Stephen Davies, Philosophy, University of Auckland

Important note: This is a final draft and differs from the definitive version, which is published in **Philosophy of Music Education Review**, 12 (2) (2004): 56-61. I have been assured by the University of Auckland's research office that if they have made this publicly available then it does not violate the publisher's copyright rules.

"The Know-how of Musical Performance".

ABSTRACT

The musician's skill falls under the category of practical knowledge or "know-how", which comes in a number of species. In some cases, one aims at the result directly and cannot bring to consciousness the steps or calculations involved in bringing it off. In others, the target action can be reduced to a sequence or process that can be retrieved by consciousness even if it is not before the mind as the action is performed. Where does the boundary between these two kinds of the musician's "know-how" fall and how much of what the musician does can be explained and analysed in terms of steps, algorithms, rules, and the like? I attempt to develop and clarify these issues. In addition, I suggest that our understanding of musicianship would benefit from a sociological, not solely a psychological, perspective, as well as from comparison with the values and practices of music making in other cultures and contexts. I discuss forms of performance with purposes and constraints unlike those for normal live performance, such as studio recordings that simulate live performances, studio recordings that use technology to create a sound environment that transcends many of the limitations of live music making, and new modes of live performance that abandon traditional instruments in favour of working directly with and on the products of modern sound technology.

Musicians make music; that is, the performance of music involves applied knowledge or "know-how". Can we attain a discursive understanding of what the musician does, and does the attempt to achieve this put at risk the very art it aims to capture? In other words, what can be said of the nature of performance and does what we say turn a living practice into a dead object? In this discussion, I aim to clarify the issues in terms of which these questions can be developed.

I

Consider acquired practical knowledge or knowing how.[i] It involves a learned skill or capacity to do something—typically, to perform an action—as in "I know how to ride a unicycle".[ii] "Knowing how" can be subdivided into types. A first variety is always conscious. For most people, mental arithmetic is of this kind. It is not mental arithmetic they are doing if they do not follow an appropriate rule, algorithm, procedure, or principle, even if they fluke the right answer. Many practical skills are of this sort. I know how to fill in tax forms, immigration documents, and hire purchase agreements. In all these cases, the working of the skill and the steps through which it is exercised are held inevitably before my mind. A second type of "knowing how" might be termed "retrievable". I know how to drive a car. Most of the time, I am not aware of the processes, judgments, and procedures that are involved. I do not have to think about my driving as I drive. Nevertheless, if I reflect on what I do, I can describe the steps or routines I go through. A third type of "knowing how" is cognitively impenetrable. Cognitively impenetrable processes are opaque to introspection. Some bit of neurological hardware receives an input, processes it, and outputs some result, but the nature of that processing is not

retrievable by consciousness. The skill is learned but the many computational, muscular, kinaesthetic, or other activities involved in the skill's application or execution are not available to the agent's awareness. From my own case, typical examples are of knowing how to walk, how to pick up a glass, and how to speak English.[iii] When a person intends to perform an action of this kind, he aims at it directly, as it were. He intends to turn his skateboard to the left, say, not to flex this muscle here and so. He can intend to produce a certain action as output, but the intermediate steps and movements involved in this, to the extent that they are controlled in an irretrievable fashion, are not what he can intend. Similarly, where "knowing how" is retrievable but automatic, the action is intended directly. The intermediary steps and movements are not what are intended so long as the action remains automatic.

In what ways is practical knowledge acquired? In some cases it can be learned from verbal descriptions of the appropriate basic actions and their sequences—"put the left leg in and shake it all about"—or of the relevant rules or algorithms—"multiply by πr^2". In others, learning is by example, copying, or experimenting. Some procedures work better for some skills than others. Generally speaking, when we encourage children and stroke victims to walk we do not provide them with examples. By contrast, language skills are often conveyed via paradigm instances. And while it is possible to learn to drive a plane from an instruction manual alone, one is more likely to be successful by following and being assisted by an instructor. Always conscious skills are often acquired by memorizing the procedure or rule that must be kept in mind, whereas automatic but retrievable skills, because their application is unconscious, are usually acquired through

physical repetition until the routine becomes unthinking. Nevertheless, even cognitively impenetrable skills might be learned by first following written instructions. What makes the skill impenetrable is not the method by which it is acquired but the inability to recall or describe the relevant steps, rules, or procedures when the skill is entrenched.[iv]

A given skill might be cognitively impenetrable for one person, retrievable for another, and always conscious for a third. Some people can tie their shoelaces but cannot describe the sequence of actions by which they do so; some can provide the description if asked, though they tie their laces unthinkingly; and yet others—I have in mind some stroke victims, for instance—can tie their laces only by reciting the steps to themselves as they go through the process. Actions that are always conscious for most people may be retrievable or even cognitively impenetrable for others. Autistic or "fast" calculators, as depicted in the film Rainman, calculate unconsciously and might not even be able to retrieve the procedures or algorithms they use. Where an action requires grace or fluency, it is likely to go better if it has become automatic and thereby unconscious. A person who knows how to waltz but can do so only in an always conscious fashion—counting "one, two, three, one, two, three" and mentally anticipating each step—is unlikely to move like Fred Astaire or Ginger Rogers.

The skills of the musician are practical but what varieties of know-how are involved? All of them, of course! Sight-reading, like all forms of reading, involves always conscious know-how. One does not read a score except by following it and "following" of this kind must be deliberate and, therefore, self-conscious. The same surely goes for planned, high-level interpretative or expressive effects. A great deal of what goes on, though, is

unselfconscious or automatic. The musician simply targets the output—that is, sounds the relevant notes or matches her efforts to those of others in the ensemble—without intending or thinking of any of the micro-processes involved en route. Much of the performer's know-how is retrievable, though. Indeed, almost all instrumentalists are capable of teaching tyros how to play their given instrument—"for this note, place the finger just so and the hand at this angle". Other aspects of performance will be cognitively impenetrable, for some individuals at last.

To generalise, the better the musician, the more automatic is the ordinary business of performance; that is, playing all the notes in the right sequence, in tune, at the right speed, with the appropriate dynamics, phrasing, attack, and decay, from beginning to end. Indeed, this is implicit in the manner by which musical skills are taught, which relies more on example than on verbal instruction and emphasises repetition and practice to an extraordinary degree. The goal, obviously, is to ingrain the skill, to make it physical and unselfconscious. There are two reasons why this is important. To be convincing musical performance must be effortlessly seamless, though an extraordinarily large number of complex physical processes are involved. The more the musician is aware of the mechanics, the less likely she is to achieve the required fluency. A second consideration is this. If the musician's concentration must be devoted to dealing exclusively with the technical demands of the moment, she is left with no time or ability to shape a wider vision of the piece. The emphasis in musical training on achieving involuntary perfection does not indicate, therefore, that performance should be brainless; the reverse, it acknowledges the need to free the player's mind

from the mechanics of performance so that she might achieve something more appealing and revealing than technical proficiency.

What is the relation between the performer's know-how and her ability to describe in language what she does? To what extent is the musician's know-how recoverable by her as propositional knowledge and, if it is, what is the cost of doing so? Some musicians fear that, by retrieving and verbalizing their practical knowledge, they may damage or inhibit the skill they have and thereby become alienated from their hard-won abilities. (For discussion of a variety of cases, see Dreyfus and Dreyfus, 1986.) A person may have had to think through what he was doing as he was learning to drive but now, as an accomplished motorist, if he retrieves that same detail and tries to allow it to control his actions, he is likely to drive very much worse. And, as any golfer knows, there is a phenomenon that might be called "paralysis by analysis". Self-conscious concentration on the minutiae of technique can fatally inhibit the smooth naturalness that is an essential element in a successful exercise of the skills involved. Musical performance is similar, observes the musician.

I am sceptical about this dread. There is an important difference between keeping in mind an analysis of what one does, as one tries to do that very thing, and providing a description of what was done after the event. It is the latter that is invited, not the former. And there is no reason to think that, having retrieved the relevant information for the sake of providing a subsequent description, one cannot then banish it from consciousness when one next attempts to exercise the given skill. After all, among golfers it is the amateurs, not the professionals who teach them, who are most subject to "paralysis by analysis". As I noted previously, very many musicians are

gifted teachers and some, at least, can offer detailed and informative descriptions of what they do without endangering their ability to perform. If she dreads breaking the spell simply by speaking, the musician's worries are exaggerated.

There are, however, two reasons why we should not expect much by way of explanation or analysis from musicians' accounts of the nature of musicianship. Where the skill is cognitively impenetrable, they do not know what they do, though they may be able to name the output at which they aim. They may speculate about what goes on, of course, but they are less well placed than are scientists to work out what happens in the "black box" of the relevant neuro-processor. And where the skill is retrievable, they may be able, on reflection, to describe the steps and processes they go through, but the result may be less informative than we would hope. When a complex action is analysed in terms of more elementary sub-routines, the account comes to an end with ordered lists of basic actions. For driving a car, the basic actions would be such things as depressing the pedal, turning the wheel, and looking in the rear vision mirror.[v] Now, how "deep" the reductive analysis of an action can go depends on how quickly we run up against such basic actions. I suspect that, in the case of music, this happens quite soon, which is why description in this realm gives way so quickly to humming and hand waving, that is, to ostension and example. Despite the complexity and sophistication of musical performances, there might not be that much to say by way of description of the actions that go into making them.[vi]

II

So far my discussion of musical performance has been psychologistic. I have focused on what goes on in the mind of the performer and on whether this

can be communicated. I now want to emphasise briefly the need for a broader, more sociological approach to the understanding of musicianship.

In his recent work on musical performance, Stan Godlovitch (1998) describes the social mechanisms by which the musical guilds—trumpeters, violinists, and so on—preserve their status and promote the values of virtuosity. Meanwhile, by monitoring and controlling technological and other innovations that could affect the degrees or kinds of skill required, they also ensure that only a modest number attain the highest levels and status. The mystique of the performer, I suspect, is part of the ideology by which the guild preserves its boundaries and touts its value. To account for some aspects of or attitudes to musicianship, it will be necessary to consider the wider social place and function of music and its performers, as well as the facts of individual psychology.

In a similar vein, I claim that it is a mistake to concentrate on the live performance of classical Western music to the exclusion of other kinds. It might be revealing and helpful to compare the performance of Western music with the rendition of non-Western varieties, as I now explain.

New Zealand, where I come from, has a population approaching four million. I am not sure exactly how many orchestras of professional quality it supports—I suspect eight would be an inflated total. Consider how this differs from the island of Bali, which has a lower population. In Bali there are about twenty different kinds of gamelan orchestras and repertoires to go with them. The most widespread is gamelan gong kebyar, an ensemble requiring some twenty-five musicians and also a troupe of dancers. The music for gong kebyar is of an astonishing degree of technical complexity and difficulty. A huge number of new works are composed for gong kebyar

each year and the annual playoff between representatives of the eight regions for the title of best group attracts a large following, with television broadcasts and a live audience of about 15,000. In Bali, there are some 1,500 gong kebyar groups. Almost all of these play to a standard fit for entertaining the gods, which is one of their functions.

In reflecting on these figures—eight orchestras of high standard as against fifteen hundred— it seems to me we are bound to enrich our understanding of musicianship if we can learn how and why so many Balinese take on the commitment to become skilled musicians. What is it about the attitude to music, the method of teaching, and so on, that makes this possible? Is the introduction to Bali of tertiary institutions devoted to training students in the arts consistent with the preservation of traditional values and practices, and if not, how significant is this? These and other relevant questions are debated in a lively fashion by the Balinese. I do not see how we could fail to grasp more about our own attitudes to music, to musicians, to performance, and to music pedagogy by considering theirs.

III

A further factor that is regularly ignored in considering the nature of musicianship is the relevance for this of developments in sound technology. I claim we can come to a clearer understanding of what is valuable in and relevant to live performances of classical works by comparing such performances with others that have different purposes and constraints, such as studio recordings that aim to simulate live performances, studio recordings that abandon the norms and aspirations of real-time playing in search of a new sound environment that uses technology to transcend many of the limitations of live music making, and new modes of live performance

that abandon traditional instruments in favour of working directly with and on the products of the sound technology.

As musicians are aware, there are differences between the approaches appropriate to live performance and to studio recordings of works created for live performances. In the studio, performances involve approaches that are not normative for live renditions. For example, the sections need not be played in order and re-takes can be made. This is a good thing, because the faults these prevent are more disfiguring of recordings than live playings. In a live performance, errors and infelicities arrive unexpectedly and are over the moment they are passed. In a recording, these same mistakes take on more import. For second and subsequent hearings, they are present for the listener from the performance's beginning, with each waiting to step forward with attention-grabbing unavoidability at its given moment.

Moreover, different kinds of interpretations are suited to the two situations. Live performances should project an interpretation that quickly engages the audience; it needs sweep and scope. In the studio, by contrast, a more intimate, focused, intricate, and polished reading of the work is called for. As a result, an interpretation that would be too reserved, inward, and subtly detailed for the live situation might be ideal on a recording, and an interpretation that is vivacious and original in the concert hall might be too bombastic and extreme on disk, given that the disk must wear well on the ear through repeated hearings.

This is not to deny that some virtuosos who made early recordings played as if they were in the live situation, or that many of today's soloists play in public as if they were laying down a recording. It is to say, however, that recordings should not be confused with live performances, even if they

simulate them. Only the most naïve listener would regard them as invoking exactly the same constraints and as pursuing exactly the same goals. It is all too easy, though, to overlook the significance of the fact that recordings have supplanted live renditions as our paradigm for performance. Most of the music people encounter now, including performances of works conceived originally for live performance, is electronically mediated, having originated in the studio. And most of the music played by psychologists to their subjects is recorded, though the paradigm assumed by the study is that of live performance.

The development and prominence of the technology of recording has given rise to new kinds of musical works. One dispenses with performers. Instances of such works are generated when clones of a master are played back via a suitable decoding machine. For instance, the piece might be composed on a computer and consist only of electronically generated sounds that are encoded digitally on disks and sounded when those disks are played on industry-standard hi-fis.[vii]

The second type of work, which is of more interest in this paper because it involves performance, is one created for what I call "studio", as opposed to live, performance. Such works are for rendition in the studio because they presuppose its technological resources for their performances. Composers and performers of these pieces transcend the limitations of the voice, of ten-digit musicians, and of acoustic instruments by using over-dubbing, filters, and any number of other electronic manipulations, though their original sources are sounds usually produced via human involvement. They massage and sculpt sound to produce "artificial" soundscapes unlike those resulting from live, "unenhanced" playing. Rather than simulating live

performance, these recordings aim to create virtual ones. Yet the pieces on these recordings are for performance, not purely electronic, since new recordings, ones made by other musicians and that rely also on the resources of the studio, result in new performances of the given core piece, not in different but derivative works.

Works for studio performance emerged in the 1960s and soon came to dominate the popular music scene. Most pop songs are for studio performance, I maintain, and they are re-performed when they are "covered". Like the popular songs of earlier eras, they allow considerable latitude to the performer, so the new version sometimes differs considerably from the original recording, as is the case with William Shatner's recording of the Beatles' "Lucy in the Sky with Diamonds". It is, nevertheless, of the original song—I am sure that copyright fees are claimed accordingly—and counts as a new performance of it, not as some different piece.[viii]

One reason for distinguishing works for live and studio performance is that they call for such different musical skills and techniques. Music composed for live performance can be recorded in the studio, and the norms for these performances differ from those for live performances, as I observed above, but we do expect that the musicians who play Beethoven's Fifth on a recording are capable also of making a fair job of doing so live. They would have "cheated"—that is, violated the norms for such performances—if they had recorded all the difficult parts at half pace and relied on an engineer to bring the tape up to speed; just as an opera singer would be deemed to be cheating if she were caught lip-synching on stage to her own recordings. Where the recording is of a work created for live performance, we judge what is on it against the sonic ideals of live performances.

The norms for performances of works for studio performances are different, however. The pop singer does not "cheat" if he uses multi-tracking to harmonize with himself on the recording, or if his voice is filtered and otherwise modified electronically. And if he goes on tour, his "live" performance is properly to be judged by what is on the disk, not vice versa. He does not swindle the audience when he mimes to his recording, or when he sings only some of the disk's vocal lines, or when he relies on pre-recorded "samples" and drum machines, or when he imports as much of the paraphernalia of the studio to the stage as he can. For this kind of music, the traditional skills of the musician may be less important (though this is not to deny the virtuosic ability of many electronic guitarists). Other demands replace them, however. The performer needs the imagination and the expertise to employ the resources of the studio in order to generate a distinctive sound environment. In consequence, the record producer may be more important to the result than the session musicians who lay down backing tracks. Pop groups soon saw the creative importance of controlling the technology of production for themselves, and there was a significant shift in what counts toward a person's musicianly credentials as a result.

There is one further impact of recording technology on the kind of know-how we associate with musicianship that deserves to be noted. The products and machinery of sound technology can themselves be appropriated for new modes of live performance; they can be substituted for traditional musical instruments. An early example was KNOBS (1971) by John Cage and Lejaren Hiller. This work was issued as an LP plus instructions on how to modify the record player's dials as the disk was played. The LP supplied the raw sonic input, but the work was instanced only when this was coupled

with the specified knob twiddling. In other words, the sound of a faithful performance is what is sonically produced by modifying what is on the disk in accord with the instructions that accompany it. Whereas the person who fiddles with the graphic equalisers on her hi-fi as she plays Beethoven's Fifth does not become a co-performer with those on the disk—both because Beethoven's Fifth includes no part for a knob twiddler and because the recorded performance is already deemed complete once the disk is issued (Davies, 1997)—the person who follows the instructions issued by Cage and Hiller does thereby perform their work. KNOBS is like Beethoven's Fifth in being for live performance, but, unlike Beethoven's Fifth, it is for disk and disk-jockey, not orthodox musical instruments (even though orthodox musical instruments, namely harpsichords, provided the pre-performance material that finds its way onto the disk that contributes the source input to the knob turner's performance).

Viewed within the context of classical music, KNOBS might appear to be a singular and eccentric. Nothing could be further from the truth when a wider perspective is adopted on the music scene. In major branches of popular music—in particular, in hip hop and techno—the disk-jockey became the key performer of a new brand of improvised music. Apart from his own voice and words, if used, his instrument became the twin-turntable record deck and his source materials were appropriated from the recordings of others, these being modified by sampling, sequencing, scratching, and filtering. Meanwhile, stage musicians often now rely on pre-recorded samples or music machines, though they may access these by touching the piano-like keyboard of a synthesiser.

Sometimes such practices are cited as evidence of the decline in performers' musicianship. I would be wary of any quick jump to that conclusion. The techniques and skills required by these practices are different in many respects from those necessary to mastering the live playing of orthodox instruments. And the new instruments are further removed from orthodox musical instruments than are electronic adaptations of those traditional instruments. The electronic guitar allowed for many devices and methods not permitted by its acoustic predecessor, such as the integration of feedback into the sonic output, but many of the traditional values, standards, and requirements for good playing survived the instrument's electronic adaptation[ix], whereas this is not obviously true of knob twiddlers and disk-jockeys. Nevertheless, one could argue that musical instruments that no longer place a premium on manual (and mouth and foot) dexterity open up new aesthetic possibilities, as well as "democratising" musical performance. And my impression is that the superior examples of hip hop and techno are full of the creative originality, intensity, and energy that one finds from the work of the best musicians in all kinds of music, even if the methods of playing and the instruments on which they are exercised are so different.[x]

IV

If the incentives to musicianship in other cultures differ from ours, what should that tell us about classical music performance? If pop musicians have taken musical performance in new directions, by developing the possibilities for sculpting sound electronically, or by appropriating to the live performance setting "instruments" and modes of "playing" that seem far removed from the traditional values and virtues of musicianship, what lessons should carry over to our understanding of classical musicianship?

The quick response is that I do not know. But this much is clear, I hope: if we want to appreciate the nature of musicianship in the performance of classical works we cannot afford to be insular. Introspection and phenomenology should give way sometimes to a wider view that acknowledges the variety of performance types and accepts that there are many ways and contexts in which musicianship can be realized.

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Endnotes

[i] I skip over the discussion of innate practical knowledge. Even if great musicians are born rather than made, they still have to learn how to play the violin, the piano, or whatever. Perhaps musicianship builds on a special genetic inheritance, so that not everyone can attain it, but even the most naturally gifted must nurture her talent if it is to ripen to fruition.

[ii] One can know how many times the postman rings, but that is not the sort of "know-how" covered here, which is always followed by a verbal infinitive. In fact, knowing how many times the postman rings is an example of "knowing that"; that is, of propositional rather than practical knowledge.

[iii] Even if it is true that basic neuro-structures of deep, transformational grammar are innate and universal, one's language is learned. Had I been raised differently, it would not have been English I learned as my mother tongue. (For discussion of differences between explicit and implicit knowledge and between accessible and inaccessible memory as these affect language use and acquisition, see Ellis, 1994.) A comparison with songbirds (passerines) might be relevant here. Some species, such as the

Chaffinch, sing when raised in isolation from their kind, but what they sing is a crude caricature, a kind of Ur-version, of the Chaffinch song, which in practice is much more detailed and is inflected by many local dialects. The song of the Chaffinch may be based on the innate, proto-version, but goes far beyond this in ways that depend on learning by imitation. In my terms, the Chaffinch song involves acquired and cognitively impenetrable know-how.

[iv] My distinction between retrievable and non-retrievable practical knowledge does not presuppose the existence of independent explicit and implicit learning systems. Within the psychology literature, there is controversy over whether there is an implicit learning system; see French & Cleeremans, 2002.

[v] My use of the term "basic action" is deliberately vague. With reference to the competent musician, playing a trill might be an example of a basic action. For the beginner, the basic actions might be better thought of as finger and hand movements.

[vi] Joseph Kerman (1985: 196) writes: "A musical community does not maintain its 'life' or continuity by means of books and book-learning. It is transmitted at private lessons not so much by words as by body language, and not so much by precept as by example … The arcane sign-gesture-and-grunt system by which professionals communicate about interpretation at rehearsals is even less reducible to words or writing. It is not that there is any lack of thought about performance on the part of musicians in the central tradition, then. There is a great deal, but it is not thought of a kind that is readily articulated in words". If Kerman's point

is that words soon run out when it comes to the description of the actions that go into performing, I agree. There may be much more to be said, though, about the thoughts and judgments that lead the musician to one interpretation or way of playing as against another. Some musicians are able to talk fluently and intelligently about their interpretations, even if they grunt at each other in rehearsal.

[vii] Though such works became more common with the advent of electronic encoders and decoders for sound, they have a long pedigree. Composers who wrote new pieces for music boxes, barrel and other mechanical organs, calliopes, and the like were creating works that are not for performance.

[viii] Here I differ from Theodore Gracyk (1996), who argues that rock works are not for performance. As indicated, I think his view is at odds with the strong performance tradition that underpins such music and with the attitude adopted to "covers", which are treated not as new but derivative works but, instead, as new performances of the given piece.

[ix] For an exchange on this and related topics, see Baugh, 1993 and Davies, 1999.

[x] For further discussion of the issues in this section, see Davies, 2001.