Notes on the Digital Schubert Lieder Edition

Why?

The Digital Schubert Lieder Edition began with the idea of having a readily transposable edition of Schubert's Lieder that would be inexpensive. As a voice teacher and singer, I was always transposing songs for my students and myself into more optimal keys than were available in print. Indeed, until recently, less than half of Schubert's songs were available in more than one key. The latest Bärenreiter edition is solving that problem, but only eight or nine of the thirteen proposed volumes are currently available in three voice-ranges each. When complete, it will be a significant purchase. Additionally, the newest edition is under copyright and can't be copied legally for student use. The majority of teachers will probably stick with the standard volumes, most of which are available as scans on IMSLP, or use the collections of scans available from CD Sheet Music. (I used the latter heavily in my teaching -- what a bargain!) However, the scans available vary in quality quite a bit. CD Sheet Music's scans are probably the best curated, but it's not easy to scan music perfectly straightly. Many scans are angled or have been straightened by software, resulting in slightly wavy staff lines and other blurring of characters. In addition, CD Sheet Music's scans are at 300 dpi, the standard resolution of printers at the time those scans were made. The current crop of computer printers have adopted 600 dpi for their standard resolution and can often manage twice that.

Ideally, a set of digital files of the songs would make them easy to transpose and would solve the quality issues associated with scans. Printouts could be done at whatever resolution a printer could handle, and no manipulation of the image would be necessary. Why not convert the songs to a digital medium just as Project Gutenberg has been doing for reams of great literature in the public domain? Optical Character Recogition software, (OCR), has made the conversion of literature to a digital medium straightforward, and you can now get a Kindle edition of the complete works of many of the greatest writers for a few dollars!

A Short History of OMR and Computer Formats for Music

The musical equivalent of OCR software, Optical Music Recognition software, began to appear in the 1990s. The initial software had a lot of issues to overcome. The recognition process for music is considerably more complex, since music notation is a combination of text and a variety of graphical symbols. Additionally, there was no standard electronic format for music notation as there was for text. In the 90's, there were many competing software packages for music notation, most of them slow and cumbersome to use, each with their own electronic file format. The only universally supported format was MIDI, the format developed for sending performance information to an electronic instrument via computer. Early OMR software focused on MIDI, but the need for a standard notation format became obvious. A consortium of software developers designed a new format, Note Interchange File Format, that was meant to be a universal format for notation. NIFF was implemented by many software companies, but support

for it was dropped by Finale, the notation software that won the largest following in the United States. Overall, support for NIFF gradually waned. A second attempt at a universal notation format was made by Michael Good using Extensible Markup Language, or XML. XML is similar to the format used to develop web pages in that it is a text format--you can open an xml file in a word processor and actually read it. Currently, Good's MusicXML format is the closest thing to a universal notation format we have, however its support by notation software is wildly uneven. The standard OMR packages available today only export minimal information via MusicXML, basically pitch and rhythm, with some support for text. Instead, today's OMR packages have aligned themselves with particular pieces of notation software. E.g. Photoscore exports more information to Sibelius in Sibelius' own format than it does to the universal format, MusicXML. The current software situation is still poor for the wholesale conversion of public domain music into a universal computer format. That is why almost all public domain music sites have files that are basically scans in pdf format. The ratio of pdf to MusicXML files available on the web or commercially is overwhelming, easily 1000 to 1, and probably much higher. As a universal format, MusicXml simply hasn't taken hold. It remains a niche format for the exchange of minimal information between different pieces of notation software.

The Software used for this edition

As the current state of software was not ideal for this project, I chose instead to use and write my own software. I began the development of my own notation program back in the 1980's, when commercially available software like Finale took 20 minutes to print one page. I needed something much faster. I have continuously developed it for over thirty years and used it extensively in my teaching and composition. For years I called it *Proscore*, but I now use the name *Prima Voce*, since it was developed for choral composition and for the transposition of art songs. My own OMR software is a retirement project begun in 2020. It is based on *Liszt*, one of the best OMR engines ever developed. *Liszt* was written by Dr. Graham Jones and was used in Jones' *SharpEye* music scanning software in the early 2000's. It remains in use by *Photoscore* today. Dr. Jones documented his work carefully and made *Liszt* available for licensed use. From its documentation, it was clear that *Liszt* produced a very accurate description of a page of music, considerably more accurate than the information that *SharpEye* was exporting in MusicXml. I designed a new front end for *Liszt* and wrote an import for *Liszt's* file format into my own notation software. This edition was begun in part to test and improve that new software, which I call *SE Plus*. *Plus* was inspired by Jones' *SharpEye*, hence SE, but goes beyond the information *SharpEye* exported. *Plus* supports all the information that Liszt can produce, and the editing interface is fast, thorough, and mnemonic. With the combination of *Plus* and *Prima Voce*, I can get a reasonably accurate, objective portrayal of a scan, one that requires only minimal editing beyond the initial correcting of the mistakes in *Liszt's* conversion. I was able to make the conversion of all the Schubert lieder in under a year. I know that sounds like a long time, but that's a lot of complex music, and six months of that work was concentrated heavily on software improvement. At 67, I can only stare at a computer screen for 2-5 hours a day before my eyes give out, so it wasn't full-time development.

In addition to my own software, I used Scansoft's *Paperport* for most of the image processing I needed, and a fine German word-processor, *Papyrus* (by ROM), for the multi-columned verses in many of the songs. *Papyrus* also has database features that were used to generate the various indices needed for the final package. Linkage of the scores and the indices was done with Adobe *Acrobat*. That is an extremely tedious process, and I used AutoHotKey, a macro scripting tool for MS Windows, to make it bearable.

Sources for this edition

The majority of the songs in this digital edition are based on the Peters, *Schubert Lieder* edition published in seven volumes. This is the primary performing edition of Schubert's lieder and the one I acquired gradually in my student days. In the United States, the International edition of *200 Schubert Songs* is quite popular, but it basically reprints from the Peters edition. The Peters edition was printed on paper slightly smaller than 8.5 x 11. That makes it congenial for adapting to a digital version that will normally be printed on standard US-letter-sized paper. The normal staff size of *Prima Voce* is close to the normal size used in the Peters, since I used Peters and the gold Schirmer editions as models when I developed the software. The Peters edition is not complete, however, and I have based the remainder of the songs on the 19th-century, Breitkopf & Härtel edition of Schubert's complete works. The format of that edition is larger than standard US-letter size.

Principles for the layout of the Digital Edition

Many modern editions since the era of computer notation software have adopted a rather spacious layout. A good example for comparison would be the original Schirmer collection of songs by Samuel Barber with its more recent edition. The size of the staff/notes in the new edition is noticeably smaller, yet the staves of a full page in the new edition take up even more space vertically than the original. The amount of blank space is considerably larger. When I was teaching, I would constantly find myself putting the new edition aside to play instead from the original. The combination of a smaller staff and more space is not congenial to the eye, particularly as you age. In general, a reasonably dense score is easier to play from. In making the DSL edition, I have attempted to retain the density of the original editions. The vertical spacing of the three staves is based on the original. Generally, the Peters edition places the lyrics as close to the melody as possible, even allowing notes and text to intersect at times. Where feasible, I have moved the text a bit further away from the notes or shortened their stems to prevent intersections. The spacing of notes in the horizontal direction in this edition is slightly larger because of the way lyrics are done in OMR software and imported into notation software. Lyrics are broken down into syllables that are identified as beginning, middle, end, or single. As it is not possible to exactly duplicate the fonts used for music and text from the original editions, this convention allows the notation software to keep the proper relationship between the melody and the syllables of the lyrics. *Prima Voce* inserts a dash between syllables in a multi-syllabic word. The Peters edition only does that when the melody notes are sufficiently far apart to

warrant it, and often words are in extremely close proximity with no dashes at all. While *Prima Voce* could duplicate that spacing, it would require editing every text line in a Schubert song manually and would easily double or triple the amount of time necessary to convert a song. Nor could songs organized that way be readily transposed without completely redoing all the lyrics. In some songs, particularly those based on the larger-format Breitkopf & Härtel edition, I have edited some lyrics manually to make a system fit within the space of US-letter-sized paper, but only as a last resort.

In general, The DSL edition is faithful to the number of measures per system of the originals and to the number of systems per page. There are departures, however. The DSL edition uses a consistent staff/font size. Some of the songs in the Peters edition are scaled to a smaller staff. I have chosen not to scale those songs, and as a result, they may have fewer systems per page than the original. In a few songs I have had to flow measures around the systems to make things fit optimally, but that was not done often. The Peters edition also has some half-pages where a new song begins mid-page. In the DSL edition, all songs are a separate entity. Schubert's name is on every song. (I can't tell you how many times a student credited a song as being composed by the poet during voice juries, since the poet's was the only name on the page.) If space permitted, I have often given the full name of the poet, or at least some initials in lieu of just a last name. (American students generally know few or no German poets.) In the song cycles, I have kept the page numbering for individual songs, not for the entire cycle. My thinking is that individual songs from a cycle might be given to a student more often than the entire cycle. Someone performing an entire cycle would probably be best off with a traditionally published score, however it would be simple to renumber the pages of the cycles if there was a demand for that. I have not included opus numbers on the songs, as performers almost never identify Schubert's lieder by their opus number. In songs with duplicate titles or poems that Schubert set multiple times, I have included the D number from Otto Erich Deutsch's catalog of Schubert's works to help the user distinguish the songs.

While one of the goals of this edition was to make the songs easy to transpose, I have decided to distribute them as pdf files, which unfortunately are not transposable. MusicXml versions would not likely produce good results and would require the user to own pricey software that supports them. Currently, I don't have immediate plans to publish *Prima Voce*, so the native format for this edition isn't a possibility either. Pdf files allow for universal access across multiple computer platforms using Adobe's free *Acrobat Reader*. The pdfs of the DSL edition are 600-dpi image printouts and should be printable to a US-letter page from Adobe *Reader* without scaling. (It is conceivable that some printers might require slight scaling if their non-printable margins are excessive). The DSLE exists in two versions. The first version features the songs in their original keys. The second version includes the original keys and a thorough set of transpositions of all the songs. Until Bärenreiter completes its new Schubert Lieder edition, the DSLE is the only edition to contain a complete set of transpostions, with most songs available in three keys.

Flaws and Limitations, Errors and Advantages

The DSL edition does not represent significant new Schubertian scholarship. It is based on the two standard, public-domain editions. Where it seemed to me that there were minor errors in the original editions, I corrected them. In turn, this edition is certain to have errors. Each song has been proofed several times, but mistakes are inevitable. My software is designed to catch rhythmic errors and can play the score, which helps with pitch errors. The OMR engine (*Liszt*) will sometimes omit dynamics or notes, and those omissions are easy to overlook.

You may notice some flaws in phrase markings. *Liszt* recognizes phrase marks as arcs (part of a circle). Modern notation software uses bezier curves for phrasing, and Prima Voce converts arcs to bezier curves when it imports from SE Plus. The conversion of smaller arcs is not always perfect. I have corrected flawed phrasing manually, but chances are I missed some "funky" phrase marks. In addition, a few phrases in the original editions are composite shapes that Prima Voce cannot currently duplicate. I've had to improvise with those curves. Another occasional issue is the placement of phrases above beams. They are dependent on the beam being accurately angled at the correct height. I designed *Prima Voce* to limit the angle of the beam based on "good" notational practice, however Peters will sometimes exceed that angle slightly. Such beams often import with a larger height than they should. They don't look particularly good and negatively impact phrasing. Again, I have made corrections manually, but some could remain.

Because the Peters edition is dense, dynamic markings in it frequently intersect the extension of the bar lines through the grand staff. In the engravings, the extensions are sometimes, but not always, broken to avoid intersecting dynamics. *Prima Voce* cannot currently break the extensions and there are some intersections not found in the original editions. Peters frequently uses opaque beams as well (meaning the lines of the staff don't show through the spaces between beams). This allows them to be more flexible with the placement of level beams. Breitkopf and Härtel does not do this, and currently *Prima Voce* does not support it. I have tried to adjust any level beams that center a staff line in the space between beams.

Prima Voce uses underscores to generate lyric extensions. This allows me great flexibility in shifting the vertical position of lyrics when transposing, but can generate slightly ragged extensions in multiple-versed scores where extensions occur at the same spot in different verses. It's a visual flaw, although a mild one.

Finally, the original editions were engraved by gifted craftsmen who lived in an era when complex music was in high demand by the general public, particularly music for the piano. That era is past. Modern editions are made on a computer. Much of the positioning is by computer algorithm. The results are rarely as good as what an artist can achieve by directly placing every element of the score. I have done my best to make the DSL edition "near typeset quality." I

believe it is highly legible, but it's not as good as the original editions. It does have, however, all the advantages of modern electronic editions. It can be distributed instantly, and transpositions are relatively easy to make. It never degrades, and is far less expensive. The entire collection of Schubert's songs fits easily on a one-inch device that you can carry in your pocket. (I still find that astounding.) You can print as many copies as you need. Best of all, the DSL edition is not static. Errors in engraved or printed editions are rarely corrected. If users will forward errors they have noticed to me, I can correct them and reissue a song quickly.

Midi Files

Another advantage of an electronic edition is that software can generate the information needed for rudimentary playback of the score through MIDI. With some trepidation, I have included midi files for all the songs in the DSL edition. I say "with trepidation" because midi files generated by a computer are horrifically unmusical. Some software goes to great lengths to make midi renderings more "human", but the only way that is truly possible is for the composer/player to take direct control of all the musical elements, usually in conjunction with high-quality electronic synthesizers connected to a computer. As a professional musician in the classical tradition, I have little interest in trying to make a computer sound musical. To me, the computer is a tool to help humans make music. Further, the midi implementation found on all modern computers is rudimentary. The synthesized sounds are poor, and the usable dynamic range is limited. That said, there is still that fascination with clicking a button and having the score play itself, so I have included midi files. Don't expect much. I have gone through and set tempi that I think are reasonable, but that's all. Dynamics are static, and fermati are not observed. Few ornaments are rendered, and no repeats are observed. Some of Schubert's longer dramatic songs are especially problematic. A recitativo fantasy like "Loda's Gespenst" really requires setting a tempo change every few bars. I have done a few but certainly not all. Nearly all the files are rendered with the acoustic grand piano sound. I found that the most tolerable. Amazingly, despite their many awful qualities, the midi renderings cannot obscure Schubert's gift. If you listen with imagination, you can get a taste of the song, even if it's a bit soured.

Acknowledgments

There were a number of online sources that were invaluable in making this edition. IMSLP was a good source for scans of the Breitkopf & Härtel edition. The LiederNet archive was an excellent site to confirm blurred lyrics and the actual poet of a song, some of whom weren't credited in the public domain editions. I used the CD Sheet Music - *Schubert: The Songs* as a model for the organization of this edition. I felt it was, by far, the easiest to use of their various lieder collections. It also simplified the proof-reading process. I also want to credit AMD for their amazing Ryzen computer processors. If you're not a computer nerd, you may not realize that AMD's Ryzen out-paced Intel's processors over the last few years and brought real competition and innovation back to the forefront in personal computing. Now a $750 laptop can compile thousands of lines of code in seconds, and do heavy video/graphic processing that a top-of-the line desktop would have struggled with just a few years ago.

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Addendum
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After a lengthy final proofread of the entire edition, I added a small appendix to the table of contents page and the complete key list page. The appendix contains the first versions to a few of the songs and an additional song that I discovered after a deep dive into the Deutsch catalog. I would have preferred to incorporate those songs into the lists, but Adobe Acrobat is surprisingly clumsy at editing what started as a simple tabbed list in a word processor. Its "creative" groupings of the list made a simple insertion impossible. Having no desire to relink hundreds of songs, I resorted to an Appendix.