STANDARDIZATION OF READING TYPES*

BY

FRANK W. LAW

London

For some time it has appeared obvious to most ophthalmologists that there are considerable differences between the Reading Types issuing from different sources. "J1" has come to mean nothing in style, size, and spacing; and while standardization of Reading Types is not as necessary as that of Distant Types, none the less it is unscientific and undesirable to tolerate such wide variations as exist at present in the material used for a clinical subjective test. As an example, and in justification, two specimens of "J2" from different sources are reprinted here.

No. 1.

In view of the above, the Council of the Faculty of Ophthalmologists entrusted the present writer with the preparation of a memorandum with suggestions for action, to be submitted to Council. In the belief that the Council would be wasting its time unless such a memorandum and suggestions met with general acceptance, permission has been obtained first of all to prepare an article for publication in this Journal, explaining the position and outlining the recommendations which it is proposed to make to the Council.

* Received for publication July 16, 1951.
This is designed to give anyone interested the opportunity of making further suggestions, independently or with reference to the recommendations, which may also be considered by the Council before coming to any final conclusions.

HISTORICAL SURVEY

The first attempt at a scientific interpretation of near visual acuity was made by Snellen, who applied to the test the same principles as he applied to his distance test; each letter was built into a square which subtended an angle of 5' at the normal reading distance. Inherent difficulties attended the reading of Snellen's types, and Jaeger's suggestions, produced at about the same time, found more general acceptance. Jaeger used ordinary printers' founts of varying sizes. He called the smallest No. 1, which thus became known as "J1". No. 2 corresponded approximately to Snellen D = 0.5, i.e., it subtended an angle of 5' at 0.5 m.; No. 4 corresponded to Snellen D = 0.6, i.e., it subtended an angle of 5' at 0.6 m., and so on. The calculation of the size of the letters was made quite simply from the tangent of 5', or 0.001454, e.g., the height of a letter to subtend the proper angle at 1 m. was 0.001454 × 1000 = 1.454 mm.

The use of "Jaeger" types for near vision testing has persisted until the present day, though the uniformity has been entirely lost from the system, mainly because the original founts from which the types were produced are now nearly all obsolete.

PRESENT POSITION

Because there are no true standard Reading Types in present use, the ophthalmologist finds himself using types which vary according to their origin. In order to gain some information on the present position and how it arose, from another angle, that of the "producer", the views, were sought of several firms of opticians and instrument-makers who produce and sell reading types. A selection of the replies is given below:

(1) . . . As soon as I received your letter I tried to establish the conditions under which we prepared out test-type, which dates back many years, in fact twenty! Greatly to my surprise, I discovered that there was no specific scientific basis for the selection of the type. It would appear that a Jaeger test-type was obtained at that time and sent for copying purposes to the printers, who did so to the best of their ability with the type then available . . .

. . . I wholeheartedly agree with your contention that some form of standardization is desirable, but as type varies from area to area and even from printer to printer, the only safeguard against undesirable, slip-shod, and inaccurately printed Jaeger test-types would appear to be a seal issued by a responsible body. I would suggest that manufacturers be invited to submit specimen Jaeger test-types to the Faculty of Ophthalmologists for approval, which could be conveyed in the form of a miniature seal block to be used when re-prints are made. I am sure that manufacturers would be prepared to pay for the block, which would of course prove a valuable selling asset . . .
STANDARDIZATION OF READING TYPES

(2) . . . So far as we can gather these types conform to ordinary printers' founts:

| Brilliant | . . . | J1 |
| Pearl    | . . . | J2 |
| Pica     | . . . | J10 |

Our Reading Test Types are printed like this, and we think that Cowell's is the only reading type constructed where the limbs are one-fifth of the height of the letters . . .

(3) . . . Our own publications of such types have not varied, except in the subject matter, for the last 30 years . . . Professor Jaeger's compromise was almost universally adopted and very soon the Snellen designation was dropped for the more convenient Jaeger number. Since then there has not, so far as we know, been any authorized investigation with regard to Reading Types . . . We do not ourselves see any reason for any publisher departing from the use of the definitely fixed sizes known as 4 point, 6 point, 8 point, etc., when printing Jaeger Reading Types, unless it were authorized by some organization such as the Faculty of Ophthalmologists . . .

(4) . . . Our Jaeger type is an exact copy of the original which was devised many many years ago. We have never altered it and the matter has not been raised before. We shall be pleased, however, to co-operate with the Faculty with a view to re-designing the type if this is thought desirable . . .

(5) . . . Naturally, we are restricted to the printing types that are available that come nearest to the calculated measurements and, in addition, we endeavour to obtain a clear Roman type since the limbs should be as near as possible one-fifth of the size of the square of the letter in thickness or, in other words, to subtend 1° angle.

In my view another important point is that the spacing between lines of print should be at least equivalent to the depth of the type although this is frequently not the case . . .

(6) . . . We quite agree that there appears to be no standardization in the production of Reading types. Originally, Jaeger types, of course, were produced by using standard printers' founts. Unfortunately, these founts appear to be made in different sizes by different printers and hence it is that there is a variation in the size. Some manufacturers have inserted a number against their reading matter illustrating the distance in metres at which the letters themselves subtend an angle of 5 minutes, but even this does not overcome the difference in spacing, nor by this, does it really hope to standardize the charts . . .

These replies, which were kindly made by the various firms consulted, indicate quite well the unsatisfactory nature of the present situation, and render further emphasis on this point unnecessary. They also reveal the existence of some interesting and important misconceptions. For example, the third reply quoted refers to "the definitely fixed sizes known as 4 point, 6 point, etc."; we shall see, however, that these sizes are neither definite nor fixed. The opening sentence of the fourth reply contains a reference to "an exact copy of the original", which the writer's experience leads him to believe is more likely to express a pious hope than a statement of fact, a view which receives support from the third sentence of the sixth reply quoted. The opening sentence of the fifth reply is a frank confession.
There are three items to consider in standardizing reading types—style, size, and spacing.

**Style.**—This is important not only for the sake of legibility but also because a type face determines to a certain extent the actual size of a letter, *i.e.*, a defined type size varies from fount to fount. While there are very many styles suitable to our present purpose, a few only have been selected by virtue of their availability, familiarity, and legibility. These are:

- Garamond
- Caslon Old Face
- Baskerville
- Kennerley
- Veronese
- Cheltenham Old Style
- Bodoni
- Times Roman

All these type faces, though possibly not their names, are familiar to all readers. Specimens are shown on p. 769, all in the size known as 10 point. The last is so named, because it is the style in which *The Times* newspaper is printed, the bulk of the letterpress being in 9 point type. It is also used for this Journal, the main body of this paragraph being actually in 11 point type.

In estimating the relative legibility of these specimens, one must carefully take into account the spacing adopted, and attempt to assess what effect in each case a variation of the spacing would have—

**Size.**—It is a relief that the habit of referring to a type size by an arbitrary if romantic name has passed; it is, however, interesting to find that even the modern "point" system is not quite so scientific and accurate as one might suppose.

A "point" is one seventy-second part of an inch. From that one cannot however state that a 10 point type contains letters which are 1/72" high; it is necessary to go into greater detail. If a letter such as *m*, *e*, or *o* were taken, only spacing would decide whether the tail of a *y* (for instance) on the line above would touch or overlap below. The further difficulty also arises of the possible vertical juxtaposition of letters such as *f* below and *y* above, and that of "tailed" letters with capitals on the line below. The "point" nomenclature refers to the distance between the top of a capital and the bottom of a "descender", *i.e.*, a letter with a tail below the line like *y*, *g*, and *p*—but it is not an exact measure of this distance because, strange as it may seem, the unit does not measure the actual type face (though it does refer to it) but the vertical height of the "body" or block of metal upon which the face is carried. Clearly, the letters would not reach to the actual top or bottom edge of the body, for if they did so juxtaposition of the kind just described would result in actual contact of the printed letters; the top of a capital
STANDARDIZATION OF READING TYPES

Specimens of Various Type Faces

Garamond - - - Printing has been influenced by few of the many distinct periods through which the arts have come, and even of these few none has had any lasting results, with the exception of the Renaissance period which

Caslon Old Face - - - Printing has been influenced by few of the many distinct periods through which the arts have come, and even of these few none has had any lasting results, with the exception of the Renaissance period which

Baskerville - - - Printing has been influenced by few of the many distinct periods through which the arts have come, and even of these few none has had any lasting results, with the exception of the Renaissance period which

Kennerley - - - Printing has been influenced by few of the many distinct periods through which the arts have come, and even of these few none has had any lasting results, with the exception of the Renaissance period which

Veronese - - - Printing has been influenced by few of the many distinct periods through which the arts have come, and even of these few none has had any lasting results, with the exception of the Renaissance period which

Cheltenham Old Style - - Printing has been influenced by few of the many distinct periods through which the arts have come, and even of these few none has had any lasting results, with the exception of the Renaissance period which led to the general

Bodoni - - - Printing has been influenced by few of the many distinct periods through which the arts have come, and even of these few none has had any lasting results, with the exception of the Renaissance period which led

Times Roman - - - Printing has been influenced by few of the many distinct periods through which the arts have come, and even of these few none has had any lasting results, with the exception of the Renaissance period which led
and the bottom of the tail of a descender are made just a little short of the body margin. Therefore, when we speak of "10 point" we refer to the fact that the body of the type has a vertical measurement of \(\frac{1}{2}"\), and that the measurement from the top of a capital to the bottom of a descender is a slight and undefined amount short of this. This amount is determined and standard for any given style, but may vary from one style to another—an important matter for our consideration.

Comment has often been heard upon the undesirability, and indeed the inadvisability, of including type as small as the average J1 in reading types. In this connection it is interesting to note that standard founts do not go below "5 point" (or sometimes to 4\(\frac{1}{2}\)), and it is suggested that this is small enough for our purpose. If it is considered desirable to include smaller types, this end could be achieved by reduced photographic reproduction.

**Spacing.**—No exception will be taken to the statement that the legibility of any style of printing is largely dependent upon spacing. As defined above, there is a "standard" spacing, so to say, but at any time it might be—and for our present purpose may be—thought desirable to deviate from this standard. If this is desired it is customary to refer to a type-face size "cast on" a body size—both in "point" notation. Thus one would say "9 point type, cast on 11 point body"—it being understood that "9 point type" means the size of type in the style under consideration that would normally appear on a 9 point body, but here cast upon a body which measures vertically \(\frac{1}{2}"\).

For our purpose it would appear desirable not to alter the size of body upon which a given size of type face normally appears.

**Paper.**—Since the glaze of art paper is known to make a considerable difference to the legibility of print, it is further suggested that the test-type be printed on dead-white paper with a matt surface, such as cartridge paper. This could then be pasted on to boards as required for convenience of handling. Alternatively, cartridge boards with a comparable surface could be used for direct printing, subject possibly to approval before distribution. A smooth-finished cartridge paper can be successfully varnished after printing without affecting legibility. This measure is therefore recommended in circumstances where use is likely to be heavy, e.g., in hospital out-patient departments, since cleanness has so marked an effect on legibility.

**Distribution.**—It is necessary to consider in some detail the actual measures to be adopted in the distribution of the new Reading Types when designed, approved, and ready for use. The most obvious method is to have the appropriate types set up and approved,
and to arrange for the loan or hire of those types to any firm who desired the use of them, either from a firm of printers or from the Faculty offices. The objection to this method consists in the difficulty of safely transporting set-up type by post or rail. An alternative would be to have a stereotype or line block made—a practical suggestion since these are easily and safely transported. A third possibility, which appeals on account of its simplicity, would be for the Faculty to commission a firm to set up the types and take off a large number of prints; these could be stored at the Faculty offices and distributed as required at a cost to cover expenses. Possible objections to this method would be that the fixed size of the sheets might interfere with the wishes of some producers of reading types in book form, and also that the actual passages printed would be identical everywhere, reducing uniformity to the level of monotony; it would, however, carry the advantage that the reading types would always be available immediately on demand, which might not be the case if the line block scheme were adopted.

RECOMMENDATIONS

The writer proposes to recommend to the Council of the Faculty that an attempt be made to standardize Reading Types. For this purpose he offers the following suggestions:

(i) that "Times Roman" type-face be adopted;
(ii) that the spacing shall be "standard";
(iv) that near acuity be recorded by the letter S (standard) followed by the number indicating type-face size, e.g., S5, S8, etc.

It is further intended to recommend that the types be printed upon dead-white matt-surface cartridge paper or cartridge boards, which may, if desired, be varnished after printing to increase durability, and that the actual printed types be available for purchase at cost price from the Faculty offices.

Specimens of various sizes of the type suggested are shown overleaf.

It is very much to be hoped that these suggestions, possibly modified by the Council, will be acceptable to all practising ophthalmologists throughout the United Kingdom, and will be adopted, and that all reading types will be altered to conform with this standard. The Council invites comments upon this scheme, and suggested modifications, all of which will be carefully considered: if any major change is adopted, previous notice will be given before the recommendations are published. Any suggestions should be
WE TOO EASILY LOSE SIGHT OF THE FACT that printing was not merely one of the key inventions of the modern technical era, much more significant in every way than the invention of the steam engine, but that at a very early period it set the pattern for the application of the machine to the other arts. Printing was thus the first modern art to introduce uniformity, standardization, and mass production by mechanical means. The aesthetic basis of this art was laid down by the scribes who produced the beautiful manuscripts of the period that antedated the printing press because of the high standard of beauty that the hand and eye had achieved here.

WE TOO EASILY LOSE SIGHT OF THE FACT that printing was not merely one of the key inventions of the modern technical era, much more significant in every way than the invention of the steam engine, but that at a very early period it set the pattern for the application of the machine to the other arts. Printing was the first modern art to introduce uniformity, standardization, and mass production by mechanical means, but the aesthetic basis of this art was laid down by the scribes who produced the beautiful manuscripts of the period.

Having arrived at our principle we must proceed to explain that any movement of the object will of course

His family has farmed the land

His family has farmed the land

His family has farmed the land
forwarded without delay to the Faculty at 45, Lincoln's Inn Fields, W.C.2. Otherwise approval will be assumed.

SUMMARY

(1) It is suggested that Reading Types be standardized.

(2) The origin of the Reading Types at present in use is outlined; the present position is described, and the reasons for standardization submitted.

(3) The desiderata for Reading Types are described and examples are given of the suggested standards of size and legibility (opposite).

(4) The suggestions it is proposed to make to the Council of the Faculty are recorded, and a request made for modifications to these suggestions to be submitted to the Council for consideration before their final recommendation is made.

The writer wishes to record his grateful thanks to Messrs. Clement Clarke, Curry and Paxton, Dixey, Hamblin, Jordan Gaskell, Keeler, and Weiss for their co-operation.