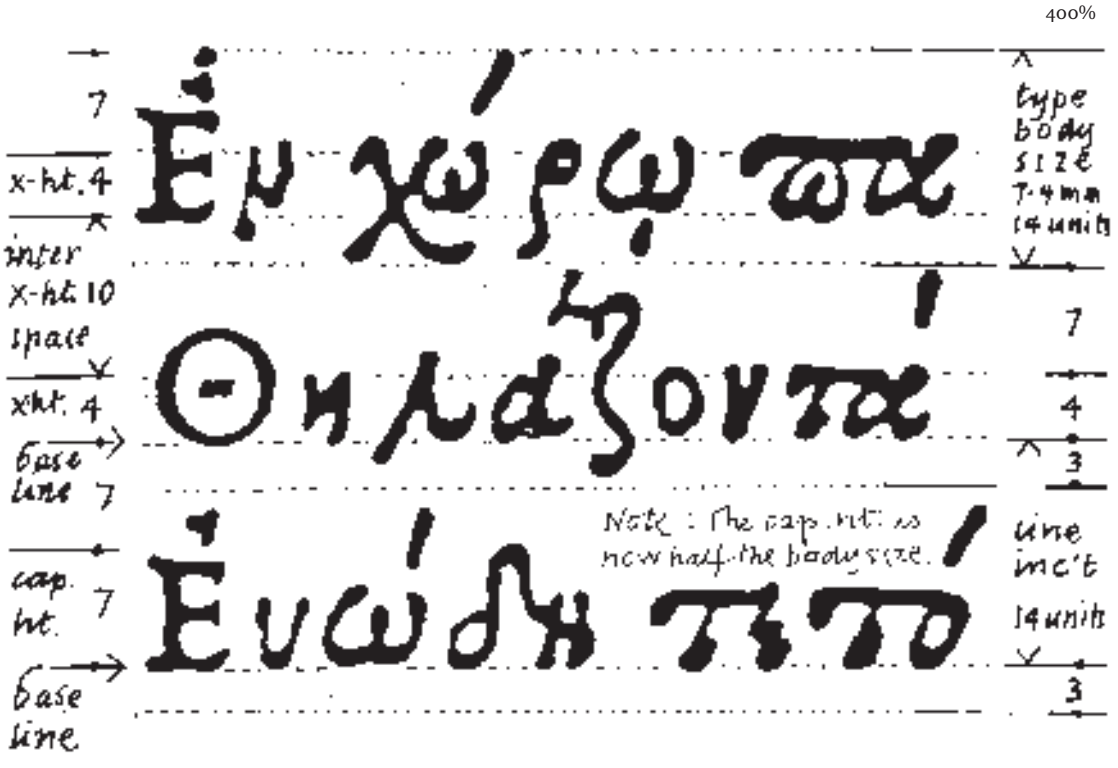


400%



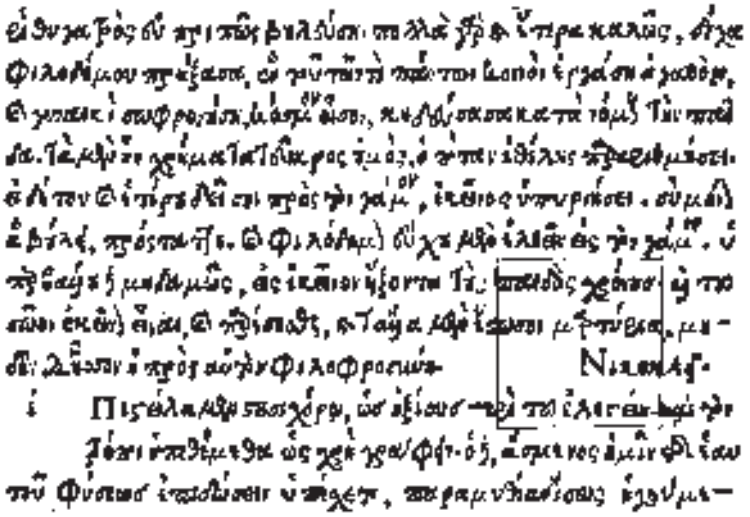
x-height / line-increment ratio – 4 : 12 units (1 : 3)
capital-height / line-increment ratio – 7 : 12 units
x-height / inter-x-height ratio – 4 : 8 units (1 : 2)



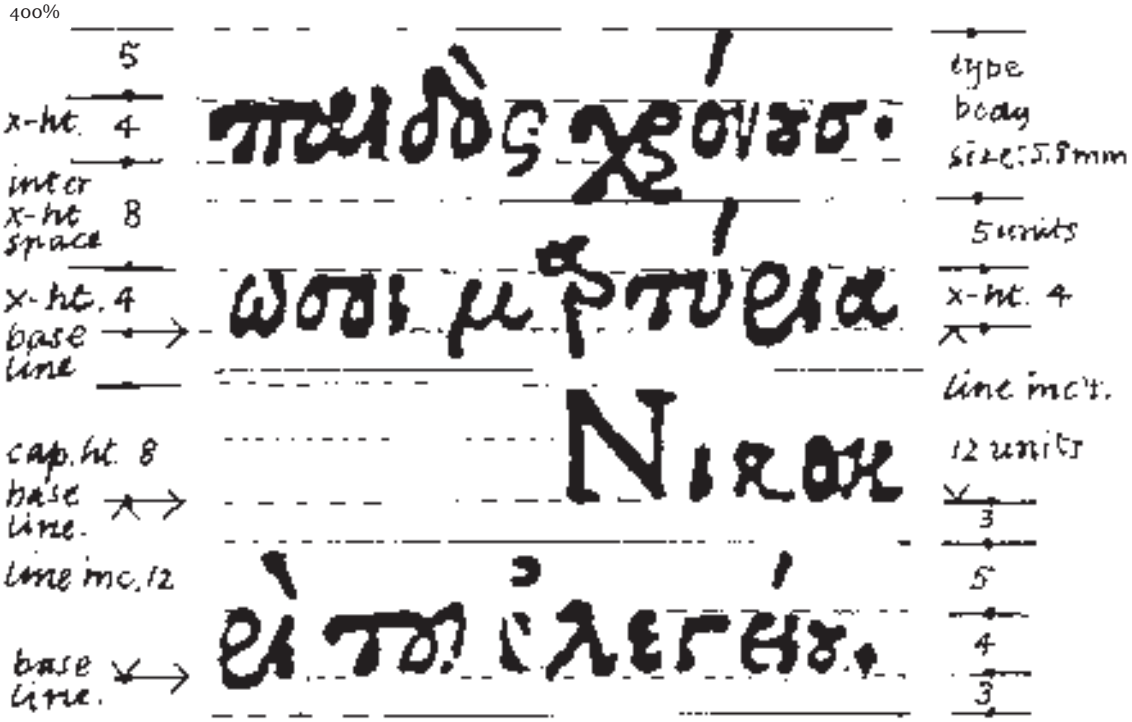


x-height / line-increment ratio – 4 : 14 units (2 : 7)
capital-height / line-increment ratio – 7 : 14 units (1 : 2)
x-height / inter-x-height ratio – 4 : 10 units (2 : 5)

100%

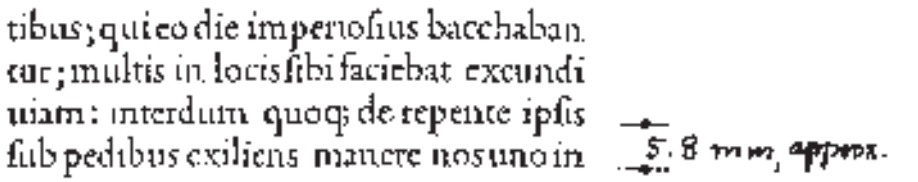


400%



x-height / line-increment ratio – 4 : 12 units (1 : 3)
capital-height / line-increment ratio – 8 : 12 units (2 : 3)
x-height / inter-x-height ratio – 4 : 8 units (1 : 2)

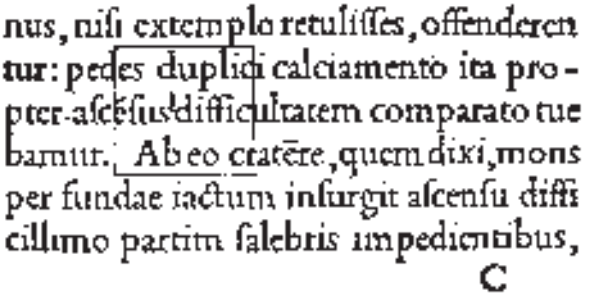
100%



400%

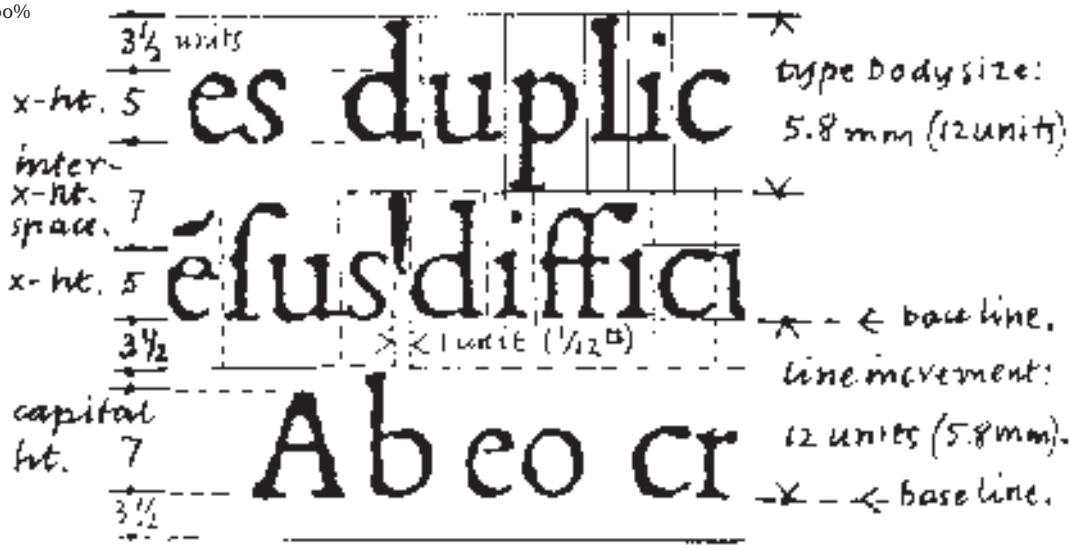
The ‘i’ in ‘interdum’ is inverted; its horizontal alignment indicates that the x-height is centred on the body.

100%



Although this character set and the second Greek have the same body size, they would not align if set sequentially. Note the rising word-space in the enlarged segment.

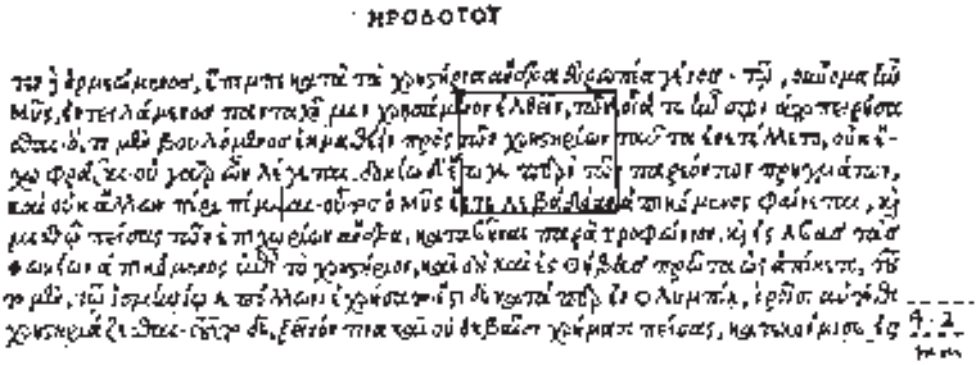
400%



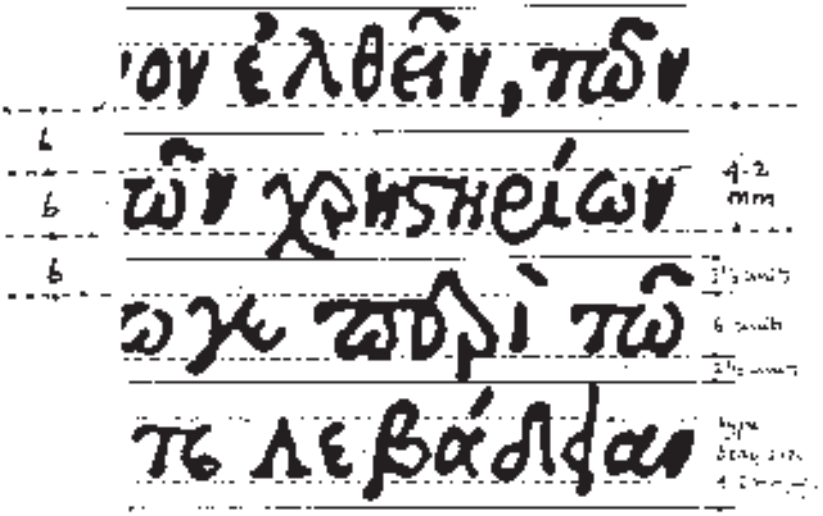
x-height / line-increment ratio – 5 : 12 units
capital-height / line-increment ratio – 7 : 12 units
x-height / inter-x-height ratio – 5 : 7 units

33 Third Greek (mould size: approx. 4.2 mm)

100%



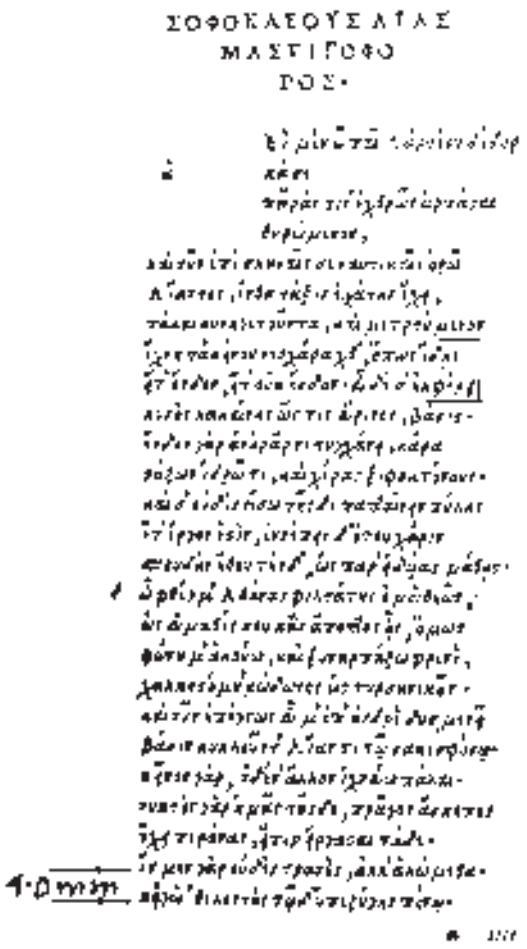
400%



x-height / line-increment ratio – 6 : 12 units (1 : 2)
capital-height / line-increment ratio – 6 : 12 units (1 : 2)
x-height / inter-x-height ratio – 6 : 6 units (1 : 1)

The capitals used with this Greek – the lowercase of which was made for use on a folio page – are identical with those sized for use with the 4 mm of the octavo classics mould.

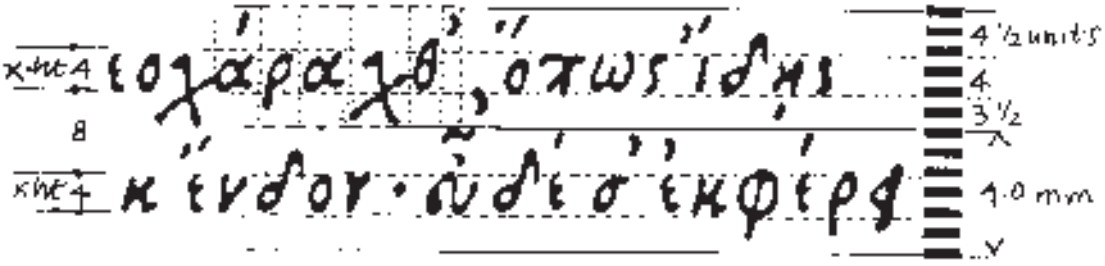
100%



The Greek–roman set of capitals cut for the octavo classics series was also used as the capitals for the third Greek, cast on a slightly larger body.

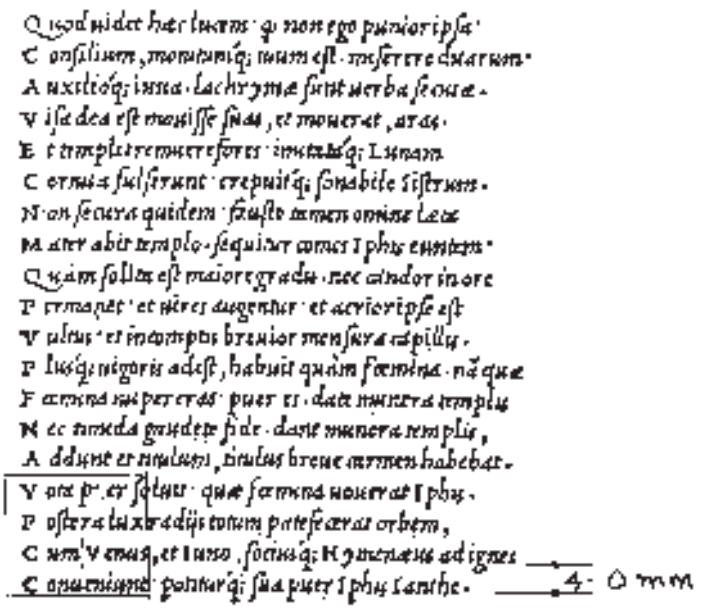
Sophocles, 1502 (BL.687.b.2)

400%



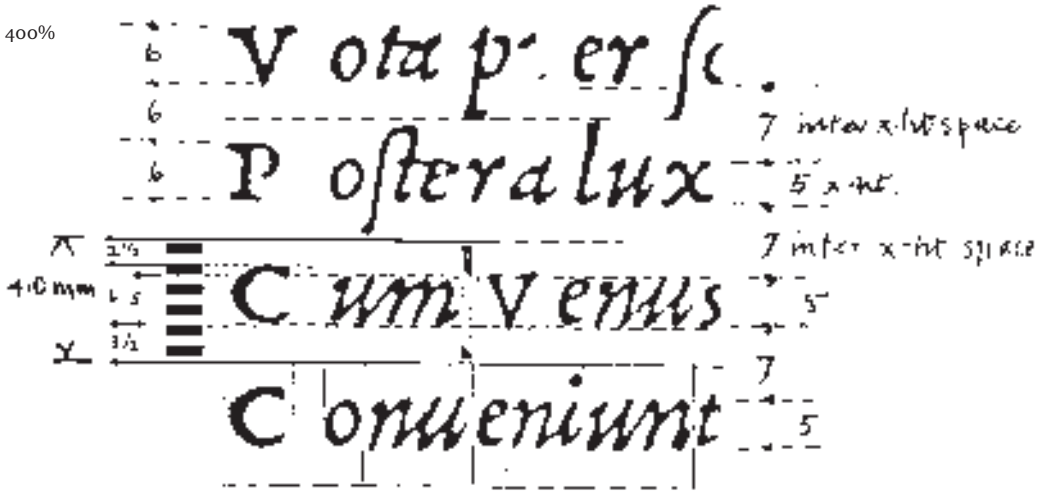
x-height / line-increment ratio – 4 : 12 units (1 : 3)
capital-height / line-increment ratio – 6 : 12 units (1 : 2)
x-height / inter-x-height ratio – 4 : 8 units (1 : 2)

100%



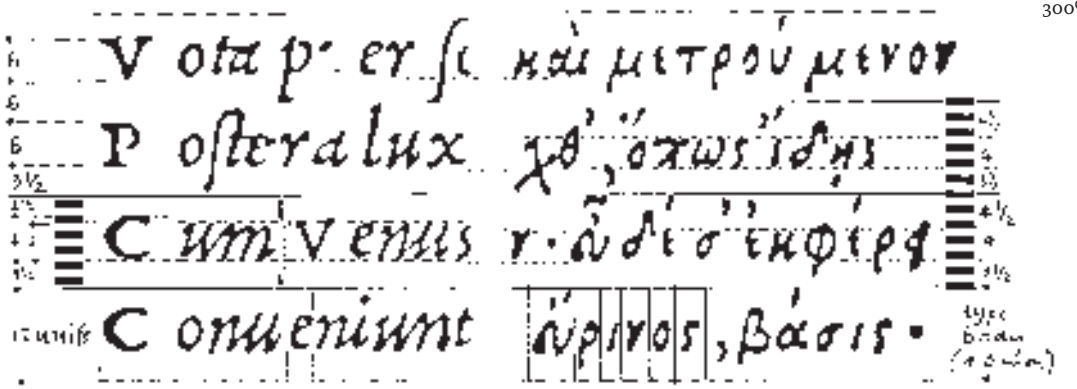
Ovid, *Metamorphoses*, sig. Q1^{v}

400%



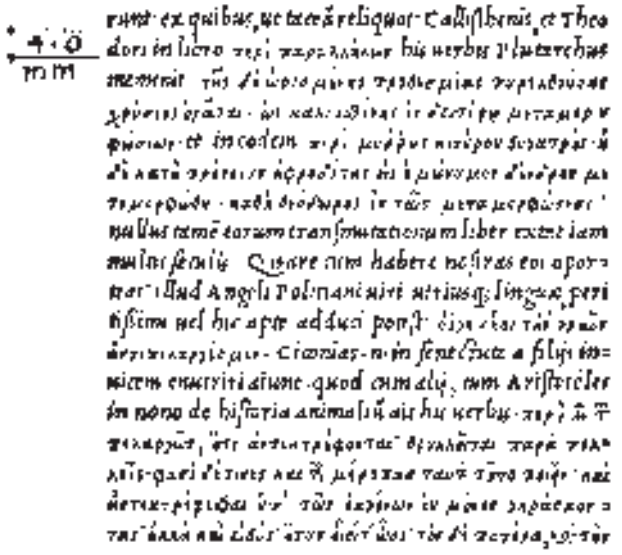
x-height / line-increment ratio – 5 : 12 units
capital-height / line-increment ratio – 6 : 12 units (1 : 2)
x-height / inter-x-height ratio – 5 : 7 units

300%



Having to fit a Greek quart into a Latin pint pot proved to be the main stumbling-block in the Lascaris job of 1495. Griffo's problem of combining Greeks and Latins sequentially was beautifully resolved some five years later when it came to making and co-ordinating the Greeks and Latins needed for the composition of the thirty-two line page of the octavo classics series, the last of the jobs he did for Aldus.

100%



At this stage in the development of Greek type, the letterforms had not yet been 'colonized' by the Latins, and still carried the mark of stylus in wax.

Ovid, *Metamorphoses*, sig. A2^{v}

[illegible] 85.

L eucothea. leucotheam. [illegible] 99.

L eucippus et leucippus. leucippon. [illegible] 194.

L ibys. libyes. libyem. [illegible] 35 et 77.

L ibycus. libycus. libycum. [illegible] 101.

L icetes et liceus. liceum. [illegible] 111.

L ilybaeon. [illegible] 110.

L imniaces. limniaces. limniacen. [illegible] Planudes illud Ouidij libro. 5. Quem flumine Gange Editum limniace virens peperisse sub undis Creditur. Sic interpretatur. [illegible]

[illegible] 109.

L iriope. liriopes. liriopen. [illegible] 68.

L ycaus et lycaos. lycaon. [illegible] 81.

L ycaon. [illegible] 8.

L ycaon. lycaonis. lycaona. [illegible] 7.

L ycaonius. lycaonia. lycaonium. [illegible] 6.

L ycabas. lycabantis. lycabanta. [illegible] 77.

L yciscus. lyciscum. [illegible] 64.

L yctimus. [illegible] 35.

L ycius. lycia. lycium. [illegible] 143.

L ythius. lythia. lythium. [illegible] 171.

L ichas. lichan. [illegible] 219.

L ychnus et lychnos. lychnum. [illegible] 236.

L ycus et lycus. lycon. [illegible] 303.

L yncus. lyncum. [illegible] Sic Planudes. Perperam igitur impressum est. Lyncum. 304.

L ycas. lycam. [illegible] 91.

L ycurgus et lycurgus. lycurgum. [illegible] 82.

L ycidas. lycidam. [illegible] 301.

L ydius. lydia. lydium. [illegible] 151.

L ydus. lyda. lydum. [illegible] 169.

L ympha. [illegible] 42.

L imyra. limyram. [illegible] 235.

L ynx. lyncos. lyncis. lynca. lyncas. [illegible] 79.

L yncides. lynciden. [illegible] 106.

L yncaeus et lynceus. lyncea. [illegible] 130.

L yncides. lyncidos. lyncidis. lyncea, et lyncea. [illegible]

L yra. lyram. [illegible] 106.

L yrnesius. lyrnesia. lyrnesium. [illegible] 296.

M acareus. macareos. macarea. [illegible] 307.

M acareis. macareidos. macareida. [illegible] 135.

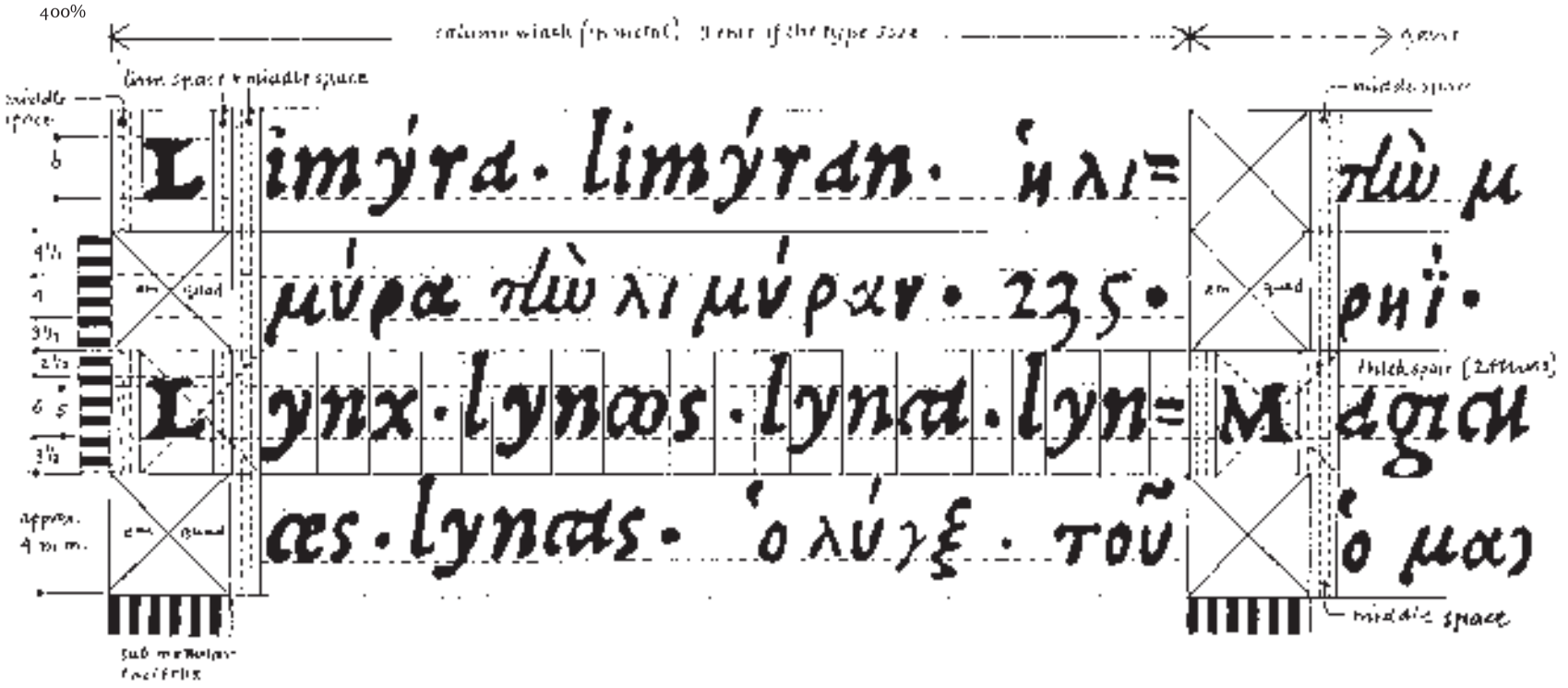
M agnes. magnetis. magnetem. [illegible] 348.

M agus et magos. magum. [illegible] 161.

M ela. melam. [illegible]

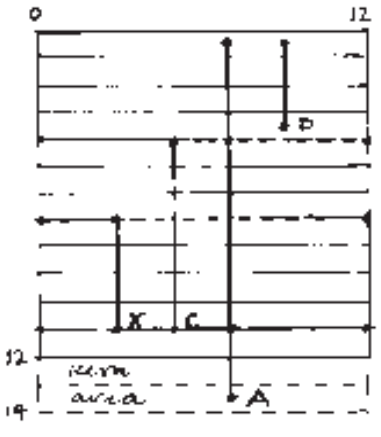
d ii

37 Ovid, *Metamorphoses*, sig. DI^{V}–D2

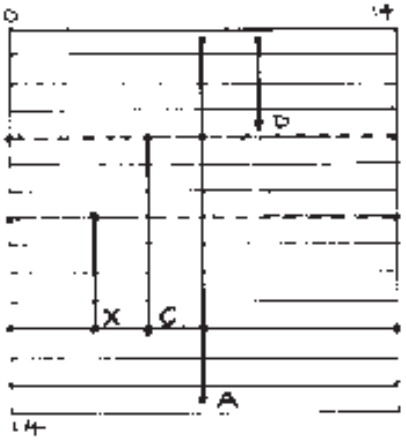


Spaces cast in multiples of one twelfth of the em quadrat of the type's body size provided a scale of values for determining not only such primary variables as x-height and capital-height, but all intervals less than the modulus (the em space) – on both axes of the page.

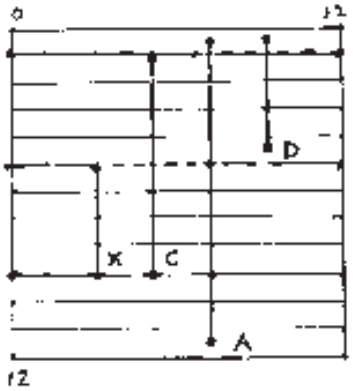
38 Schematic representation of dimensional relationships shown at the same sub-modular unit size



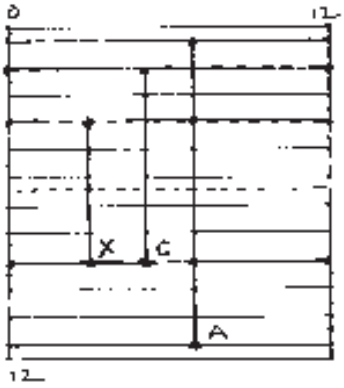
First Greek, first casting
Quadrat: 6.3 × 6.3 mm



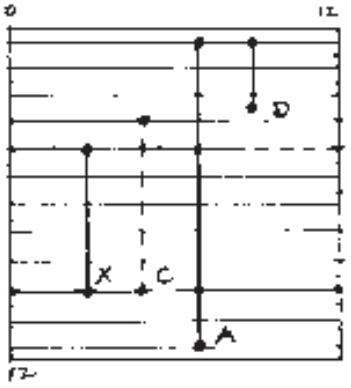
First Greek, second casting
Quadrat: 7.4 × 7.4 mm



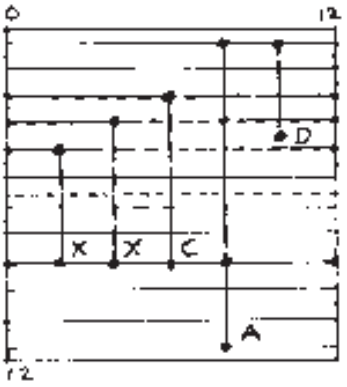
Second Greek
Quadrat: 5.8 × 5.8 mm



De Aetna roman
Quadrat: 5.8 × 5.8 mm



Third Greek
Quadrat: 4.2 × 4.2 mm
(capital-height as fourth Greek)



Fourth Greek & italic
Quadrat: 4.0 × 4.0 mm

x: lowercase vowel-height or x-height
c: capital-height
a: ascender / descender range
d: diacritic range

Index