Shifting the Paradigm of Violin Playing: The Significance of Friedrich Adolph Steinhausen

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Violin playing and teaching rely on knowledge accumulated within a complex history. Untangling influences and sources here seems no easy task. This is in part the result of a discipline determined by subjectivity, individual experience and aesthetic judgment. It is further determined by the relevance of theory to the activity of musical performance and the traditions of theoretical exposition this relevance has generated. Theoretical writings about violin performance and pedagogy tend to be formed and justified by the experience of individuals and their success. They are largely aimed at improving practice and know-how rather than knowledge. To make matters even harder, there are substantial bodies of pedagogical knowledge which are yet to be linked across history and which await appropriate contextual analysis. Two cases from the pedagogical canon illustrate this readily: Galamian's pedagogy is widely acknowledged for its practical success. We can only speculate about the sources of his knowledge, though. His *Principles of Violin Playing and Teaching* remains entirely silent on any sources of this understanding and it is left to us to wonder about any historical influence by his teachers of the Russian (Mostrass) and French school (Capet). Flesch's *Art of Violin Playing* is more explicit here. There is reference to the view of others and even occasional acknowledgement of sources of knowledge. However, on the whole, neither Flesch nor Galamian have scholarly aims. They are aiming to improve pedagogical practice directly. Any theory is first and foremost the result of reflection and analysis of their personal pedagogical understanding and experience.

Beyond the writers on this topic in the English speaking world we face further challenges. The theory of the Russian School which achieved spectacular successes remains inconsistently accessible.[1] The very individual approaches and views of the Polish violinist, teacher and writer Tadeusz Wronski, whose important work[2] on the technique of violin playing remains similarly inaccessible to anyone without adequate knowledge of Polish at this point. So, to ask how our conceptions of violin playing and teaching may have evolved in detail and in its completeness might be asking an impossible question. Nevertheless, when looking at the history of violin playing over the past century, we can isolate turning points to pedagogical thinking which have impacted on practice in ways similar to the paradigmatic shifts or scientific revolutions described by Thomas Kuhn[3]. Kuhn argues that while most ordinary scientific understanding increases within a framework or paradigm of

[1] An exception are some translations into German of writings by Konstantin Mostrass (works on intonation and rhythm) and a collection of articles by Yankelevich, Yampolski, Belenki, Saposhnikov, Mostrass and Agarkow in Kathinka Rebling's *Violinspiel und Violinpädagogik* (Rebling, 2005)

[2] Wroński 1996.

[3] Kuhn, 46 "Paradigms may be prior to, more binding, and more complete than any set of rules for research that could be unequivocally abstracted from them."

fundamental assumptions, so called "scientific revolutions" constitute a shift of paradigm which leads any investigation and understanding towards a new context. In the context of violin pedagogy, the scientific positivism of the late 19th century inspired musicians and teachers to embark on a comprehensive (and at times obsessive) analysis of physiological and psychological functionality. With its principal focus on movement as the defining perspective in violin playing, this analysis culminated in a standardisation of technical, mostly bio-mechanical building blocks. This approach had clearly far-reaching practical and theoretical results.

The theoretical analysis also extended to the physical analysis of sound and sound production on a string instrument, starting with the investigations by Helmholtz in the 19th century. This led towards detailed, practical conceptions of the principles of sound production finding their way into Flesch's exposition of the role and privilege of the contact point[4] which is not significantly modified by even the most recent expositions[5].

In any account of the history of violin playing as a narrative of shifting paradigms a number of individual contributions may thus naturally stand out. In this paper I will discuss one of the earliest such contributions inspired by the scientific investigation of physical movement by Friedrich Adolph Steinhausen, a physician, amateur violinist and pianist born in 1859. Steinhausen documented his knowledge in two books: His *Physiology of Bowing* was by all accounts a successful work and experienced five editions with the fourth edited by the renowned musicologist Arnold Schering and the final edition enlarged by the remarkable violinist Florizel von Reuter[6]. A work on the physiology of piano playing[7] remains in print today and has been translated into English. Steinhausen's work is all but forgotten today. I will try to revive some of his principal insights and argue their sustained relevance for violin playing. I am hoping to show that Steinhausen's conceptions have some potentially unexplored consequences for our practice and that his understanding may in fact be clearer and more significant for pedagogical practice than some of the more recent authors on this subject.

Critical reception

Before I turn to a direct discussion of Steinhausen's work, however, a brief look at its reception will provide an introductory context for discussion. Flesch acknowledges Steinhausen on occasion (albeit critically) for his seminal importance

[4] Flesch 1934, 7
[5] Fischer, 41
[6] For this paper I have relied on the 1920 edition. Steinhausen, Friedrich A. (1920). *Die Physiologie der Bogenfuehrung auf den Streichinstrumenten*. Leipzig: Breitkopf. All citations from Steinhausen are my own translations of the German text.
[7] Steinhausen, Friedrich A. (1905). *Ueber die physiologischen Fehler und die Umgestaltung der Klaviertechnik*. Leipzig: Breitkopf. This work is translated as *Physiological Errors and changing piano technique*, Rochester, N.Y., 1963. (according to Kolneder, 444)

in confronting the predominant and evidently erroneous technical conceptions advocated by the Joachim-school[8] at the time. According to Flesch, the influence of this school significantly retarded violin playing in Germany in the latter part of the 19th century[9] and Steinhausen's analysis on the physiology of bowing was seminal in ending this regress. Immediate contemporaries of Steinhausen's such as the physiologist Wilhelm Trendelenburg (praised by Flesch for his analysis of sound production) take issue with individual details of Steinhausen's analysis in particular in relation to his understanding of the bow hand (which comes remarkably close to Galamian's view) and particular bow strokes. More recent commentators are at times ambivalent without providing clear reason. Kolneder argues that "in some ways Steinhausen's enthusiasm carried him too far" with some of his statements being "exaggerated and one-sided".[10] Not surprisingly, Steinhausen was attacked by disciples of the Joachim School, notably Andreas Moser, the co-author of Joseph Joachim's "Violin School" for his own criticism of the school's faulty technical premises. According to Kolneder, "many of Moser's reservations are well founded". However, regrettably Kolneder fails to disclose which ones he has in mind here making his contribution too general to be relevant.

Steinhausen seemed to have fared better outside a cultural context of reverence for the eminent violinist Joachim. The Russian pedagogue Konstantin Mostrass (a teacher of Galamian) includes Steinhausen's entire chapter on sound production in his book on intonation without critical comment[11]. The cellist Janos Starker cites the importance of Steinhausen to the Hungarian violinist Imre Waldbauer[12] and implies that these ideas may have been seminal at the time. Paul Rolland confirms this when he suggests that in fact "Steinhausen's work was a great impetus to this more scientific style of Hungarian teaching"[13]. Evidently, Rolland's own approach and technical conceptions are informed significantly by Steinhausen. In particular some of his own fundamental principles of movement are explicitly acknowledged to be derived from Steinhausen, while there is critical engagement on occasion as in the case of the rotary movement of the bow arm.

"The principle of rotary movement for tone production was first advocated in 1902 by F. A. Steinhausen. He denounced the wrist movement as used by the Joachim School as an inferior motion which should be replaced by rotary movements of the forearm. He called for the inward and outward rotation of the forearm (pronation and suppination) to increase and decrease bow

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[8] "Vor allem sind hier i. W. Steinhausen und A. V. d. Hoya zu nennen von denen dem ersten das Verdienst gebührt, mit dem Götzendienst der horizontalen Handgelenksbewegung aufgeräumt zu haben während der Zweite die Priorität im Erkennen des motorischen Koordinationskomplexes für sich in Anspruch nehmen kann." (In particular we need to refer here further to Steinhausen and A. V. d. Hoya - the former deserves credit for doing away with the worship of the god of horizontal wrist movement whereas the latter can claim priority in the understanding of the complexities of motor co-ordination." (Flesch, II 73)
[9] Flesch & Keller (ed), 147
[10] Kolneder, 445
[11] Mostrass, 105-109
[12] Starker, 270
[13] Fanelli, 21

pressure…However, Steinhausen did not recognise the advantage of using rotary movement of the upper arm for tone production, a more powerful and reliable movement"[14]

The more recent discussion by Palac gives perhaps the most specific examples of the contemporary appreciation of Steinhausen. Palac cites Steinhausen's "concept of the double leverage around the thumb-and-second-finger axis" as biomechanically sensible and vindicated by modern conceptions of the bow hold[15]. She also cites Steinhausen's identification that "basic bowing motions are curved and that the nearly straight-line path of the bow on the string is due to a combination of curves" and that "no part of the arm should be fixed or isolated"[16] as examples how scientifically based investigations of bowing technique of the kind undertaken by Steinhausen "serve as valid resources for the study of bowing today."[17]

Fundamental Insights

When looking at Steinhausen's writings for both instruments, a number of common thoughts emerge. In the first instance Steinhausen emphasizes the need for a holistic analysis of movement which is ultimately dependent on a mental impulse. No matter what the nature of any particular movement in its partial determination of geometric or mechanical properties may be, the movement in its entirety is always determined by a process within the nervous system which is based on a "mental innervation schema" (*Gehirnerregungsbild*). All work on movement thus is mental work – practice is "in the first instance mental work, learning"[18]. The acquisition or modification of motoric patterns is a matter for mind-body correlation- a phenomenon identified as central much later by Galamian without, however, making any reference to Steinhausen[19]:

"For all types of technical practice, the principle of mental preparation is of paramount importance. It means that the mind always has to anticipate the physical action that is to be taken and then to send the command for its execution. This, it will be remembered is what I have called 'correlation'. It is the key to technical control, and all practice concerned with the building of technique or the overcoming of particular difficulties has to center on the development and improvement of this correlation."[20]

However, Steinhausen goes further into an analysis of movement learning and complexity. According to Steinhausen all learning of movement is based on an already acquired repertoire of movement. This means, that the learning of

[14] Rolland 1974, 35
[15] Palac, 32
[16] Ibid, 32
[17] Ibid, 33
[18] Steinhausen 1905, 26
[19] It is unclear whether Galamian was directly aware of Steinhausen's work
[20] Galamian, 95

appropriate movements which inform our playing technique is never uninformed and is never entirely new or unprepared.

"Every process of movement relies on an already present repertoire. The individual impulse for a movement would make no sense if it was not already determined through manifold earlier experience exactly for the particular size of movement of two bones, for a particular velocity, for a particular dynamism."[21]

The implication here is that all movement learning is essentially a process of adaption: A repertoire of movement is extended and refined to suit a particular task and purpose. Thus Steinhausen can conclude that we essentially learn from our body rather than teach ourselves new movements. This approach Steinhausen pointedly summarizes as follows: We "cannot teach our body we can only learn from it"[22]. By drawing attention to the privilege of already present movements and the inherent capacities of our repertoire of movements, Steinhausen argues against the independent construction of movement devoid of a connection with an imagination for music and sound. He emphasizes instead the need to correlate just such an image with an appropriately selected, refined or adapted movement. The immediate context for the insight that we must learn from our body rather than teach it is the recognition that the fundamental determination of instrumental technique is the musical idea. In the performance of a musical instrument our musical intention must remain the ultimate guide or judge of our technical capacities and decisions. The most accomplished movement remains "even if it appears ever so mechanic, nevertheless a mental process."[23]

The characterisation of instrumental learning as a process of selection and discovery from within a repertoire of already available movements is further supported by a careful observation: complex movements are essentially unconscious and their fluidity and effectiveness depend on their efficiency. A beginner is ordinarily characterised by using excessive movement since all complex movement, unless refined towards high accomplishment, carry with them sympathetic movements (*Mit- Nebenbewegungen*). It is a major task of instrumental learning to reduce and inhibit these unnecessary movements and to achieve a balanced sense of active and passive movement. The task then of acquiring a fluid and natural technique is not the acquisition of entirely new, unknown movements, but the elimination of unsuitable activity, the refinement and adaption of existing movement to a given task.

"Freedom to the limbs, letting go, no anxious holding fast and fixation, because the body, left to its own device, finds the path on its own and with such entire certainty that it is not even distracted by distortion or violation or diverted from its aim"[24].

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[21] Steinhausen 1905, 29
[22] Steinhausen 1920, 8
[23] Steinhausen 1920, 30
[24] Ibid, 37

The aim of technical refinement is a "letting go" (*Loslassen*) which in accordance with the complexity of movement needs to be organised within a temporal sequence. This requirement of release is a matter of mental attention and highlights the relevance of rhythmic understanding and attention for the development of technical ease and freedom. In his 1905 work on the physiological misconception within piano playing Steinhausen introduces an entirely dynamic view of movement as a basis of instrumental technique:

"…nowhere rest and fixation, everywhere never resting, fluid movement. There is no interruption, no stop, no arrest in the air, every even temporary "position" already endures and implies an interruption of movement. It is damaging to deceive the learner with pictures of positions, illustrations of positions and stances about the essence of piano technique, about the swinging, continuous movement. The only possible method of representation would be a cinematographic one."[25]

The concept of "swing" (Schwung)

The fundamental concept of "swing" (*Schwung*) which Steinhausen starts to develop here as a characteristic of all natural movement will lead us towards important consequences for the theory and practice of violin playing. As Arnold Schering points out in the foreword to Steinhausen's *Physiology of Bowing* it continued to preoccupy Steinhausen in the further development of his thinking. A marginal note in his handwriting designed to improve previous editions of this work indicate this direction which, however, it seems Steinhausen was unable to fully articulate on account of his death in 1910.

"Most important is the insight that all practice aims at economy of effort, release, passivity, short impulse and swinging movement. Swinging (*schwungvoll*) is the final aim, perfection, accomplishment, highest ability, perfect technique. Absence of swing is: flawed, artless, not accomplished, thus devoid of spirit."[26]

The identification of the fundamental importance of "swing" is revealing for two closely related reasons: it indicates a desire to move away from mechanical descriptions towards a phenomenological characterisation of movement which include an energetic, dynamic and temporal dimensions. Further, it attempts to introduce us to the importance of temporal organisation of movement where the timing of physical impulse, its profile of energy and its release and recovery play a fundamental role in explaining the effectiveness of the movement itself, the importance of energetic release ("letting go" -*Loslassen*) and the possibility of correlation between mental impulse and physical execution identified above. Early commentators have already cautioned against unqualified emphasis of this "swing"

[25] Steinhausen 1905, 98
[26] Steinhausen 1920, X

character of movement[27] and Steinhausen himself seems quite clear that its importance may be of greater significance to piano playing:

"There the basic form of movement is everywhere free swing in infinite variation and modification; here (*in the case of violin playing*) a strict mechanism restricts the freedom, the swing becomes less significant and only constitutes a part of the muscular activity in playing."[28]

Mechanic and dynamic analysis of movement

Any controversy about the fundamental importance of a swinging characteristic of movement aside, Steinhausen's endeavour to describe an abstract characteristic of movement as a dynamic phenomenon and not merely according to geometric descriptors defining positions in space is a significant step. It has important implications for pedagogical and artistic practice. Furthermore, requirements for a dualistic understanding of movement in the dimensions of direction and energy may not have been sufficiently emphasized - notable exceptions being Galamian's conception of "springs"[29] and the work of Paul Rolland. In distinguishing a mechanic- from a dynamic or energetic description of movement, Steinhausen introduces a new paradigm into our technical conceptions: the essentially static and geometric analysis is complemented by an energetic analysis. This understanding distinguishes impact and timing of forces as essential to the ultimate movement. The insight here is that changing parameters of timing and impulse does not only vary the intensity of movement which otherwise remains identical in its spatial co-ordination, but it in fact changes the movement as a phenomenon in its totality.

It is the task of the player to bring both dimensions of movement to consciousness in her practice. In the case of the mechanical conception of bowing, Steinhausen demands that the mental image of the mechanism must always be clear to the player[30]. This image is completed with the assistance of our kinaesthetic sense providing details of the effective muscular forces and innervations. The sense of proprioception (*Muskelgefuehl*) is vital in supplying us with information about the energetic state of our physical effort. For Steinhausen it provides us with the

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[27] Notably Trendelenburg: "With this his (Steinhausen's) view of the overwhelming importance of the swinging movement (*Schwungbewegung*) is refuted if one understands by this, as Steinhausen evidently does, a thrusting movement. Its essence consists in a moving mass continuing its movement even after the cessation of a dynamic impulse (in this case the contraction of the empowering muscles) until the moving limbs arrive at the limits of possibilities of movement. In contrast to the thrusting movement we find the inhibited movement, in which at every moment the resistance provided by small muscular tensions inhibits the given impulse so that the movement rests in the moment when the empowering muscle no longer contracts increasingly. That we cannot speak about a thrusting movement in the case of a calm stroke appears obvious. That the movement of a *spiccato* might be a thrusting movement is as certain as the fact that one plays a very fast spiccato (*balzato*- springing bow) with an inhibited movement, accordingly with greater muscular tension. (Trendelenburg, 93)

[28] Steinhausen 1920, 10

[29] Galamian, 44. However, Galamian does not develop a comprehensive energetic concept of movement restricting this to the energetic properties of the bow hand alone.

[30] This is also an important emphasized much later by Galamian,

opportunity to "learn the lowest possible degree of activity through consistent 'letting-go'"[31]. The dynamic conception of movement also points towards the fundamental importance of the temporal co-ordination of impulse and recovery (*Loslassen*). A movement in its entirety thus will only function freely and naturally if the partial movements that constitute it are naturally balanced in their contribution to the entire movement. Temporal organisation and order are accordingly fundamental to the characteristics of movement and it is the mental refinement of our conceptions of such order as well as its intensity that provide us with the freedom of movement. While the mental schema of the movement is initially required in a conscious effort to learn and establish any particular movement, practise and use transposes the schema into the sub-conscious were it runs off automatically and at the command of the musical impulse.

"In this process we experience high spiritual freedom and immediate command of the technical realm, we can turn towards the tasks of art without hindrance, without having to explain every tactile- or tensile perception or every partial movement or rotation of a joint when playing the instrument. Thus soul and performance are unified."[32]

Relevance and significance

Steinhausen's analysis of movement in violin playing focuses predominantly on bowing and bow technique. He articulates specific principles which notwithstanding critical corrections and clarifications still inform much of our thinking about bowing and bow technique to date and have been confirmed and articulated by others following him. In particular Steinhausen recognises that the "mechanism of bowing action is a complex system of levers with multiple turning points."[33] Included in this system of levers is the bow hand itself. Steinhausen identifies the "turning bow hold" (*Griffwechsel*) as crucial for appropriate arm movements and supported by a rotating forearm which effects supination and pronation of the bow hand. He argues against a view articulated by Courvoisier at the time who schematised bowing movement to include an immovable bow hold and a flexible wrist. Steinhausen makes clear that his famous argument against the Joachim School is simply taking issue with the dissonance between practice and theory that such a view entailed: Courvoisier's conception simply did not reflect the way distinguished violinists played at the time. In the face of this, Steinhausen argues for a description which captures the prevailing reality. Subsequent theory has vindicated Steinhausen's position and committed Courvoisier to history.

However, Steinhausen's significance and relevance goes further than his famous conceptualisation of bow mechanics, his conceptualisation of the turning bow hand or his distinction between active and passive muscle groups (summarized in his

[31] Steinhausen 1920, 39
[32] Ibid, 49
[33] Ibid, 71

famous dictum that the bow arm leads while the hand follows). Steinhausen's importance rests with a paradigm shift from a single-minded concern for the mechanics of movement towards a dualistic conception seeking to understand the dynamic – and psycho-physical unity of movement in violin playing in general. In particular this shift is characterised by the emphasis that movement patterns are most effectively acquired through mental and active attention. This attention is, however, directed at the energetic properties of movement and more importantly at a particular phase of the movement: its "letting go" or recovery phase. Without such a "letting go", movement may lose its natural, swinging and free characteristics. Notwithstanding that not all movements actually are subject to visible or audible energetic thrusts, it is the conception of movement in the abstract notion of swing which leads to the identification of energetic variation in the movement and ensures its freedom. Despite this initially theoretical conception, the "letting go" phase of the movement is directly accessible to our proprioception.

Steinhausen's understanding has far-reaching consequences for our practice and learning. It does away with purely mechanical or gymnastic practice as Steinhausen emphasises repeatedly and directly. It identifies as the principal aim of practice the promotion of attention and in particular rhythmic attention as our consciousness builds mental patterns of the energetic profile of movements (including their essential "letting-go" phase).

"Learning movement means to acquire mental capacities; to "be in command" of a movement means to possess the correct blueprint, the mental excitation map (*Hirnerregungsbild*). This possession is the result of practice.... the schema of the movement acquires and order. Accordingly the feeling of control of the movement, the unity of will and ability... in this process we are granted high mental freedom and immediate command of technique.... soul and performance are unified (*So wird Seele und Spiel zur Einheit*)."[34]

Violin practice unfolds as the collaboration between attention to aural image, sounding reality and proprioception or kinaesthetic sense (*Muskelgefühl*). Steinhausen's view implies that technical improvement is achieved through temporal organisation or predominantly rhythmic practice attending to the fluid coordination of movement in which we attend to the release of the movement impulse. In practice our attention seeks a minimisation of effort and inhibition of unnecessary action. This is accomplished as much by attention to the silence between the notes than by attention on the energetic property of any movement itself. The aim of violin practice is then essentially the identification and instant achievement of rest or recovery at any required time. This rhythmic flexibility and direction is no longer a purely physical or technical achievement. It in fact articulates a unity between mental and physical realities and reflects a way in which "soul and play" become a unity: Idea of sound, mental innervations map, gesture, bow movement, sounding reality "are the different sides of one and the same

[34] Ibid, 46-49

thoroughly unified psychological process"[35]. The result of this view of violin playing is a unification of the realms of music and technique not after the technical has been conquered but while the freedom of play is refined.

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[35] Ibid, 123