EYE-MOVEMENTS IN READING MUSIC

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ABSTRACT

So far as it has been possible to ascertain, there have been very few experiments made of the photographing of eye-movements in reading music. In fact, only two such studies have been found, one by a student at Leland Stanford University, and the author's own study at the University of Chicago. Since having made this particular study, however, the author has completed four other experiments in music-reading, one of reading rhythm; another of pitch; a third of reading vocal music; and a fourth, a combination of reading problems. The results of these five studies indicate the reading habits of the immature, average, and the mature readers and the development necessary for the immature reader for improvement and progress.

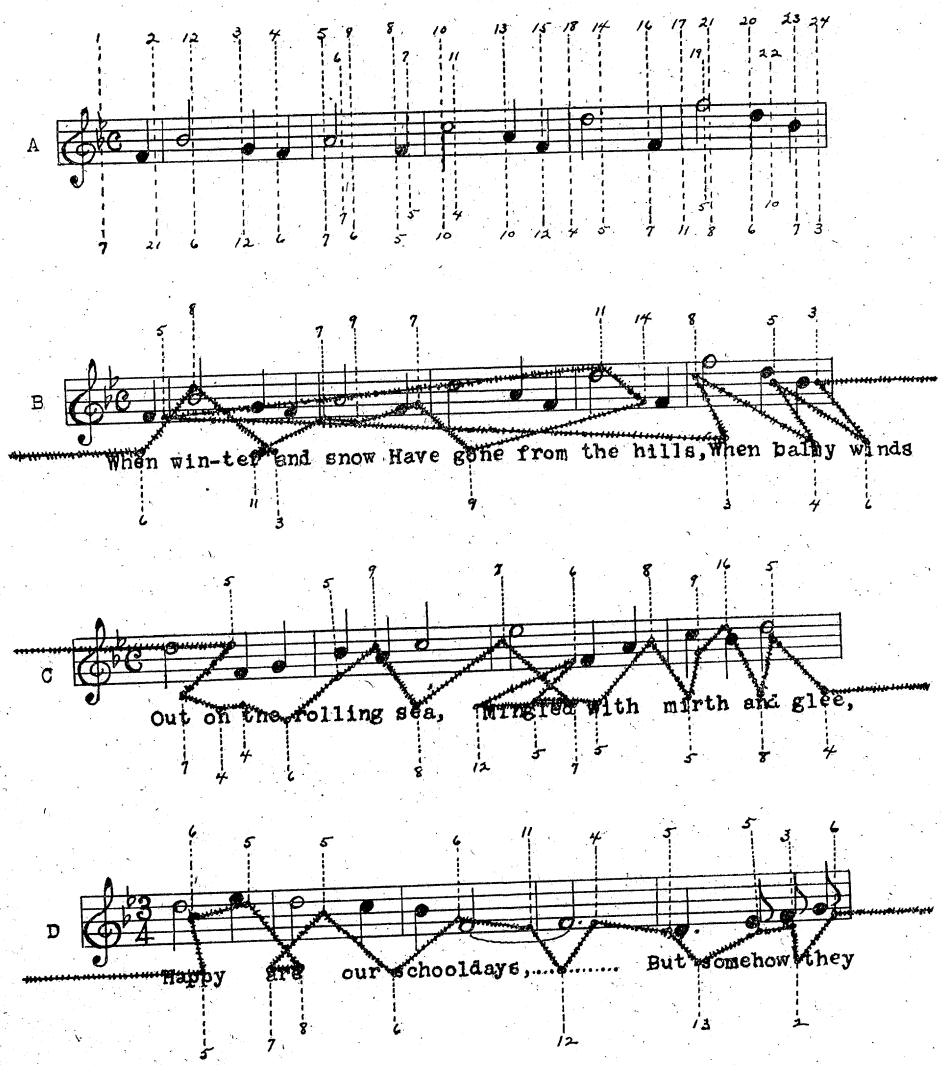
In describing how the eyes move while reading music, reference was made to the number of pauses made in reading a line or selection, and also to the length of these pauses (in 25ths of a second) or average length of pauses. Naturally, less time is required by the reader who can reduce the number of pauses or the length of pauses, or both. Also, regressive or backward movements of the eyes retard reading and indicate confusion in reading. The mature readers will therefore have fewer pauses, of short duration or length, few or no regressive movements, and the quality of reading will be indicated by few or no errors in reading. Both vocal and instrumental music were read by the subjects.

Chart I (not shown here) merely indicated the manner of recording the vertical and horizontal movements from the films, how they were synchronized, and how these results were transferred to the musical score. This selection consisted of instrumental material of whole notes.

Chart II (not shown here) indicated the eye-performance span (distance the eye preceded performance) for both mature and immature readers, and for one- and two-part selections. An attempt was made also, as shown in Chart II, to determine the width or extent of the span of recognition.

Four examples of reading shown in Chart III (fig. 1 of this article) are by the same subject, a mature adult reader. Example A shows the reading of the Latin syllables (do, re, mi). In this entire selection there were 40 notes, the reading of which required 27.68 seconds of time; 68 pauses; and in which two errors were made. In Example B, the same selection was again sung, but with the words, and the results were as follows: time, 15.84 seconds; 53 pauses; and no errors.

In the reading of Example C, the words were sung directly (excluding the Latin syllables first) and requirements for reading the selection of 38 notes were as follows: time, 16.92 seconds; 59 pauses; and no errors. Examples A and C contain almost the same rhythm, the same pitch intervals, and hence they can be



considered to be of the approximate same difficulty.

In the reading shown in Example D, the subject was permitted to read the printed words prior to performance of the singing. This selection contained 37 notes, the time required for reading was 14 seconds, with 52 pauses and no errors.

In general, all of the subjects tended to make nearly the same number of errors, when reading the words directly, and to require no more time or even less, with no more pauses, *than* when the Latin syllables had been sung prior to singing the words, as is the practice in school music to-day. Although fourth grade subjects were the youngest included in this experiment, it can be concluded that the Latin syllables, or some other form of pitch association, can be discarded, and need not serve as a crutch throughout the elementary school period; also, that it is a good plan to read the printed words prior to singing, as this reduces the number of errors as well as the amount of time required for reading. When the words were read prior to the singing, it is interesting to observe that less than one-third of the total time required for reading was given to the

words and two-thirds to the notation, whereas otherwise it was about one-half of the time to each.

Chart IV illustrated the eye-movements of an immature and a mature reader in performing part of a four-part instrumental selection. Chart V also showed the type of reading of the mature and immature readers, for instrumental scale runs and arpeggios.

The conclusions drawn from the experiment can be summarized briefly. The number and length of the pauses, and the number of errors and regressive movements in reading, indicates the ability of the subject, and the aim for improved reading habits should be to read by phases or groups of notes and not to continue to read note-wise as beginners must necessarily do. The presentation and arrangement of the reading material is extremely important, a fact often overlooked in school music materials. Recognition and familiarity with the staff degrees, and with the instrumental keyboard or with pitch relationship in vocal performance are essential for improved reading. A good reader should also have a very fast reaction time since reading involves not only quick recognition but also quick response.