Typography papers 1

Typographic measurement: a chronology

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Typographic measurement: a chronology

The author's main aim in this paper is to provide a clear historical sequence to what is a complex chain of events. In his introduction he explains how business imperatives have driven most attempts to reform systems of typographic measurement. He suggests that metric reform – an ISO proposal for which was developed in the 1970s – is still needed. The chronology which follows presents a sequence of significant events in the development of typographic measurement systems. The chronology makes considerable reference to an extensive bibliography: in this respect it provides a useful reference tool for future researchers and students.

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Introduction

For a period of about twenty years – from the mid 1960s to the mid 1980s – typographic experts in national and international standards meetings devoted much effort to adapting type measurement to non-metal-based typesetting technologies and to the adoption of the metric system. A moving force in this work was the Austrian emigré Ernst Hoch. But his efforts, and those of others, were ultimately no match for the opposition of manufacturers. The attempts of the International Organization for Standardization (ISO) to agree on a standard for metric typographic measurement ceased in 1984. This was the same year, ironically, that Apple Computer licensed the PostScript page description language from Adobe Systems – a language in which traditional methods of type measurement were perpetuated.

Because of the dominance of the American computer industry in typographic matters since then, these important issues have been swept aside. But the problems arising from non-metric dimensional units and out-of-date methods of measurement have been exacerbated by their use by a wider public of non-typographers. Adobe and Apple, as developers of radically new approaches to page description and document production, had little to lose and much to gain from the *status quo*. So they adapted a measurement system the principle of which would be understood by a core of niche-market users. This adapted system became widely accepted, as PostScript gradually became the industry standard in page-description languages.

Similar business imperatives have driven the development of typographic measurement since the late seventeenth century. Pierre Simon Fournier set up his own foundry around 1737, at the same time as he was developing a system of type body sizing based on a scale of 'typographic points'. He did not have to bear the costs of foundry re-stocking while implementing his system, so he too had little to lose and much to gain. François-Ambroise Didot, who associated the typographic point to the French official measure (the *pied de roi*) around 1783, was also in the process of establishing a type foundry. And Marder, Luse & Co., the Chicago foundry which rationalized its type body sizes in 1872 – so leading to the development of the American point system – was re-stocking its foundry after the great fire of 1871: again, the problem of making existing stocks obsolete was avoided.

Fournier, Didot, and Marder, Luse & Co. all aimed to improve and rationalize type measurement. Fournier's efforts were limited by his decision to base his typographic points on an arbitrary inch. Didot's attempts to improve Fournier's system were negated by the

adoption of the metric system in France in 1801. And Marder, Luse & Co.'s efforts were confused by a United States Typefounders Association meeting held in 1886. Certainly it seems that since the mid nineteenth century well-entrenched interests have ensured the perpetuation of non-standard units and arcane methods of measurement.

There have been numerous attempts to devise a coherent system which could secure international agreement as a standard. These efforts have failed, either because of unforeseen changes in other measurement standards, or because of the vested interests of type manufacturers, and, more recently, of computer system manufacturers. François-Ambroise Didot's son, Firmin, attempted to adapt his father's system to the metric system as long ago as 1812. This fated line of enquiry ends in this century with Ernst Hoch.

A reformed and internationally recognized system of typographic measurement is still needed. The case for reform in the 1970s was that in metal the range of preferred type sizes had to be a range of body sizes. However, the physical body occurs only in metal composition, and photocomposition is characterized by an image untied to any kind of body (Hoch, 1978). Metal type users who referred to '10-point type' could not measure an image of that type and see that it was 10 points. Type size should therefore no longer be specified in terms of a dimension which does not indicate the visible size of type (Ó Brógáin, 1983).

In the 1960s and early 1970s objections to reform, on the grounds of large-scale re-stocking and equipment adaptation, may have had some justification. Today it is simply an issue of adapting software. And the widespread use of professional tools in document production software by a large number of 'lay' users further fuels the argument for reform. For example, 'lay' users do not know what a point is. They do not know how the point is applied to the measurement of typographic characters: they have no understanding of the non-existent 'body', no need to understand it because it is now redundant, and no desire to understand it because its relevance cannot be demonstrated.

Reform is necessary if typographic measurement is to be seen to make sense. The use of a unit of measurement familiar to professionals and lay users alike is essential. The millimetre is the base unit of the most coherent measuring system. Its use would make typographic and paper measurement compatible; the importance of compatibility was recognized by Firmin Didot around 1812, and in 1966 Ernst Hoch pointed out that 'the simultaneous use of different uncoordinated systems of measurement is detrimental to the efficiency of any industry'. Millimetric reform is, however, worthless unless we additionally reform the way in which type is measured. The 1978 ISO proposals by no means provided a complete solution, but they prepared the ground. It is the responsibility of professional typographers to adapt to technological change, and to the changing needs of the growing community of type users.

The following chronology is not an exhaustive history of typographic measurement.* It was compiled as a tool for further research work in the area of type measurement reform, and in this respect it may be most helpful when used with the accompanying bibliography. My other aim was to provide a clear historical sequence to what is a complex chain of events.

* Readers requiring a fuller discussion of developments in type measurement should consult Ovink, 1979.

Typographic measurement: a chronology

1683 Moxon in his *Mechanick exercises* (1683) acknowledges the problem of non-standardized type sizing and shows a table 'wherein is set down the number of each Body that is contained in one Foot'. He does this 'that the Reader may the better understand the sizes of these several Bodies'.

1695 Jean Truchet 'Calibres des toutes les sortes et grandeurs de Lettres', in Jacques Jaugeon's manuscript *Description des arts et métiers* (see Mosley, 1991, where the scheme is reproduced, and Mosley, 1992).

1723 Paris: '... in a set of regulations on the conduct of printers ... there was included a rule that type founders were to make their types to a standard height ... and their body sizes to a prescribed system of relationships' (Tracy, 1961, p. 63). However, Morison (1963, p. xv) notes that 'although regulations for the book-selling and printing trade made in 1723 successfully dealt with some of the anomalies in the trade (as, for example, differing heights-to-paper), the *Conseil* did not succeed in its effort to standardize type bodies, and it remained for Fournier, in 1737, to devise an efficient system.'

1737 First widely recognized scheme of type body sizes, and the development of the 'typographic point' by P. S. Fournier, also known as Fournier le Jeune (see De Vinne, 1902; Fournier, 1764–66; Hutt, 1972; Legros and Grant, 1916).

'The invention ... I rendered in 1737' (Fournier, 1764–66, p. 137).

'Using the familiar terminology ... he set up a scale of two "inches" (*pouces*), divided these into twelve parts (*lignes*) and each part into six *points* ... Fournier's *pouce*, *ligne*, and *point* were not of the same dimension as the divisions of those names in the French "foot" (*pied du roi*)' [*sic*] (Tracy, 1961, p. 64).

Fournier (*Manuel typographique* chapter XVII: 'Typographical points') refers to the table of proportions which he printed in 1737. Updike (1937, vol. 1, p. 26) calls this a 'tractate ... entitled *Tables des proportions qu'il faut observer entre les caractères*'. Carter notes that this was probably identical to the table later included in the preface to his *Modèles des caractères de l'Imprimerie*, of 1742 (see Fournier, 1742). This table is also reproduced in Updike (1937, vol. 1, facing p. 28) and Tracy (1961, facing p. 69).

Fournier notes in his *Manuel typographique* (1764–66) that, 'after printing this Table, which I first did in 1737, I noticed that the paper in drying had shrunk, making the scale a little less than its proper length. On this occasion I have guarded against this error by adding enough to compensate for the shrinkage of the paper.' (This scale is reproduced in Fournier, 1764–66; De Vinne, 1902; Legros and Grant, 1916; Updike, 1937). This problem alone might have suggested to Fournier that it may have been more satisfactory had he divided the *pied de roi*, rather than basing his points on an arbitrary inch, but he probably took pains to ensure that his resulting type body sizes differed as little as possible from those in common use. Measurements of Fournier's scale from four separate copies are given by Carter (Fournier, 1764–66), and measurement from a fifth copy is given by Ovink (1979). The average

of these five measurements is 0.349 mm. Legros and Grant (1916) state that Fournier's point 'is equivalent to 0.34875 mm'.

Fournier had the ideal opportunity to attempt to establish a rational system (he was setting up, cutting his own punches, etc.). Fournier knew that even if others did not adopt his system he was not likely to lose a great deal.

1755 'It ought to be made a law, that each of the different bodies of letter should *always* be cast to *the same height*, *depth*, and *line*; by letter Founders of the same place, *at least*' (Smith, 1755).

For further information on type bodies prior to the introduction of the point system see, for example, Carter, 1969; De Vinne, 1902; Fournier, 1764–66; Gaskell, 1972; Hansard, 1825; Johnson, 1824; Legros and Grant, 1916; Mosley, 1992; Ovink, 1979; Reed, 1887; Savage, 1841; Southward, 1887. De Vinne and Legros and Grant also show American, English, French, German, Italian, Spanish, and Dutch names for type bodies.

*c.*1783 Fournier system revised by François-Ambroise Didot, who allied the point to the official unit of length, the *pied de roi* (equal to 12.7897 English inches). Didot did not write about this work. (See, for example, Legros and Grant, 1916; Ovink, 1979; Tracy, 1961; Updike, 1937).

In establishing a type foundry Didot, like Fournier before him, had the commercial opportunity to attempt reform. François-Ambroise Didot supervised the cutting of his types by the punchcutter Pierre-Louis Vafflard (or Wafflard). These were first used in 1781. Firmin Didot (his son) started to cut his own punches in 1783, having been taught by Vafflard.

Many authors suggest that François-Ambroise Didot set up his foundry around 1775. There is no evidence to support this. Veyrin-Forrer, the most authoritative source, states: 'it was about 1783 that François-Ambroise, perfecting the idea of Fournier le Jeune, applied a new system to the nomenclature and size of types, the typographic point, based on the division of the *pied de roi*, the legal measure of the time' (Veyrin-Forrer, 1987, p. 135).*

An important consequence of Didot's reform was that type and paper measurement were now compatible. The other important aspect of Didot's work was that he abandoned the names of the type body sizes altogether, preferring to use the point size as the size descriptor.

Ovink (1979) makes the important point that, 'with hindsight it may be regretted that with their plumping for the *pied de roi*, an exclusively French unit, they came five years too soon – in 1790 the length of the metre was fixed [*sic*].' The Didot 'pica' (or unit of 12 points) called the Cicero, measures 0.1776 English inch.

1790 French Academy of Sciences entrusted with devising new system of weights and measures (the metric system) (see Kula, 1986, p. 228).

1791 'The Didot system soon – in 1791 – gained a foothold in Germany through the connection between Firmin Didot and the Berlin printer and typefounder Johann Friedrich Unger' (Ovink, 1979, p. 112). In Germany the Didot system was known as the French or Parisian system (Ovink, 1979).

* My thanks to James Mosley for bringing this reference to my attention, and for help in translation.

1801 2 November: metric system given legal status in France. The metre was fixed as 1/10,000,000 part of the arc of a meridian between the pole and the equator. (It is now officially defined as a length equal to 1,650,763.37 wavelengths of the orange light emitted by the krypton atom of mass 86 *in vacuo*: Kula, 1986, p. 121).

A consequence of the introduction of the metric system was that the compatibility between type and paper measurement established by Didot was now lost.

1812–15 Firmin Didot attempts to revise his father's system to bring it into line with the metric system (see, for example, Bensusan, 1972; Le Roy, 1955; Ovink, 1979; Stork, 1954; Tracy, 1961).

Hoch (1972b) states: 'Didot's rejection of the earlier Didot point and his proposal to replace it by a point of 0.4mm was not a change of mind: it was a reflection in a logical mind of the replacement of the *pied du roi* [*sic*] by the metre.'

Napoleon requested that a new range of types be cut for the Imprimerie Nationale. Firmin Didot proposed that the new types be cast on metric bodies. (Types cast on these metric bodies were used only once, for the *Relation des cérémonies du sacre et du couronnement de sa Majesté L'Empereur Napoléon*. The project was abandoned after Napoleon's fall.)

All the discussions of Firmin Didot's metric point which I have seen either state that it was 0.4mm, or do not mention its size. Some Imprimerie Nationale documents suggest that, in fact, he devised a scale of sizes from 9 to 52 point, using a 0.25mm point.* A 52 point body, for example, is thought to have measured 13mm, which, when divided by 0.39877mm (the size of the Didot point still in use at the Imprimerie Nationale), equals 32.6 Didot. This 52 point 'Didot millimétrique' is therefore equivalent to 36 point Didot.

The confusion surrounding the 0.4mm point no doubt stems from the fact that the Imprimerie Nationale continues to use its own version of the Didot point (0.376mm everywhere else, see 1879 below) which may have been intended to be 0.4mm but actually measures 0.39877mm (see Grinevald, 1990).

* I am indebted to James Mosley for his help in attempting to confirm information about the 'Didot millimétrique'. (Chris Burke helped with translations.)

1824 Johnson (1824) calls for regularity of type bodies. He makes no mention of Fournier or Didot.

1825 Hansard (1825) calls for regularity of type bodies. He makes no mention of Fournier or Didot. Hansard shows the scheme of James Fergusson, 1824, based on the nonpareil at 1/12 inch. It was ineffective due to awkward calculations (see De Vinne, 1902; Legros and Grant, 1916; Ovink, 1979).

1840 Bower Brothers propose six picas to the inch, 16 points to the pica. The firm folded in 1851, with no evidence of the system being adopted (see De Vinne 1902; Ovink, 1979).

1841 Savage's *Dictionary of the art of printing* includes the first discussion of Fournier and Didot in a British publication (Savage, 1841).

1855 J. H. King & Co. devise a decimal system (outlined in Legros and Grant, 1916, as 'the system introduced by Shanks in the Patent Type Foundry, and there used for many years'). The firm later became

Stevens, Shanks & Co. The pica equalled 0.1667 inch, but was divided into 20 points.

1855–67 Stork (1954), for example, discusses a number of other failed attempts at standardization throughout this period.

1872 Marder, Luse & Co. (Chicago) resumes business after its type foundry had been destroyed by fire in 1871 and it rationalizes certain type body size relationships. Later, in 1877, John Marder puts into practice a suggestion made by Nelson Crocker Hawks (a Milwaukee printer who had become Marder's agent in San Francisco) to establish the 'American system of interchangeable bodies' with six picas to the inch (i.e. one point equal to 1/72 inch). Some success was guaranteed, again because of the opportunity afforded by completely restocking their foundry.

Some objected that the Marder, Luse pica was different to the pica in common use. (On the development of the American point system see, for example, Ovink, 1979; Tracy, 1961; Updike, 1937; and for the fullest account see Hopkins, 1989.)

1873 28 German foundries simultaneously announce that supplies to all new printing houses will be to the French (Didot) standard. However, large printing houses could afford to continue with their own systems, so five Berlin foundries commission Hermann Berthold (a brass rule manufacturer who retired in 1888 before his company began typefounding) to devise a standard based on the metre (see Ovink, 1979; Rommen, 1988; Smalian, 1899).

1879 Hermann Berthold registers his standard with the weights and measures commission in Berlin: the Didot point is defined at 0.376mm and formally adopted as the European standard (Bensusan, 1972; Ovink, 1979; Smalian, 1899).

1882 The Bruce typefoundry sizes its type according to its system of geometrical progression. In George Bruce's system each type body size increased by 12.2462 per cent over the size preceding it. The system was not adopted outside Bruce's foundry (see De Vinne, 1902, who dates the system 1822; Hopkins, 1989; Tracy, 1961; Updike, 1937, who dates the system in the first quarter of the nineteenth century).

1886 17 September: 24 member companies of the United States Typefounders' Association, meeting at Niagara, formally adopt the point system of Marder, Luse & Co. as a standard, but do not accept the 'Chicago' pica. Instead they adopt the pica of MacKellar, Smiths & Jordan of Philadelphia (then the largest and oldest type foundry in the United States). Hopkins (1989, p. 60) gives the fullest account and quotes the proceedings of the meeting: 'Mr MacKellar moved its approval. It was approved.' (Thomas MacKellar was then president of the Association.) This fixed the pica at 0.166044 inch, rather than exactly 1/6 inch, because of objections to the recurring fraction, and possibly because 83 picas would equate with 35cm. Ovink (1979) suggests that this equation may only have tipped the balance, whereas other authors, e.g. Elliott (1931), imply that the 83 picas to 35cm equation played an important part, since it gave the committee an indirect conformance to the metric system. In fact Legros and Grant (1916) note that '996 points are very nearly equal to 35 centimetres'. They

also point out that 'the British and the United States inches are not absolutely identical, one British inch being equal to 0.999997 United States inch ... a difference of one three-hundred-thousandth of an inch'.

The process of adoption of the American point system was probably speeded up by the formation of the American Type Founders' Company (ATF) in 1892. Ovink (1979) suggests that the adoption contributed to the economic situation which actually led to the formation of ATF. (ATF took over 23 foundries whose output amounted to 85 per cent of the total for the USA; see Hoch, 1966a.)

1891 The International Congress of Printers in Antwerp pass a resolution to base the point on the metric system (see Stork, 1954, who outlines financial objections and the odds against adoption at this stage).

1898 British type founders start to adopt the American point standard.

1903 The *British Printer* 'Adoption of point system' (BP, 1903) states that the following founders have guaranteed to supply type on the recognized bodies: 'H. W. Caslon & Co., Ltd; Caxton Type Foundry (John Haddon & Co); Miller & Richard; Sir Charles Reed & Sons, Ltd; P. M. Shanks & Sons, Ltd.; Stephenson, Blake & Co.; The Wicks Rotary Type-Casting Co., Ltd'.

1905 Most British foundries had adopted the Anglo-American point system by this time (Tracy, 1961).

1916 'In the United States of America the point system has for nearly twenty years been in universal use. It may be said also that its use is now practically universal throughout Great Britain and her colonies and dependencies' (Legros and Grant, 1916, p. 60).

1919 Monotype adopts the Anglo-American point standard in March 1919. Prior to this the Monotype pica had measured 0.1667 inch. (Information supplied by John Latham to G. W. Ovink, and noted in Ovink, 1979). Legros and Grant (1916) incorrectly state that the Monotype pica measured 0.1668 inch at their time of writing.

1945 After the Second World War metrication of the Didot point was discussed again in Germany. Many argued that because a number of printing houses and foundries had to completely re-stock after being destroyed in the War, this was an opportune time for change (Hoch, 1966b).

1954 Stork advocates the introduction of 1/2 mm unit of measurement, and argues that Didot points equate well with this. Stork was representing the Dutch Master Printers' Federation at the Venice International Printing Congress. The idea was well-received, and published, but obtained no industrial backing.

1954 & 1956 Two German printing houses (Druckerei Osterwald in Hanover, and CEG Druckerei in Hamburg) metricate their Monotype and Linotype composing equipment with the full support of the manufacturers (see Hoch, 1966a, and Hoch, 1967).

Arguments, especially in the German press at this time, centre on two views:

1. that there should continue to be a basic increment (i.e. a point) with a specific metric value (e.g. 0.4mm argued by Tracy in 1966, or 0.5mm as suggested by Stork in 1954)
2. that there should be a straightforward description of sizes in millimetric terms (again see Hoch, 1967).

1961 Walter Tracy (1961) suggests a revision of the point system to give compatibility between it and the imperial system (then, of course, the standard measurement system for paper sizes, etc. in Britain). He highlights the engineering problem of the recurring '6' in the decimal expression of 1/6 inch, so instead of suggesting a return to the Marder, Luse & Co. (or 'Chicago') point he suggests a system of 80 points to the inch (1/8 inch = 10 points) which is conveniently divisible by 2, 4, and 8, and argues that it allows a more flexible range of sizes.

The proposal does not seem to have aroused much interest from manufacturers, and it came a short time before metrication became an urgent issue in Britain.

1964 ICOGRADA (International Council of Graphic Design Associations) launches the ICOGRADA Project for International Unification of Typographic Measurements (Ernst Hoch, project chairman), and studies of the problem are carried out by the SIAD (Society of Industrial Artists and Designers) and the STD (Society of Typographic Designers). (See Hoch and Goldring, 1966.)

Hoch (1966a) also reports that the SIAD and STD set up a United Kingdom working party in 1965.

Deutsche Industrie Normen publish DIN 16507 *Typographical measures* [*Typographische Maße*], retaining Berthold's millimetric value for the Didot point of 1879. (For a discussion of the draft of Part 2, intended to establish a coherent system of distances to be measured in phototypesetting, see Rommen, 1988.)

1965 February: general demand for adoption of the metric system throughout the British printing industry.

May: the British government declares a ten year change-over period to metrication in all fields (see Hoch, 1967).

The United States Senate authorizes a feasibility study of the metric system.

1966 Hoch and Goldring (1966) argue that 'it seemed necessary not only to strive for agreement on the consistent use of one system of mensuration, but to develop a system of dimensional references permitting precise description of type size.' Arising from the ICOGRADA Project discussions, they propose a method for measuring the visible image, rather than the non-existent body (later referred to as the 'ghostly body').

June: the International Congress of Master Printers, at Cannes, adopts a resolution 'to co-ordinate all the efforts which have already been initiated in this field [the promotion of a metric system of typographic measurement] ... and ... to set a target time-table for the various stages needed to give effect to the system' (IBPAT, 1966). A BSI (British Standards Institution) committee (S/–/2, which became S/40 in 1970) is set up, in conjunction with the British Federation of Master Printers, to consider the problem (chaired by J. I. Goulding of the

Monotype Corporation). In November the International Bureau (of Master Printers) decides not to act on the Cannes resolution, so ICOGRADA plans an international typometric conference in Düsseldorf in 1967 during DRUPA (Hoch, 1969, 1972b, and 1978).

1967 Hoch argues strongly that there is no need for a 'point' at all: 'are there any technical or psychological aspects in which the printing industry characteristically differs from other modern industries?'

May: The International Association of Research Institutes for the Graphic Arts Industry (IARIGAI) adopts a resolution at its conference in Rome, stressing the need for a coherent system of measurement, and endorses the work of ICOGRADA (Hoch, 1969, and 1972b): 'The Conference notes that the 12th International Congress of Master Printers at Cannes in 1966 reaffirmed the recommendation of the 8th International Congress at Venice in 1954, in favour of progress towards a metric system of typographical measurement ... there appears to be a *prima facie* case for adopting [the metric system] forthwith' (in Hoare, 1967).

ICOGRADA holds an international typometric conference during DRUPA in Düsseldorf, and plans an International Typometric Centre. Much support results from a meeting held at the ATYPI conference that year in Paris (Hoch, 1969). A brief summary of the conference is given in BP (1967).

1969 The BSI panel (S/–/2), which was set up in 1966, establishes the following criteria as basic considerations for any system of typographic measurement (Hoch, 1970):

1. Proposals should provide a basis for international standardization.
2. Dimensions to be metric and follow conventional metric decimal notation.
3. There must be a basic dimension for purposes of character design, such dimension having a direct relationship to any other dimension used, e.g. line length and depth.
4. Dimensions to be clear in their own right and eliminate specialist terminology.
5. The normal metric scale should be used, thus avoiding the need for special typographic scales.

1970 German Federal Republic: 'Order of 26 June 1970 made under the Units of Measurement Act of 2 July 1969 lays down that the use of the 'typographic point' in business or official communication in any form whatsoever after 31 December 1977 constitutes a punishable offence' (in Hoch, 1972a; see also Hoch, 1972b).

1971 International Organization for Standardization (ISO) Technical Committee 130 (TC130 Graphic Technology) discusses the metrication of typographic measurement in June at its first meeting in Paris. The committee had the Draft Proposal (for BS4786) from the British Standards Institution (Hoch, 1971, and 1978).

26 June: Council of Ministers of the European Economic Community adopts Germany's order of 26 June 1970 (Hoch, 1978).

1972 Hoch (1972a) asserts that 'the change over to millimetric typography, is moving toward international implementation'. Hoch (1972b) also

states that 'The Verein der Schriftgiesser (Association of Type-founders) has lodged an "objection to the abolition of the typographic point system".' Hoch (1978) states that they 'lodged a "legal objection",' and that they 'engaged in a hopeless rearguard action in defence of the duodecimal point systems'.

January: BSI publishes BS4786: 1972 *Specification for metric typographic measurement* as a culmination of the work of the technical committee S/40. In this standard BSI recommends a 'range of preferred sizes for character depth', e.g. 1.75mm, 2.0mm, 2.25mm, 2.5mm, 2.75mm, etc., and a basic unit of measurement of 0.5mm, with interline spacing to be specified in multiples of 0.25mm (see also Bensusan, 1972).

The British Standard therefore recommended a straightforward description of sizes in millimetric terms rather than the use of a metric 'point'. Diagrams are included which show the relationship of these preferred sizes to Anglo-American and Didot point sizes. No mention is made of the idea of measuring the visible image, but Bensusan (1972) points out that the standard did recommend that type be measured from baseline to baseline (more by implication than through a specific statement: '*Character depth*. The minimum depth required to accommodate the typeface, conveniently measured from base line to base line') (see also BP, 1971).

Some manufacturers made the millimetre the base unit of typographic 'character depth' measurement in their typesetting machines. Most, however, were capable of accepting any measurement system (Anglo-American points, Didot points, inches, millimetres) and since the adoption of metric measurement was therefore dependent upon typesetters themselves, and designers specifying to typesetters, the standard gained little acceptance in the industry.

1975 Following the introduction of BS4786 an ISO working group (WG4, *Typographic measurement*) is set up under the ISO/TC130. This ISO Technical Committee was guided by AFNOR (Association Française de Normalisation) since its inception in 1969. The chairman was Loic Cahierre, Director of IPREIG, the French printing research organization. ISO/TC130 set up WG4 in 1975 at its second meeting with the remit to prepare a Draft Proposal for an international standard on metric typographic measurement. (This information from Bensusan, 1972; Ó Brógáin, 1983; Hoch, 1978; and personal communication with Mr N. B. Smith (BSI)).

WG4 produced the 1978 proposals mentioned below (ISO 1978 a, b). Ó Brógáin states: 'This working group became the battle ground between those who wished to adopt a standard based on measurement of the printed image (the majority) and those who wished to continue specifying type size in terms of body size, even for phototypesetting. Draft proposals for international standards were drawn up, reflecting the majority viewpoint, but agreement could not be reached, and the working group was disbanded in 1982.'

1976 Hoch (1977/8) reports a strong debate in late 1976, mainly exercised in the *Deutscher Drucker* magazine in which traditionalists demanded minimal change (i.e. a mere conversion of Didot points into millimetres, and the continued measurement of the ghostly body) and radicals

demanded an entirely new approach to photocomposition with a commitment to measuring the image. In this article Hoch, argues strongly against measuring 'the newly invented "fictitious type body"'.

1978 The date originally set by the European Commission as the date by which all measurements conflicting with the metric system should be abolished was 1 January 1978. The date was later changed to 1 April 1978.

WG4 produces its proposals (ISO 1978 a and b, mentioned above). The draft proposals recommended that the character image should be measured and that for the purpose of short reference capital letter height (H-height) should be used as the nominal size designator. Further, for each typeface and size, manufacturers would provide a minimum recommended row distance (or line feed). This two-part size designation is illustrated in figure 1. WG4 could not come to an agreement on these proposals, so the issue was referred back to TC130, which was also unable to agree. TC130 therefore recommended that the proposals become a Technical Report. Mr N. B. Smith (BSI) informs me that there is no evidence of any further work having been carried out by TC130. The fullest account of the events surrounding TC130/WG4 proposals, responses, and extent of consensus reached is given in Hoch (1980 and 1984).

Mr John Saville, a member of WG4, has kindly supplied me with copies of the draft proposals (the secretariat of ISO/TC130 are not able to locate them). The best summary of the content that I have found is Hoch (1978).* Ó Brógáin (1983) states that: 'The ISO draft proposals – the most serious attempt at an international solution – recognized the logic of phototypesetting in rejecting the notion of measuring the type body: but chose instead the height of the capital letters as the definitive measurement ... It is remarkable that the ISO draft proposals, having made the necessary break with tradition, failed to carry through the logic of this change and recognize the dimension which decides the visual size of the type: the lower-case height.'

* My thanks to Peter Pavey for this reference.

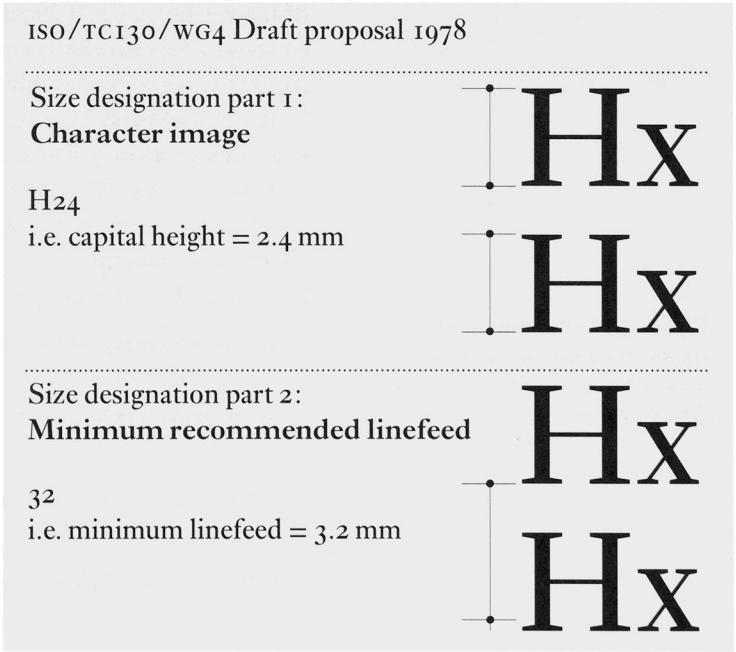

Figure 1. The two-part size designation recommended in ISO (1978a) [ISO/TC130/WG4 Draft proposal X1: typographic measurement – photocomposition and related techniques – systems and units].

1983 Séamas Ó Brógáin (1983) suggests type size defined in millimetres with x-height as the size designator, along with a planned system of notation.

1984 Hoch (1984) responds to Ó Brógáin. He does not refer to the recognition of a 'dimension which decides the visual size of the type' and qualifies the decision to use H-height as the nominal size designator: 'insofar as the geometric proportions of the character sizes within a given character face are fixed by the typographic design of that face H, as the nominal character size designator, serves only to define the capital height; it also implies the appropriate scaling of all other dimensions and proportions to retain the characteristics of the face in question.' (Note that Hoch and Goldring's 1966 paper had acknowledged that x-height best defines visual size.)

Hoch further explains that prior to the Lausanne meeting of ISO/TC130 (March 1980) certain parties claimed that the working group's proposals 'would necessitate wholesale redrawing of existing typeface designs'. An erroneous memo, suggesting that the proposals required a constant capital height for each face, was circulated to numerous type manufacturers (most of whom, we can be sure, had never studied the real proposals). Naturally many manufacturers registered their opposition. 'The invention served as the means for diverting the real proposal into a Technical Report'; a Technical Report was never produced.

Ó Brógáin (1984) replies, suggesting that Hoch's argument for H-height could equally be applied to x-height.

Macintosh and LaserWriter launched by Apple Computer, incorporating Adobe's PostScript page description language (Adobe, 1985).

The few significant developments in typographic measurement have been successfully implemented because their protagonists have been involved in major setting up, or foundry re-stocking. Given that Adobe introduced a powerful new page description language, and that Apple introduced a radically new input technology, the decision to incorporate a default value for the point of 1/72 inch (the original Marder, Luse & Co. 'Chicago' point of 1872–86) must, in retrospect, be seen as the twentieth century's most unfortunate missed opportunity in the area of typographic measurement. Also, it was possibly the least well-publicised event in the history of typographic measurement: some designers only discovered the change through bitter experience and many books about DTP are unclear on the subject.

The one advantage of the re-standardization was that type and paper measurement in the USA were made compatible for the first time since the 'Chicago' point.

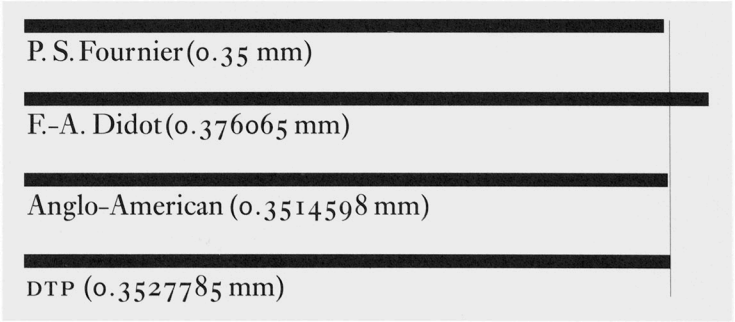

Figure 2. The Fournier, Didot, Anglo-American, and DTP point enlarged by the same scaling factor for comparison.

1989 DIN (Deutsche Industrie Normen) takes over responsibility for TC130 around 1989. This has had no impact on the progression of the work of WG4. (ISO's *Memento* 1989 defines the scope of TC130 but makes no mention of WG4, and the ISO/TC130 secretariat informed me on 14 July 1992 that there are currently no activities concerning typographic measurement.)

1990 BS4786: 1972 *Specification for metric typographic measurement* withdrawn around this time.

1991 Publication of ISO/IEC 9541-1 (and -2): *Information technology – font information interchange – Part 1: Architecture* (and *Part 2: Interchange format*). Part 1 specifies the architecture of a font resource, i.e. the font metrics, glyph description, and properties of glyph metrics required for font references and the interchange of font resources (p.viii). This Standard aims to provide a mechanism enabling the interchange of font information on open networks in both office and publishing environments (p. ix): 'Glyph shapes and metrics are defined with respect toa single two-dimensional Cartesian coordinate system ... Within the glyph coordinate system dimensions are specified as a ratio to the body size of the glyph. Body size is a scalar reference size, often expressed as an integral number of unit sub-divisions equivalent to the x,y grid employed to digitize the font resource ... Distances are specified as unsigned ratios to the body size. Locations are specified as signed x and y coordinates, each coordinate a ratio to the body size, generally specified relative to the origin of the glyph coordinate system.' The standard also notes that 'the sizes of typographic fonts are traditionally specified in terms of body size, by height measured in printing points or millimetres' (pp. 11–12).

The point is not defined. As far as this Standard is concerned the units of measurement are immaterial. This is a consequence of the fact that with linearly scalable fonts the units of measurement are to some extent immaterial.

Although it is not within this ISO committee's remit to address the broader issue of typographic measurement, the passages quoted above reinforce the supremacy of the body as the reference for measurement. One example given in the Standard explains the size of fonts not normally specified in terms of body size – i.e. Courier 10 pitch, usually printed at 6 lines per inch, which might therefore be assigned a body of 1/6 inch. All other examples in the Standard have body sizes expressed in millimetres, and the Standard recommends that body sizes be expressed in millimetres (p. 22).

1992 BSI reports that 'there is no work in progress in this area at all'. Paul Ellison (of University of Exeter Computer Unit, personal communication) states that some American contributors to ISO/IEC 9541 think that issues of typographic measurement may be re-emerging.

1996 There is no evidence to suggest that type measurement reform is being taken seriously at all. In the period since 1992 design and publishing conferences (e.g. Seybold) have consistently ignored the subject. Leading system software developers will not back change as they fear being seen to be 'rocking the boat'.

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Acknowledgements

Mike Bott, The University of Reading Library (for the ICOGRADA archive); Chris Burke, formerly of Monotype Typography (now at The University of Reading, Department of Typography & Graphic Communication); Paul Ellison, University of Exeter Computer Unit; Paul-Marie Grinevald, Conservateur, Imprimerie Nationale, Paris; Lyn Jenkins, formerly of British Standards Institution; Ole Lund, The University of Reading (Department of Typography & Graphic Communication); the late Willy de Majo (former president of ICOGRADA); Alan Marshall, Musée de l'Imprimerie et de la Banque, Lyon; James Mosley and the staff of the St Bride Printing Library, London; Christian Paput, Graveur, Cabinet des poinçons, Imprimerie Nationale, Paris; Peter Pavey, Napier University, Edinburgh; Tina Potter and Paul Clarke, Prima Language Services; John Saville, HMSO, Norwich; N.B. Smith, British Standards Institution, Manchester; Paul Stiff, The University of Reading (Department of Typography & Graphic Communication); Michael Twyman, The University of Reading (Department of Typography & Graphic Communication); Astrid Weber, Deutsche Industrie Normen, Berlin; Kay Westlake, British Standards Institution, Milton Keynes.