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## Verba Volant, Scripta Manent

Tom Ward  
*University of Leeds, U.K.*

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## Verba Volant, Scripta Manent

### Cover Page Footnote

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# Verba Volant, Scripta Manent

Tom Ward

*School of Mathematics, University of Leeds, Leeds, UNITED KINGDOM*  
t.b.ward@leeds.ac.uk

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## Abstract

“Most people think typography is about fonts. Most designers think typography is about fonts. Typography is more than that, it’s expressing language through type. Placement, composition, typechoice.”

(Mark Boulton)

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Using examples, we attempt to prove the following assertions. None is original to the author, and each is readily contested. As a courtesy, the examples are artificially constructed rather than taken from the mathematical literature.

- Mathematical notation can either help or hinder the reader.
- Commutative algebra and harmonic analysis can be made more or less difficult by font choices.
- Making deliberate choices about line and page breaks can help or hinder the reader.

The so-called grid method in arithmetic amounts to this. To work out $13 \times 15$ , think of $(10+3) \times (10+5)$ and expand: $10 \times 10$ , $10 \times 5$ , $3 \times 10$ , and $3 \times 5$ . Then we add 100, 50, 30, and 15 to obtain 195.
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To avoid confusion, we denote the character group of a locally compact abelian group  $G$  by  $\widehat{G}$ , and the annihilator of a subgroup  $H < G$  by  $H^\perp$ . Then for a closed subgroup  $H$  of  $G$ , we have isomorphisms of topological groups as follows:

- $\widehat{G/H} \cong H^\perp$ ;
- $\widehat{H} \cong \widehat{G}/H^\perp$ ;
- $(H^\perp)^\perp \cong H$ , under the identification between  $G$  and the character group of  $\widehat{G}$  given by Pontryagin duality.

Let  $R$  be a valuation ring of a field  $K$  and assume that we have  $R \subset R' \subset K$  with  $R \neq R'$ . Let  $M$  be the maximal ideal of  $R$ , and let  $P$  be the maximal ideal of  $R'$ . Then

- $P \subset M \subset R$  and  $P \neq M$ .
- $P$  is a prime ideal of  $R$  and  $R'$  is the localization  $R_P$ .
- $R/P$  is a valuation ring of the field  $R'/P$ .

“90 percent of design is typography. And the other 90 percent is white-space.” (Jeffrey Zeldman [2])

To avoid confusion, we use the same letter in different fonts, denoting the character group of a locally compact abelian group  $G$  by  $\mathcal{G}$ , and the annihilator of a subgroup  $H < G$  with  $\mathcal{H}$ . Then for a closed subgroup  $H$  of  $G$ , we have isomorphisms of topological groups as follows:

- $\mathcal{X} \cong \mathcal{H}$  where  $X = G/H$ ;
- $\mathcal{H} \cong \mathcal{G}/\mathcal{H}$ ;
- $\mathcal{X} \cong H$ , where  $X = \mathcal{H}$ , under the identification between the character group of  $\mathcal{G}$  and  $G$ .

Let  $\mathfrak{R}$  be a valuation ring of a field  $\mathfrak{K}$  and assume that  $\mathfrak{R} \subset \mathfrak{R}' \subset \mathfrak{K}$  with  $\mathfrak{R} \neq \mathfrak{R}'$ . Let  $\mathfrak{M}$  be the maximal ideal of  $\mathfrak{R}$  and let  $\mathfrak{P}$  be the maximal ideal of  $\mathfrak{R}'$ . Then

- $\mathfrak{P} \subset \mathfrak{M} \subset \mathfrak{R}$  and  $\mathfrak{P} \neq \mathfrak{M}$ .
- $\mathfrak{P}$  is a prime ideal of  $\mathfrak{R}$  and  $\mathfrak{R}' = \mathfrak{R}_{\mathfrak{P}}$ .
- $\mathfrak{R}/\mathfrak{P}$  is a valuation ring of the field  $\mathfrak{R}'/\mathfrak{P}$ .

“90 percent of design is typography. And the other 90 percent is white-space.” (Jeffrey Zeldman [2])

## **References**

- [1] M. Boulton (2015), in <https://typography.guru/quote/>
- [2] J. Zeldman (2015), in [www.zeldman.com/2015/12/24/the-year-in-design/](http://www.zeldman.com/2015/12/24/the-year-in-design/)