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# Piano Technique and Fingering in the Eighteenth and Nineteenth Centuries: Bringing a Forgotten Method Back to Life

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*We develop a creative method for teaching and learning piano technique which motivates students to devote more time and energy to technical exercises. First, we describe the approach to technical exercises of pianists and piano students of the eighteenth and nineteenth centuries. Second, we address a central feature of technical practice from earlier periods: fingering rules and systems. Third, we discuss whether and how older methods might be reintroduced to contemporary piano pedagogy and practice.*

## Introduction

It is commonplace for modern piano teachers to complain that their students lack the motivation to do technical exercises. You can almost take it for granted that a student will be uninspired by the exercises of Hanon (1898) or Cortot (1928). Some teachers manage to minimise the problem by encouragement, discipline, or a combination of both. But the problem seldom disappears entirely.

The systematic, guided acquisition of pianistic skills has always involved technical exercises. But approaches to technical exercises changed radically during the nineteenth century (Gellrich 1992, 1993). A number of historical sources (referred to in some detail below) suggest that pianists and piano students in the eighteenth and early nineteenth centuries embraced technical exercises with much more enthusiasm than do their modern counterparts. Perhaps the clearest evidence for this is the amount of time that pianists devoted to technical exercises: before 1850, reports of five or six hours a day were not uncommon (Gellrich 1992: 24f), whereas today it would be unusual to find a piano student or professional pianist spending as much as one hour in a day on technical exercises.

The ultimate purpose of this paper is to suggest what modern piano teachers might do to rekindle their students' motivation to study technique, on the basis of what we can learn from the past. First, we will survey the various methods used by piano students in the eighteenth and nineteenth centuries to improve their technique. Second, we will look in some detail at a central feature of traditional technical methods: piano fingering. Third, we will discuss whether and how older methods of teaching and learning could impact on contemporary approaches to piano teaching and performance. Finally, we will report on some practical experiences made by the first author, who – in his work as a piano teacher and as a trainer of piano teachers – is attempting to bring some of the old methods back to life.

## Variations and studies

Before 1850, the art of piano performance could be characterised as a creative art. Pianists routinely learned not only to interpret but also to improvise and compose at the piano. During the second part of the nineteenth century, piano performance in the Western art–music tradition was gradually transformed into a reproductive art that has been based almost exclusively on interpretation. From about 1850, pianists focused less on improvising and composing, and increasingly devoted themselves to the interpretation of existing musical works.

As the art of piano performance was transformed from a creative to a reproductive art, the function of technical exercises gradually changed from one of helping the pianist to become an all-round musician – able to improvise, compose and interpret – to one of sharpening the technical skills of a more specialist musician who was primarily interested in interpretation, and perhaps could not compose or improvise at all.

Consider, for example, the practising of scales and arpeggios. Ever since the invention of the piano, these have always been a staple component of the pianist's repertoire of technical exercises. Before about 1850, the performance of scales and arpeggios was regarded primarily as a means of learning the common vocabulary of musical language. In other words, their function was primarily music–theoretical. As pianism gradually became more focused on interpretation, the music–theoretical function of scales and arpeggios was neglected and pianists increasingly came to regard them as they do today – as a means of improving and perfecting technical skills.

Of course, pianists have always interpreted written-out pieces of music, and have practised those pieces with the primary aim of interpretation in mind. And for this purpose they have always isolated specific passages from the score for practice purposes. What changed around 1850 was the way in which these isolated passages were approached during practice. When modern pianists extract difficult passages from a piece and practise them, the purpose is primarily technical: they gain mastery of a passage simply by repeating it, probably at various speeds. Before 1850, passages that were isolated from pieces of music for special attention were not necessarily technically difficult, and were used to practice a wider range of musical skills, including sight-reading, improvisation and composition, in ways that we will shortly describe in some detail. This approach guaranteed the maintenance of a direct link between technical exercises and other aspects of piano practice and general musicianship.

The relative unimportance before 1850 of 'piano technique' – in the modern sense, considered separately from other pianistic and musical skills – is reflected by the remarkable absence of the term 'technical exercise' (or its German equivalent, *technische Übung*) in most writings on piano performance published before 1850 (an isolated exception: Rameau, 1731). In German-speaking countries, a different term was used: *Passagenübung* – literally, 'passage exercise'; this term is rendered somewhat freely in the remainder of this article as 'passage work'. The term 'technical exercise' did not emerge until the art of playing piano had changed from a creative to a reproductive art.

Until about 1850, passage work had a central position in the daily work of a pianist. Piano students typically devoted between a third and a half of their practice time to it (Hünten, 1832: 22; Czerny, 1839, vol. II: 136). This suggests that they often worked on passages and studies for three to six hours a day. The central position of passage work in piano practising is illustrated in Figure 1.

Passage work was intimately connected to the improvisation and composition of

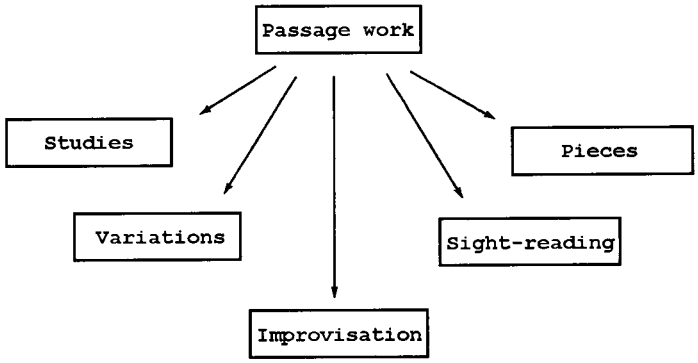


Fig. 1. The various aspects of pre-1850 piano practice, and the relationships between them.

variations and studies. The function of playing variations was to situate technical exercises within realistic musical contexts (Gellrich, 1992: 72f; 1995). The basis for variation was often a chord progression of eight bars' duration. This was held constant while other musical parameters such as melody, rhythm, texture, tempo and mode (major or minor) were varied. A famous example is Beethoven's *Variations in C Minor* (WoO 80). In the course of 32 variations over an eight-bar theme, Beethoven covered almost his whole repertoire of physical and expressive techniques. The piece seems to be no more than a notated collection of Beethoven's own improvisations during his daily passage work – evidence that passage work was practised not only by beginners but also by advanced musicians (Schumann, 1948: 28; Gellrich, 1992: 38f; other evidence for this point includes Beethoven's and Brahms' own finger exercises, and Clara Schumann's practice of *Passagenphantasie*, see below). The piece also vividly demonstrates our point that, in the early nineteenth century, technical practice had not yet become separate from more general musical skills.

Improvisations were not always variations on an eight-bar theme. Another way of developing an isolated musical passage was to use the passage as a seed for the generation of a longer piece of music. J. S. Bach's *Two-Part Inventions* are typical examples. The starting point for their composition was an *inventio* which, according to Forkel (1802/1925: 93), was a musical thought from which a piece of music could be developed by imitation and transposition of the voices. In his piano method, Couperin (1717/1933: 19f) gave examples of how 2-, 4- and 8-bar passage's can be expanded to create an extended bass line (Fig. 2).

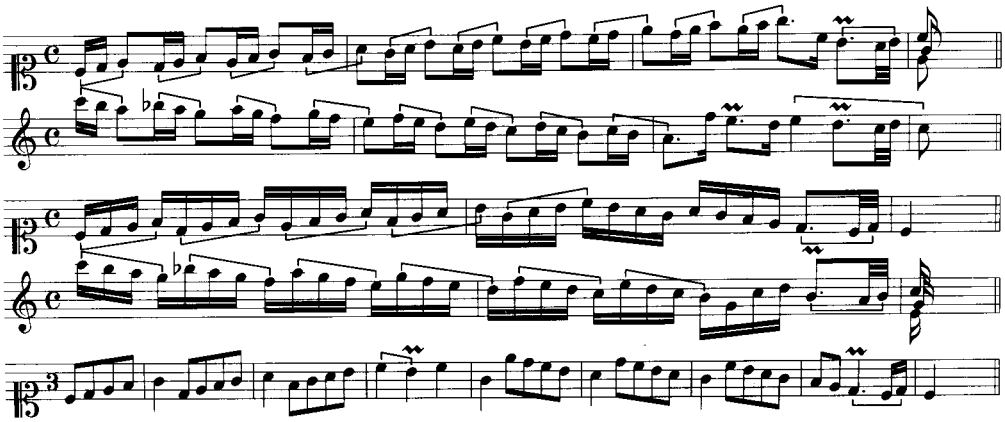

Fig. 2a. Progressions of thirds, fourths, fifths and sixths (Couperin, 1717/1933: 17).

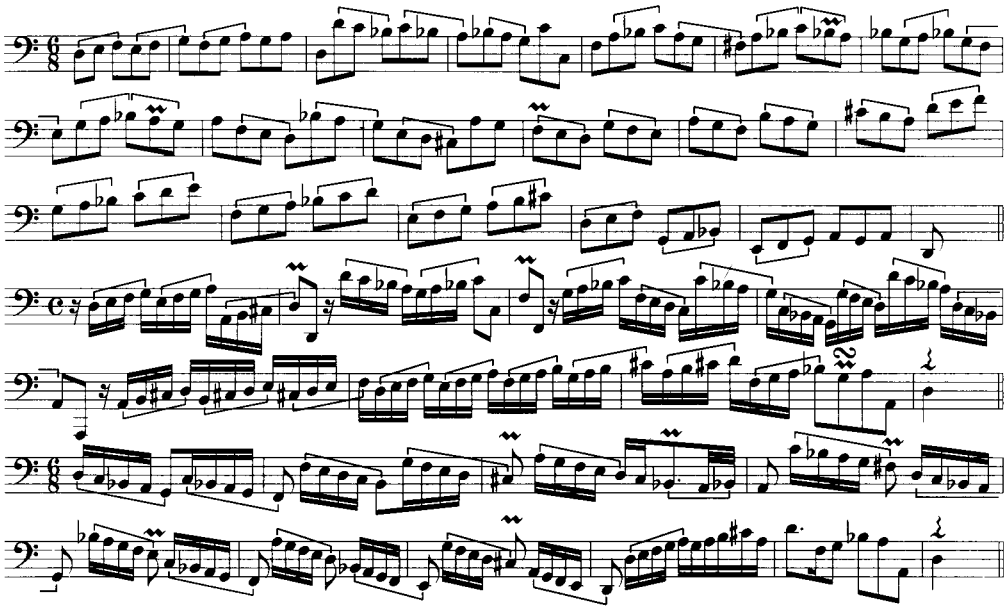

Fig. 2b. Bass lines invented on the basis of the exercises in Fig. 2a (Couperin, 1717/1933: 21).

In the compositions of J. S. Bach, technical difficulties had been limited – at least, from a nineteenth century perspective – and did not increase much during the course of a piece. Pieces like Couperin's eight-bar passages may be regarded as the forerunners of what later became known as studies, replacing previous terms such as *Übungsstücke* (Gellrich, 1993: 91). The virtuosos of the nineteenth century pushed technical difficulties to, and even beyond, human limits. The practice of writing and practising studies was one of the techniques that made this possible. The purpose of inventing a study was to develop or improve a specific musical skill, and thereby to overcome a particular technical difficulty (Schumann, 1871, vol. I: 201). Studies normally grew out of improvisations. A musical idea was repeated and transposed, changed a little, and then made more difficult. After practising for a while, a pianist–composer would write down the improvisations in the form of a study. In this sense, the study may be regarded as a compact record of living performance practice. The fashion of inventing variations and studies was one of the main forces behind the rapid expansion in the musical arts during the nineteenth century.

A third opportunity to incorporate a learned passage in a musical context was the *freie Fantasie*. Until about 1850, free improvisation was one of the most important means by which pianists developed virtuosity (Hand 1837/1841, vol. II: 301). Czerny (cited in Molsen 1982: 63) reported that Beethoven's free improvisations contained passages that were technically more difficult than anything in his compositions. The practice of using free improvisation as a vehicle for developing virtuosity is reflected in the notated free improvisations of Mozart, Beethoven, Chopin, Schumann, and so on.

## Inventing exercises

Young pianists did not begin their careers by performing written compositions. A musician's apprenticeship started with the performance of exercises: scales, broken chords, arpeggios and various forms of ornaments. Until about 1850 it was common

for teachers and students to invent their own exercises, dealing with a wide range of technical and musical problems. Couperin (1717), for example, presented a few examples of exercises which were intended as guidelines for students to use in composing their own passage work (12).

Very few books of exercises were published in the eighteenth century. In the nineteenth century, the trickle gradually became a flood, and during the second half of the century, it was already normal for pianists to play exercises from printed scores. But until about 1870 a significant number of pianists adhered to the traditional method of inventing exercises. These included not only masters such as Beethoven, Schumann and Liszt but also ordinary instrumental teachers who still believed that students should invent their own exercises, on the basis of short passages (Boissier 1827/1930: 95; Schumann, 1832: 2; Breslaur, 1871).

Many of the famous virtuosos spent their whole lives inventing new exercises. Clara Schumann's daughter Marie wrote that her mother regularly spent three hours a day improvising passages and exercises. When she asked her mother to write down her daily technical exercises, Clara Schumann answered that she could not – her passage work and exercises changed from day to day, depending on which aspect of her technique she wished to work on (Schumann 1948: 28).

Why was the old method of invented and improvised exercises replaced by the new method of reproducing exercises from printed scores? One reason was the invention of the lithograph and the high speed printing machine (Senefelder, 1818). In about 1830, it became possible to print scores cheaply and in large quantities (Ballstedt and Widmeyer 1989: 104). Another reason was that the musical and technical vocabulary of pianists expanded immensely during the nineteenth century – so much so that it became difficult for individual pianists to remember it all. The oral tradition was broken, and the only way of keeping systematic records of all the new technical devices was to publish them in the form of piano methods (Gellrich, 1992: 45f).

The case of Hummel's (1828) pianoforte-method is a good example of what was happening to piano pedagogy around 1830. Hummel had been a pupil of Mozart, and improvised exercises throughout his career. When he was 50, he wrote down these improvisations and published them. His method is a clear illustration of the problematic consequences of printing piano exercises. For Hummel, it was presumably quite fun and exciting to invent 2200 exercises. But for the students who used Hummel's method, the exercises were difficult to perform, and to play these exercises 'second hand' from printed scores was downright boring.

## Technical exercises in music and sport

Technical exercises in music have always had interesting parallels with the technical exercises in sport. There have always been connections between the way pianists do technical exercises and, for example, the way gymnasts or figure skaters train. Today, figure skaters spend long hours every day practising specific technical elements such as complicated jumps or combinations of steps. They aim to master new difficulties, and to present them at the next competition. Pianists before 1850 worked similarly diligently to invent and master new virtuosic figures. Once a new figure had been invented, other pianists immediately tried to master it. The publication of books of exercises made this process easier. For this reason, books of technical exercises increased considerably in size and number during the first decades of the nineteenth century.

The relationship between music and sport is also clear from the way in which

studies were invented. Take, for example, the studies of Franz Liszt. He composed the first version of his *Studies* op. 1 in 1826. Today, they are considered to be only moderately difficult. During his life he gradually developed these pieces into veritable pieces of witchcraft. The 24 *grandes Etudes* of 1838 were partly based on the same studies as the original set, but these studies were much harder and longer. Variants of the same studies can also be found in the *Etudes d'execution transcendante* published in 1851.

The relationship with sport is also implicit in exercises to increase strength and agility of the fingers. In the nineteenth century some pianists used machines for this purpose. They also began to do exercises to increase the span between the fingers, going so far as to put corks between the fingers – a practice apparently adopted by Chopin (Mikuli 1880: 3), who left the corks there overnight. Such practices are reminiscent of ways in which people train in modern body-building studios.

Late nineteenth-century pianists developed effective new methods for practising repetitive or technically demanding passages. First of all, the number of repetitions that might typically be performed by a pianist increased dramatically – between 30 and 100 repetitions of difficult passages were commonplace (Kontski, 1851: 2; Breslaur, 1889: 105). These almost endless repetitions were rather boring, of course, so some pianists – including Kalkbrenner, Liszt, Herz and Clara Schumann – read books at the same time (Boissier, 1832: 28; E. Schumann, 1948: 29; Eigeldinger, 1986: 146). A similar strategy was adopted by Glenn Gould, who practised with two radios loudly playing (different) music, or with a loud vacuum cleaner next to the piano (Page, 1987).

Methods such as these can be remarkably effective. If a pianist can play a passage while reading a book, he or she can be sure that the passage will run automatically without conscious control during a concert, freeing him or her to attend to interpretation. The associated fingering pattern may often then be applied to a range of musical passages.

## Fingering systems of the eighteenth and nineteenth centuries

Pianistic exercises and passage work in the eighteenth and nineteenth century had several goals. They included the development of agility and strength of the fingers and hand; speed and accuracy; and what we now call aural skills and music-theoretic knowledge.

Another equally important goal of these exercises was to practise fingering patterns. By doing technical exercises, pianists acquired a procedural knowledge of a wide range of fingering formulae. These could then be applied more or less automatically whenever the corresponding note patterns occurred in improvisation, sight-reading, and rehearsed or memorised performance – without further practice. Perhaps this is why fingerings are so seldom printed in scores from the eighteenth and nineteenth centuries; it was taken for granted that, through passage work, pianists had independently acquired a good working knowledge of fingering rules and procedures.

Pianists who developed and published comprehensive fingering systems included C. P. E. Bach (1753/1762), Türk (1789/1962), Adam (1802), Müller (1804), Hummel (1828), Czerny (1839, vol. 2), Köhler (1861), Kullak (1876) and Werkenthin (1889). We use the term 'fingering system' to emphasise that the fingering rules in these various treatises were intended to fit together and complemented one another. Each of these pianists created a system of rules, and provided numerous examples of their application. Naturally, each was well acquainted with the methods

of his older colleagues; Czerny, for example, extensively studied the fingering systems of C. P. E. Bach, Müller and Hummel, before developing his own.

In the following, we give an overview of the historical development of fingering systems by looking at the details of five of the most important: one from the eighteenth century (C. P. E. Bach), two from the first half of the nineteenth century (Czerny, Chopin), and two from the second half of the nineteenth century (Kullak, Werkenthin).

## C. P. E. Bach

Until about 1750, fingering rules had the status of trade secrets. They were passed down by word of mouth from master to student. Only in the latter part of the eighteenth century did some pianists begin to write down and publish rules of fingering. In the foreword to his *Versuch über die wahre Art, das Clavier zu spielen*, Carl Philipp Emanuel Bach (1753) said that he 'wanted to open the secrets of the craft to the public'.

In C. P. E. Bach's fingering system the number of passages is limited, reflecting the relatively limited musical vocabulary of pianists in the eighteenth century. As that vocabulary expanded during the nineteenth century, so too did the number of fingering patterns and rules that pianists needed to have at their fingertips.

The so-called rules of the craft were not intended to be strictly adhered to, but were actually flexible rules of thumb. For example, C. P. E. Bach listed three different fingerings for the C major scale (Fig. 3). He then showed how to apply them to specific melodic figures. He used strong fingers for accented notes and weaker fingers for unaccented notes.

C. P. E. Bach liked to improvise and compose in C or G major, because these keys provide more opportunities to vary fingering than the keys with more sharps or flats. Figure 3 suggests that experimentation with different fingerings was one of the central features of the traditional method.

Figure 3 shows another characteristic of C. P. E. Bach's system: the practice of crossing the long fingers over each other (especially the third over the fourth). This technique was often used by pianists in the eighteenth century. Another important rule in his system was the avoidance of the thumb and fifth finger on black keys (although there were exceptions, especially in the case of the thumb).

As Figure 3 demonstrates, fingering choices in the eighteenth century were primarily intended to enhance musical expression. The development of velocity was as yet relatively unimportant. Pianists often deliberately used uncomfortable fingerings to intensify the musical expression of a passage.

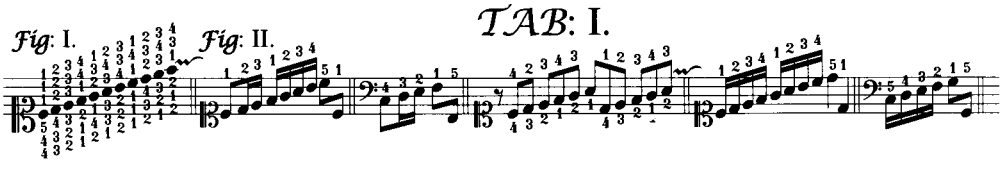


Fig. 3. (Bach 1753, Beilage: 1).

## Czerny

One of the most important fingering systems of the first half of the nineteenth century was that of Carl Czerny (1839, vol. 22). Unfortunately, the second volume of his *Pianoforte-Schule* was all but forgotten soon after its publication in 1839.

Czerny's system was structured more clearly than the older fingering systems of Müller (1804) and Hummel (1828). Czerny developed a system of rules, and gave numerous examples of their application. Like other methods, Czerny's was organised into sections dealing with different technical difficulties: scales, sequences on the basis of scales, chords, broken chords, double notes, leaps, and so on.

Czerny's system of fingering rules was clear and carefully thought out. It differed from older fingering systems in that the development of virtuosity was a central feature. He tended in all cases to choose the most comfortable fingering that would allow the pianist to achieve maximum velocity and virtuosity. One of the main principles of his system was to hold the hand as still as possible (Czerny, 1839, vol. II: 4). In his opinion, pianists should not cross the four longer fingers over each other (Czerny, 1839, vol. II: 2). In scales, and in scale-like sequences, the thumb and the fifth finger were not to be placed on black keys. As a result, when a figuration was transposed to a different key (e.g., one tone higher in a sequential repetition), the fingering pattern usually changed. This feature made Czerny's fingering system quite complicated.

Figure 4 illustrates the important role played by the thumb in Czerny's system. On white keys, it is like a joker in a pack of cards: it can be used instead of any other finger. This approach takes advantage of the thumb's horizontal agility. Czerny's fingering system can enable pianists to play fast and evenly. A disadvantage of the system is that it takes a long time to learn a passage in a different key, because each key has its own particular fingering.

Czerny's system placed relatively little emphasis on the 'rule of regularity', according to which parallel passages (diatonic or chromatic transpositions of a repeating pattern) are played with the same fingering, even if that means placing the thumb on a black key. Instead, Czerny tends to use a new fingering for each sequential repetition (Fig. 5).

What is new in Czerny's fingering system is the internal consistency and comprehensiveness of his system of rules. He carefully describes exceptions to each rule and justifies the best solutions in doubtful cases. Sometimes, he recommends practising more than one fingering pattern for the same passage, if the patterns are equally comfortable (Czerny, 1839, vol. II: 18). He goes on to give methodological and technical advice on how each passage might best be practised and performed.

Czerny's examples of the application of his rules include longer pieces of music. An example is shown in Figure 6.

Czerny typically began by explaining a given rule or rules, and then applied them to passages of increasing length – two, four or eight bars – which were to be practised by the student. He composed several collections of eight-bar exercises: *Die Schule des Virtuosen* op. 365, *125 Passagen-Übungen* op. 261, and *160 achttaktige Übungen* op. 821. Each of these collections was intended to develop particular technical devices.

Czerny suggested that students play exercises in different keys. But he did not spell out the fingerings for transpositions of his exercises. Instead, he explained the underlying fingering rules so that students could work out fingerings in other keys for themselves, as well as for other pieces of music.

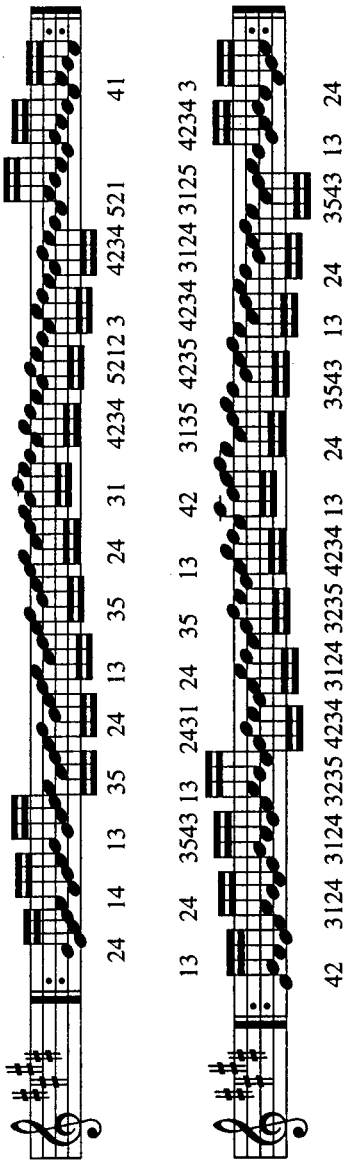


Fig. 4. Changes in fingering of a 4-note pattern depending on black and white keys (Czerny, 1839, vol. II: 17).

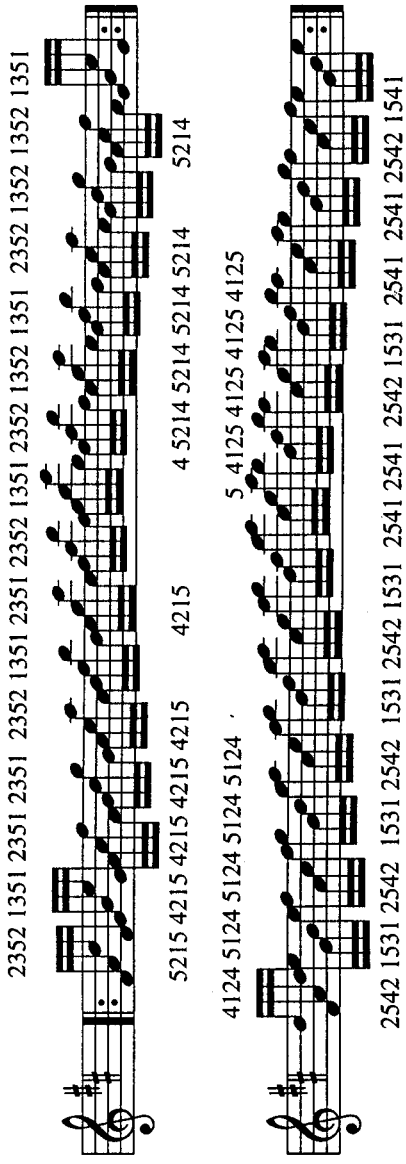


Fig. 5. Example of lack of adherence to the 'rule of regularity' (Czerny, 1839, vol. 2: 53).

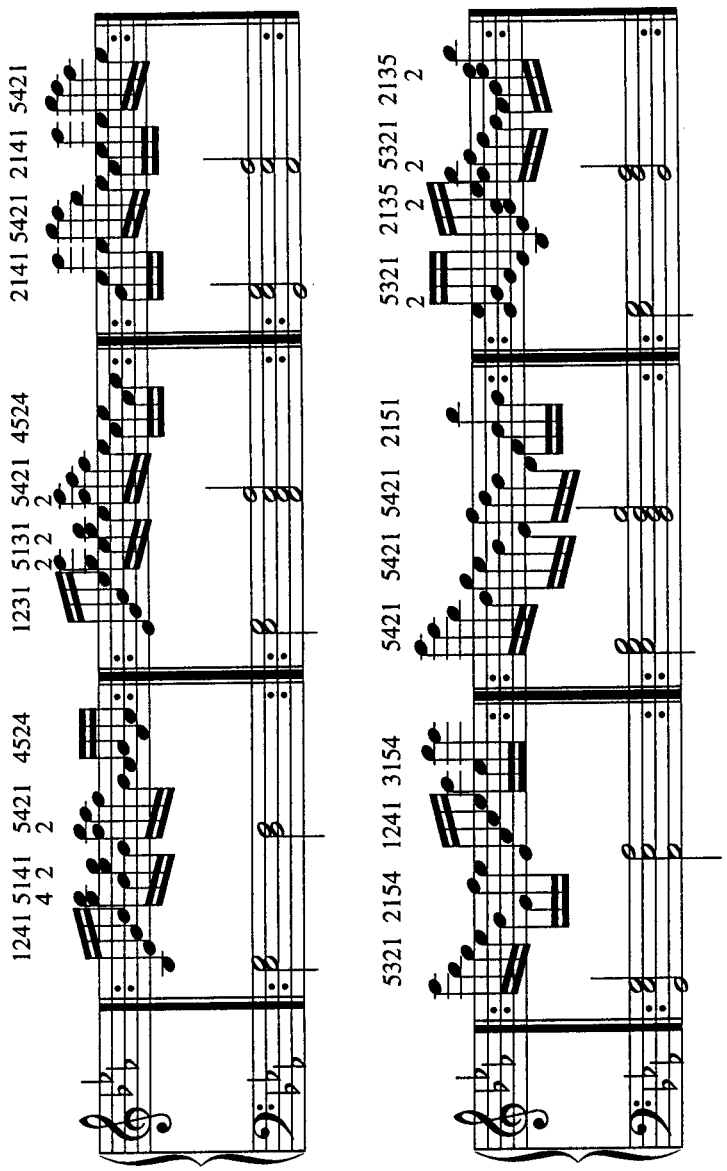


Fig. 6. A longer example of the application of fingering rules (Czerny, 1839, vol. II: 5).

## Chopin

Until about 1830, pianists tended to take for granted that stronger fingers should be used on more accented notes and weaker fingers on the less accented notes (e.g., C. P. E. Bach 1753/1762, Beilage: 1f). It was only occasionally that pianists deliberately chose uncomfortable fingerings, and when they did, their aim was primarily musical rather than technical. For example, in the Adagio at the start of the last movement of Beethoven's op. 110, the composer specified that the repeated A on the B7 chord should be played alternately with the fourth and third fingers. In another example, Beethoven required a fast scale of equally accented notes to be played only with the strong middle finger (Cramer/Kann, 1974).

In about 1800, pianists began to train the weaker fingers in an attempt to make all fingers equally strong (Adam, 1802: 11; Müller, 1804: 4). A number of different reasons may be identified for the change in general attitude towards fingering that occurred at this time. Perhaps the main factor was the industrial revolution, whose most important inventions were the steam engine and the machines which steam engines drove (Marx, 1886/1974). Pianists seem to have taken the machine as a model, and some pianists even came to think of themselves as machines (Allgemeine Musikalische Zeitung, 1821: 525; 1835: 166; Köhler, 1905: 266).

A machine works in a steady and regular rhythm. It produces equal hammer blows without any deviations. The machine-model made velocity and virtuosity the most important criteria underlying fingering, where previously the main criteria had been musical expression (accentuation, articulation, character, and so on). Of course, musical expression continued to influence fingerings, but its relative importance was diminished.

Frédéric Chopin was one of the last pianists to defend the older approach to fingering. He advocated the practice of exercises to develop the special character of each finger. These exercises were intended to make the fingers even more different from each other than they are naturally – quite the opposite of exercises designed to make the fingers the same, or at least equally strong and agile (Eigeldinger, 1986: 32f; 1993: 74).

In Chopin's view, the index finger has a strong character. The middle finger is strong and suitable for cantabile playing. The fourth finger is sensitive. The thumb has horizontal agility. All these 'natural' characteristics of the fingers can be developed through special exercises. So, for example, the pianist should do exercises that (further) develop the strength of the index and middle fingers, the sensitivity of the fourth, and so on.

Chopin made other important, original contributions to the development of piano fingering. He often placed the thumb on a black key, and passed it under the fifth finger (Mikuli, 1880: 4; Eigeldinger, 1993: 115, 120); indeed, some of his music can only be played this way (e.g., the Study op. 25 no. 11 in A minor). Chopin's art of fingering is best illustrated in the original editions of his piano works, especially the *Nocturnes*, where he recommended frequent use of the sensitive fourth finger in delicate coloratura passages.

Equally interesting are reports of Chopin's piano lessons. Some of the scores he used in his lessons are marked with fingerings written with a pencil. These fingerings sometimes differ from score to score, suggesting that Chopin experimented with fingerings in order to vary the musical expression – not only with his students, but also for his own performances of his pieces. The various sources are listed by Eigeldinger (1986: 245f).

## Kullak

One of the most important fingering systems of the second half of the nineteenth century was presented in Adolf Kullak's (1876/1994) *Ästhetik des Klavierspiels* (Chapters 4 to 10). In contrast to older fingering systems, his was systematically structured on the basis of quasi-scientific analysis. Somewhat in the style of a physical scientist, he attempted to establish the basic principles and laws of the art of piano performance. He structured his fingering system even more clearly and more compactly than Czerny, by focusing only on the most important rules and principles.

In contrast to his forerunners, Kullak not only tried to analyse the art of piano playing at the level of concrete phenomena, he also tried to look behind the surface and discover deeper structures and laws. Unlike Czerny's, Kullak's book was not primarily structured according to fingering rules *per se*. Instead, he made a detailed study of piano touch (*Anschlagsarten*). He analysed the act of touching the key into the movements of the various joints: the knuckle, wrist, elbow and shoulder. He described different kinds of touch in terms of the relative degree of activity of the different joints. In Kullak's system, the fingering depends on which joint is active. For example, a pianist using a large wrist movement may prefer a quite different fingering from another pianist playing the same passage but using mainly the finger joints.

Kullak's approach was systematic and modular. It consisted of elements which could be combined in different ways. As an example, here is how he approached exercises for agility and independence of the fingers (Kullak 1876/1994: 149). Kullak recommended that pianists practise the following three points separately before combining them:

First, he systematically listed all possible combinations of fingers:

Combinations of two fingers: 1 2, 1 3, 1 4, 1 5, 2 3, 2 4, 2 5, 3 4, 3 5, 4 5.
Combinations of three fingers: 1 2 3, 1 2 4, 1 2 5, 1 3 4, 1 3 5, 1 4 5, 2 3 4, 2 3 5, 2 4 5, 3 4 5.
Combinations of four fingers: 1 2 3 4, 1 2 3 5, 1 3 4 5, 2 3 4 5.
Combinations of five fingers: 1 2 3 4 5.

The pianist was asked first to practise all these combinations in the normal five-finger-position-range.

Second, Kullak distinguished between different positions of the hand:

1. all fingers on white keys
2. 1 and 5 on white keys, one or more of the other fingers on black keys
3. 1 or 5 on black keys
4. 1 and 5 on black keys
5. all fingers on black keys.

Third, he differentiated between extended and contracted hand positions:

The smallest position is the chromatic position, C, C#, D, D#, E.
An example of a large position is C, D#, F#, A, C.

Another characteristic element of Kullak's fingering system was the passing of the thumb under the little finger, and the little finger over the thumb (Kullak 1876/1994: 195). Once developed, this skill can facilitate the playing of certain scales, arpeggios and complicated virtuoso passages. The 'rule of regularity' (as discussed above) played an important role in Kullak's system.

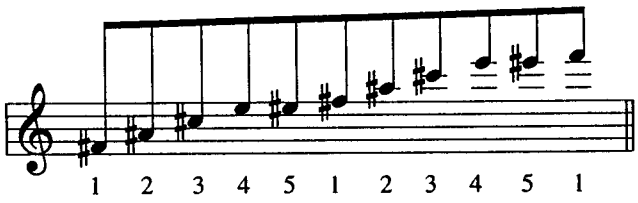


Fig. 7. An example of the repetition of a finger sequence (Kullak, 1876: 195).

Generally, Kullak recommended that finger sequences and hand positions be repeated with as little change as possible. Figure 7 (from Kullak, 1876/1994: 195) shows a passage in which a finger sequence is repeated an octave higher. Although the thumb is placed on a black key and the space between the fingers is not very comfortable, this fingering is a good one.

Kullak also recommended practising difficult variants of a given fingering pattern – passages that are considerably harder than anything commonly occurring in written-out compositions. In this way, the normal variants of a fingering pattern could be mastered more easily. Here again, there is a parallel between piano technique and sport. The repeated testing and expansion of technical limits was a central feature of piano practice in the nineteenth century.

Kullak offered a system of fingering rules, and gave a few examples of their application. But you will not find in his book a collection of printed finger exercises. Pianists working with Kullak's method were obliged to invent and to improvise passages of their own. In this way, the method automatically encouraged creativity.

## Werkenthin

The last fingering system we will discuss is that of Albert Werkenthin, as published in the second volume of his *Lehre vom Klavierspiel* (1889). Werkenthin was a pupil of Hans von Bülow and Franz Kroll, and his fingering system was largely based on the ideas and approach of Kroll. Arguably the most detailed fingering system of the nineteenth century, it was unfortunately forgotten soon after publication.

Like Kullak, Werkenthin's method is structured clearly and efficiently. But it is more comprehensive than Kullak's method. Werkenthin often recommend more than one fingering for a passage. He compared different possibilities, discussed advantages and disadvantages for each version, and gave reasons for the best solution, sometimes basing his decision on expressive requirements. He recommended different fingerings depending on whether a passage was to be played slowly and *legato*, or fast and *leggiero*. He presented practical tables of more and less comfortable versions of a given fingering pattern.

Changes of hand position may occur in a number of different ways, including passing the thumb under a finger or a finger over the thumb (called a 'full change' by Parncutt *et al.*, 1997), or drawing a finger close to another finger and 'inserting' it into the position (a 'half change', called *Einsetzen* by Türk, 1789: 140), e.g. when playing CDEFEFGA with fingers 12341234. Werkenthin suggested various possible fingerings for half changes, discussing the relative difficulty and usefulness of each (Fig. 8). For example, he pointed out that it is easier to draw the thumb and fifth fingers close together (fingers $\frac{5}{1}$ listed as 'good') than the second and fifth fingers (fingers $\frac{5}{2}$ listed as 'not good').

| | Good | Less good | Not good |
|---|---|---|---|
| | 3 4 5 | 4 5 | 5 |
| R. | 1 1 1 | 2 3 | 2 |
| | 1 1 1 | 2 3 | 2 |
| L. | 3 4 5 | 4 5 | 5 |

Fig. 8. Finger pairs that may be drawn together in half changes of hand position (Werkenthin, 1889: 86).

Typical of Werkenthin was the search for fixed finger sequences that could be repeated in different octaves and in different keys. The rule of regularity was more important in his system than in any other fingering system in the nineteenth century. Conversely, the rule of avoiding the thumb on black keys was less important.

Table 1 gives a clear demonstration of how Werkenthin's fingerings are built up. He gives two fingerings for a scale in thirds. The first consists of two groups per octave: one group of three thirds, and one group of four. In the second fingering, there is a group of three followed by two groups of two. Only fingerings for outer voices of the two hands are shown. Based on his extensive teaching and performing experience, Werkenthin recommends that the first version be used for slower or cantabile playing; the second, for faster passages (Werkenthin, 1889: 100f)

Table 1. Fingering (2 groups per octave) – major scales (Werkenthin, 1889: 90).

| | | |
|---|---|---|
| | 3 4 5 (3) 2 (4) 3 4 (3) 5 4 (5) 3 4 | 3 4 5 (3) 2 (4) 3 4 (3) 5 4 (5) 3 4 |
| C. | c d e f g a h \| c d | A. a h cis d e fis gis \| a h |
| | 5 4 3 5 4 3 2 5 4 | 5 4 3 5 4 3 2 5 4 |
| | 3 4 5 (3) 2 (4) 3 4 (3) 5 4 (5) 3 4 | 3 4 5 (3) 2 (4) 3 4 (3) 5 4 (5) 3 4 |
| G. | g a h c d e fis \| g a | E. e fis gis a h cis dis \| e fis |
| | 5 4 3 5 4 3 2 5 4 | 5 4 3 5 4 3 2 5 4 |

Where the two hands play the same material an octave apart, Werkenthin advocated that changes of hand position should occur simultaneously in the two hands; the two hands should only start a fingering pattern at different places if other constraints make this absolutely necessary. Table 2, taken from Werkenthin (1889, p. 91), is constructed according to this overriding principle. Here, the hands switch simultaneously from the group of three thirds to the group of four.

Table 2. Fingering (3 groups per octave) – major scales (Werkenthin, 1889: 94).

| | | |
|---|---|---|
| | 3 4 5 3 4 3 4 (5) 3 | 3 4 5 3 4 3 4 (5) 3 |
| C. | c d e f g a h \| c | A. a h cis d e fis gis \| a |
| | 5 4 3 4 3 4 3 (2) 5 | 5 4 3 4 3 4 3 (2) 5 |
| | 3 4 3 4 (2) 3 4 5 3 4 3 4 | 3 4 5 3 4 3 4 (5) 3 |
| G. | g a h c d e fis \| g a h c d | E. e fis gis a h cis dis \| e fis gis a |
| | 4 3 4 3 5 4 3 4 (2) 3 4 3 | 3 4 3 5 4 3 4 (5) 3 4 3 |

In these scales of thirds, there is always the problem of making a *legato* connection between hand positions. Werkenthin made some useful suggestions for overcoming this difficulty. For example, the leap can be facilitated by lifting the wrist and turning the hand outwards (Werkenthin, 1889: 99).

Like Kullak's system of technical exercises, Werkenthin's system included only a limited number of examples and fingering tables. Students were expected to invent or construct their own exercises creatively. A characteristic feature of Werkenthin's method was the inclusion of tables of fingering for different keys. Students of the method were expected to apply patterns from these tables to passages of music that they had already memorised. This approach allowed students to focus on the fingering and on the resultant physical interactions between their hands and the keyboard. It prevented them from using fingerings printed in scores without understanding the underlying principles.

## Modern applications

In the last part of this paper we will discuss whether these older methods could have an impact on modern piano performance. First of all, we will address modern approaches to technical exercises and use of fingerings. Today, many pianists use fingerings prescribed by editors (or, less often, by composers), only looking for a better fingering if the printed one is uncomfortable. Prescribed fingerings allow pianists to learn fingering rules, but only unconsciously and unsystematically. The fingering rules that they do learn depend on the kind of music that they play and the editions that they normally use. A pianist's ability to apply fingering rules to different pieces is limited, because they are not consciously aware of the underlying rules. Clearly, this method is not very effective; in a sense, it is not really a 'method' at all. (For relevant comments by professional pianists see Clarke *et al.*, 1997.)

Modern piano students normally play finger-exercises from printed scores. This method is problematic in two respects: first, it is boring; and second, even if students are motivated to do their exercises, the results are unlikely to be impressive. Such students learn to play passages automatically, using fingerings that are based on rules, but they do not learn to apply those rules consciously or deliberately to other, unfamiliar passages and contexts. They may be able to apply fingering rules intuitively, but they often cannot verbalise or analyse them.

In our experience, the basic principles of older methods of developing piano technique can be brought back to life. They are still valid, although the art of piano playing has changed considerably since 1850. The main principles are:

- invention of passages
- the parallel with sport
- determination of fingering by a combination of rule systems and creative exploration, taking into account musical demands
- conscious and deliberate application of specific fingering principles
- use of written methods and treatises as a source of ideas on passages and fingerings
- invention of studies and variations on the basis of passages
- improvisation on passages.

When these elements are incorporated into their technical work, students become more motivated to do technical exercises. Their practice time becomes more effective, because it is more systematic. A direct connection is made between technical exercises and improvisation – so the exercises make musical sense.

## Inventing passages in early piano lessons

In the following, we give some practical examples at different levels of piano teaching. First, we show how beginners can create their own exercises. (In the following, the pronoun 'I' refers to the first author, MG.)

In the first lessons, I start with exercises. These exercises are played without scores. I like to begin with a task that at first seems somewhat outrageous, but later turns out to have been highly relevant and fruitful. I ask students to look at the keyboard and their hands, and to tell me what kinds of food they like. Then I have them say what their favourite food is, over and over. I ask them to do this with conviction in their voices! Their next task to invent a musical figure that reminds them of the sound of the food. I ask them to experiment in three different keys: C, D and E. After having experimented for a while, the student chooses the best version, and proceeds to build a modulating sequence on this short figure. Next, the student attempts to transpose this exercise into different tonalities. Finally, I have the students experiment with different fingerings. For the next lesson they are asked to make a list of fingering possibilities, with the easiest fingerings at the top the most uncomfortable at the end.

This exercise has several benefits. First, the student never plays without musical expression. It is easier to play this exercise expressively – with deliberate variations in loudness and timing – than it is to play it perfectly evenly. Second, the student becomes interested in experimenting with fingerings. In class instruction there is the additional advantage that students begin to discuss fingerings, because the students differ in their opinions. They see that there are different possibilities. Third, students become conscious of fingering rules. Fourth, the students are motivated to practise, because they are now in a position to invent their own exercises.

## Inventing fingerings

Consider the passage in Figure 9. It appears in several of the cited books. It can easily be memorised and played by more advanced students without the score, looking at the keyboard and their hands.

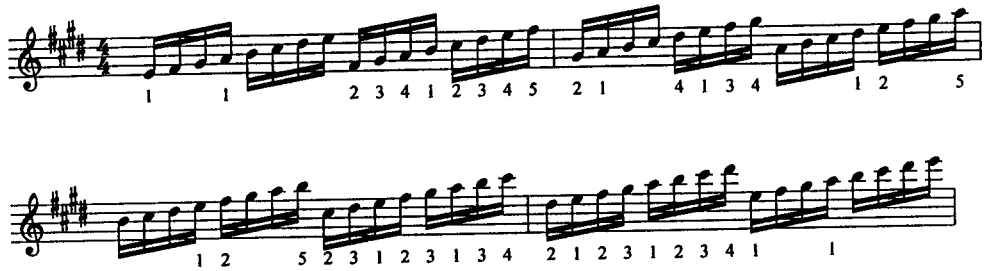


Fig. 9. Example of a fingering problem for teaching purposes.

My role as a teacher is to explain to my students two rules of fingering for these scales: first, the rule of avoiding the thumb on black keys; and second, the rule that the last note of each scale should be played by the fourth or fifth finger. On the basis of these rules, the students find the best fingering in different tonalities.

Here again, creativity is important. The search for the best fingering is a creative act. By doing this exercise students become aware of their fingerings and the underlying rules. Furthermore, the focus on fingering rules prevents students from playing unconsciously. When students play finger exercises from printed scores, there is always the danger that they will stop listening when the passage runs automatically.

## Improvisation

When practising arpeggios in different keys, it is helpful to use chord progressions that students agree sound good. You can of course use typical Chaconne basses of the eighteenth or nineteenth centuries, such as Pachelbel's Canon, or La Follia; but you can also use chord progressions of contemporary music in Jazz or Pop style, depending on the experience and preference of the individual student. In my piano lessons, students often use their favourite pop songs as basis for practising arpeggios. Consider for example the following chord progression from Joe Cockers ballad 'You are so beautiful':

| | : A♭ F- D♭E♭ : | |
A♭ A♭maj7 A♭7 D♭7 G♭9 A♭ E♭-7 A♭ D♭ C7 Fm ....

Pop songs such as these often contain parallel voice leading, but voicing is not an issue here. Nor does it matter if the chords include complex extensions or upper structures; for the purpose of practising arpeggios, 7th, 9th and 13th chords can be reduced to one of their component triads (the major seventh chord, for example, contains a major and a minor triad). Students need not preserve the rhythm of the song; they use the chords only as a basis for their improvisation. The duration of each chord can be freely varied.

Another way to practise arpeggios is over a bass ostinato. To learn a figure so that it is possible to play it automatically, students take a pedal point on C in the left hand. On the basis of this pedal point, they begin to improvise with triads in the right hand. For example, the C-major triad may be chosen as tonal centre. After having played several dissonant chords, students always come back to the C-major triad. They can then begin to experiment with some arpeggios on the basis of this improvised chord progression.

In my experience it is helpful not to play these exercises exactly in time. Playing in time can be stressful! It is better to add ritardandos, accelerandos and dramatic pauses freely. That makes it possible to focus on one problem only: finding and practising the best fingering. The pianist can then improvise without being under pressure from the metronome. It is also useful to repeat each arpeggio several times. Students begin slowly, and gradually increase velocity. After a few attempts at this, they can also change the bass. For example, it is possible to alternate between a melody played in octaves in the left hand and arpeggios in the right hand. In this exercise, only one hand plays; the other hand held a pedal point of a chord. So, it is easier to concentrate on the active hand.

Another option is to insert some melodic elements in the right hand. Later, an ostinato can be taken in the left hand. On the basis of this ostinato the pianist can begin to improvise with the right hand based on a specific figure. This exercise is helpful for both the ostinato-figure and the figure used for improvisation; and it is useful for developing the independence of the two hands.

Of course these are only some of many possible ways of re-introducing the spirit of older methods of piano teaching, appropriately adapted to a modern context. Our intention is not for other teachers to copy the above ideas, but for teachers to invent creative approaches of their own, using the above ideas only as guidelines, or as a source of inspiration.

## What fingering system is the best?

I teach each student how to find fingerings for a wide range of passages and patterns: scales, sequences, chords, arpeggios, double notes, octaves, and repetitions, and so

on. Sometimes, I give students a book on piano technique (e.g., Cortot, 1928; Czerny, 1839, vol. II) to give them some ideas on what patterns and fingerings are possible. I avoid having them play finger exercises from printed scores, preferring that they focus attention on the fingering rules. The aim is to increase their awareness of what fingerings are being used in the different passages and tonalities. In my experience – and consistent with recent experimental results of Sloboda *et al.* (1997) – stable, clear fingering rules lead to accurate sight-reading. More importantly, a clear, conscious concept of fingering rules is an important ingredient in good interpretation and improvisation.

Which fingerings are the best? Which rules are the most important? The answers to these questions depend on pieces and style; but there is an underlying general set of rules that transcends style.

To acquire a good working knowledge of fingering rules, it is useful to make a systematic study of the old fingering systems, especially those of Czerny, Kullak and Werkenthin. For common tonal figurations, these old fingerings are the best; they facilitate velocity and virtuosity. Each of these three fingering systems is useful, and each has its advantages and disadvantages.

My favourite is Werkenthin's, for the following reasons. First, his system is the most developed and systematic fingering system of the nineteenth century. Second, Werkenthin's system is easier and faster to learn than other systems. The main principle – of choosing fixed finger sequences and trying to apply these patterns in all tonalities – allows the pianist to develop stable fingering patterns as well as the skill of applying these patterns in different positions on the keyboard. Third, Werkenthin's system is the best system for improvisation. It enables the pianist to develop the skill of transposition as fast as possible, and so could be useful for jazz musicians. Fourth, Werkenthin's book can still be used as a method for modern piano students. He explains the rules and gives advice on how to practise passages. But he leaves it to students to construct and invent their own exercises. There are very few fully written out fingering examples in Werkenthin's book. Clearly, an English translation of Werkenthin is long overdue.

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