in the element of permanent creation
there is no compulsion

every model
involves compulsion

not that we can live
without them
though we only really live
in the moments
we throw them away[1]

Chapter 9: Two Sides of the Same Coin—Professional Knowledge and the Culture of Knowledge

Introduction

Referring to a case study on the work of forest rangers, in which both calculations (of the value of timber and forest land) and judgements (of the quality of a wooded area) form part, Bo Göranzon writes in *The Practical Intellect*: "When giving their views on computer support in their work, the rangers repeatedly returned to the point that *the ability to calculate and the ability to make judgements were two sides of the same coin. – The double grasp*.[2] Over many years Bo Göranzon conducted research projects into professional knowledge and computerisation at the Centre for Working Life in Stockholm.[3] These research projects were based on carefully reasoned epistemological positions and led to an ongoing and advanced process of

1 From poem nr. 150 in the final suite in "Det omöjliga; andra delen" ("The Impossible; the Second Part") in Göran Sonnevi, *Det omöjliga. Dikter* (Stockholm: Bonniers, 1975).
2 Göranzon, *Practical Intellect*, 32.
3 When the Centre was closed down, he continued his research in the Skill and Technology programme at the Royal Institute of Technology (KTH), Stockholm. Later he moved on to the Linnæus University, Växjö, and the Centre for Skill and General Education (Centrum för yrkeskunnande och bildning.).

reflection on knowledge and knowledge formation.[4] The concept of tacit knowledge has been a key one in this work.

My intention here is to look at a number of themes, about which Bo Göranzon has some important things to say, above all in his book *The Practical Intellect*.[5] My main aim is to deepen and extend my own discussion about knowledge in action. "The phenomenon of the double grasp" is one important theme, another is *certainty* in a practice and its conflictual relation to *criticism and critical study*. We will also be considering the subject of research into professional knowledge, a problem that has been accentuated by Wittgenstein's statement that *a practice has to speak for itself*.

A central theme in the work of Bo Göranzon, in which various artistic portrayals feature prominently, is the way in which professional knowledge and experience are portrayed. His studies, *The Practical Intellect* in particular, are themselves fine examples of a portrayal of this kind. This is an aspect that I cannot mirror here. With reference to portrayal, it is important to consider the issue of which *concepts* are used to talk about knowledge. I start therefore by reflecting on time and rhythm.

The Time and Rhythm of Knowledge

90-talets industriarbete i Sverige[6] (Industrial Work in Sweden in the Nineties) was an authoritative work which presented the dominant lines of research into working life in Sweden at that time. Its focus was on changes

4 The research theme of Education-Work-Technology at the Centre for Working Life provided the foundation for this work. An overview of work carried out at the Centre 1977–91 is presented in Florin, *Skill and technology*, together with a bibliography. Important documentations of some of this and later research are the volumes Bo Göranzon and Ingela Josefson, eds., *Knowledge, Skill and Artificial Intelligence*, Bo Göranzon and Magnus Florin, eds., *Artificial Intelligence, Culture and Language*, Bo Göranzon and Magnus Florin, eds., *Dialogue and Technology*, Bo Göranzon and Magnus Florin, eds., *Skill and Education*, and Bo Göranzon, ed., *Skill, Technology and Enlightenment*. More recent research is comprehensively described in Bo Göranzon, Richard Ennals and Maria Hammerén, eds., *Dialogue, Skill & Tacit Knowledge*.

5 Göranzon, *Practical Intellect*, is an edited and somewhat shortened translation of Göranzon, *Praktiska intellektet*.

6 Bengtsson et al., *90-talets industriarbete i Sverige* (Stockholm: Carlsson, 1991).

to working life, particularly on the kind of research and development work which contributes to desirable changes. Issues to do with organisation and the working environment appear to be very important. This comprehensive book contains, however, almost no discussion about the *contents of professional knowledge*: What does professional knowledge consist of? What changes are taking place? I was able to find only one discussion which directly engages with the key issues pertaining to the contents of professional knowledge. It can be found in an essay by Lars Bengtsson and Paavo Bergman, "Kvalificerat lagarbete som möjlighet och problem" (Skilled Teamwork as an Opportunity and a Problem). What they discuss is *time*.

The context Bengtsson and Bergman refer to is the work of operators in the chemical processing industry and computerised, numerically controlled production.[7] The periods during which the operators do not directly intervene or actively monitor the processes are referred to as time not bound by process, also known as *passive* time. As the authors point out, what this supposedly passive time provides, however, is "scope for reflection and shared knowledge formation, an opportunity which is essential if the process is to be handled correctly."[8] When it comes to jobs which require collaboration, what is important is that "you know one another well and have a common mental picture of the way the equipment works, in order to be able to act appropriately and in concert."[9] Such knowledge and such images—which typically belong to the realm of orientational knowledge and familiarity—are developed over a long period, "passive time" is necessary time.

Susanne Rosberg has described an experienced physiotherapist who deliberately removes items from the treatment room, in order to have an excuse to leave the patient now and then with the express purpose of gaining *time* and opportunity for reflection on what she is doing and in order to decide what to do next.[10] This, too, is indispensable "passive" time. In

7 Lars Bengtsson and Paavo Bergman, "Kvalificerat lagarbete som möjlighet och problem," in *90-talets industriarbete i Sverige*, ed. Lars Bengtsson et al., 285, 291 (Stockholm: Carlsson, 1991).

8 Bengtsson and Bergman, "Kvalificerat lagarbete," 291.

9 Ibid., 285.

10 From a project involving interviews with experienced physiotherapists, oral communication.

order for knowledge to come to expression, a rhythm is required between acting without hesitation and reflecting.

Maja-Lisa Perby has referred to similar phenomena in the work meteorologists devote to developing and changing their internal weather-picture.[11] It takes time to develop that picture of the weather which plays such a vital part in the professional knowledge of the meteorologist. Information needs to be digested; the picture has to ripen into shape. One of the meteorologists said that when their duties are less heavily scheduled, "pieces of information fall into place when you take a cup of coffee and do not think of work for a while."[12] The meteorologists point out the importance of their conversations with pilots while briefing them, for example, and of those with colleagues: "It is important that the two of you are meteorologists talking together so that you can each say to the other what you think is important or peculiar. That's when you can get a valuable exchange of views. You also remember things better than if you try to tell yourself to remember this and that."[13] This all points to the need for "passive time." However, the trend is for the availability of this kind of time to diminish, since work duties are becoming increasingly tightly scheduled and the volume of information is increasing all the time. These issues of time and rhythm directly affect the very rhythms of thinking and knowledge. As one meteorologist put it: "there are short thoughts and there are long ones."[14]

On several occasions, Bo Göranzon stresses the significance of time and rhythm, including a reference to the experience of meteorologists, highlighted by Maja-Lisa Perby.[15] He refers "to rhythm, co-ordination, motion at work" which also includes the "movements of thought." He even says "the expression of rhythm is a sign that a technique has been mastered."[16] Göranzon goes on to refer to Tempte's portrayals of the work of Gösta the boat-builder's work: "rhythm is expressed in the physical action alternating

11 Perby, "Computerization and Skill," particularly 45–51.
12 Perby, ibid., 46.
13 Perby, "Den inre väderbilden," 127.
14 Perby, "Computerization and Skill," 48.
15 See primarily Göranzon, *Practical Intellect*, 51–52.
16 This and the preceding brief quotations are all from Göranzon, *Practical Intellect*, 52.

between activity and pauses in the work." Göranzon refers to the following paragraph:[17]

> The extraction of each plank from the timber, shaping it and setting it into the hull is an act of birth. Gösta appears to be ambling aimlessly round his workshop, looking at irrelevant objects, standing still for long periods, making remarks about where a particular tool has been placed, looking at the sky. His hand-rolled cigarettes are lit and then stubbed out. He goes out and rummages among the timber or just looks at it. Judging, assessing and weighing. Finally he makes up his mind. We are asked to help lift in the timber for the planking. He hums and measures, making marks with his carpenter's pencil. He takes a break for a proper smoke. This is an act of concentration. Bouts of concerted action are interspersed with moments of total relaxation. But never any haste. The haste and the effort all take place inside Gösta.[18]

This is a splendid image of a *long thought*. Concentrated thinking, rest until the thought is ready, action, reflection, airing one's thoughts and getting a reaction, and so on. Both activity and "passivity" are needed. The alternation between them is part of knowledge in action. Living knowledge entails a complicated sequence of events which takes place over a long period. In order to be made visible, the knowledge involved has to be portrayed—*including* time and rhythm. This is a consistent theme in Göranzon's book. He stresses the significance of reflection, if language and reality are not to slip apart. Knowledge is a whole whose various phases only become apparent over a longer temporal perspective.

Time and rhythm are bound to appear very differently within different activities. But one cannot "think them out of the picture" if knowledge is to become visible. It is from this perspective that philosophers—in company with a large number of other researchers—ought to reflect on their own epistemologies, which are frequently based on abstractions beyond time, rhythm and space.

Research into Professional Knowledge

Let us stick with time. Donald Schön says that nothing is as clear a sign of progress in the acquisition of artistry as the student's discovery of how

17 Ibid., 52.

18 Tempte, *Arbetets ära*, 38–40, (which we also came across in chapter 1 above).

much *time* it takes.[19] We ought also to ask the question how long it takes to *understand* what a knowledgeable person does. This is not an easy question to answer and should not be answered in haste.

One of the practice cases Bo Göranzon worked on concerned the development of a computer system for the heating, water and sanitation department at the Swedish Tenants' Savings and Building Society (HSB).[20] The aim was for computers to take over the work of performing the expert calculations made by the heating, water and sanitation design engineers, who could then be got rid of for the most part. The systems engineer, whose job was "to tap" the design engineers of an important part of their professional knowledge (according to the data 40–60% of the work of the design engineers consisted in making advanced calculations) was not very successful. This is how he describes his experiences:

> In my efforts to chart the working methods used, I was able to observe that many design engineers wishing to appear to be professionally knowledgeable did not even know how an elementary single pipe system worked. However, professional pride prevented these gentlemen from admitting their ignorance. Instead, as soon as I tried to elicit a response, they began to make demagogic statements on the relativity of everything. I have often met this phenomenon when professional pride is at risk, and I would therefore recommend that all systems engineers give some thought to the approach to adopt on such occasions. Should I continue to press my victim for information which he probably does not possess, or should I accept his vaguely-formulated responses and try to find the answers to my questions somewhere else? Or should I force him to admit his ignorance and then ask him to find the correct answers?[21]

As an afterthought he adds "it would have been well worth investing in a few days' training in systems technology for the heating, water and sanitation design engineers who would be involved in data collection—not to turn them into systems engineers but solely to give them a better idea of the relative importance of various aspects of the systems engineer's work."[22]

Göranzon refers to "a clash between two quite different perceptions of reality and language."[23] This is no exaggeration—the reality concerned

19 Schön, *Educating*, 311.
20 See Göranzon, *Practical Intellect*, 6–8.
21 Ibid., 8.
22 Ibid.
23 Ibid.

is, of course, that of the plumbing system. The systems engineer refers to "vaguely-formulated responses" of the design engineers. It is hard to believe that the engineers in question made any great effort; and who would, when encountering an individual who believed that in a short space of time she could "tap" knowledge that had taken years to acquire. Heating, water and sanitation design engineers have their own experience and their own professional language, with which they are able to build functioning heating, water and sanitation systems. The systems engineer appears to have no understanding of this at all.

Researchers can easily find themselves in a situation similar to that of the systems engineer. Researchers are keen to believe that they possess a competence and a language which are more universal and therefore also "superior" to the knowledge and the language they are researching. In one sense their language is bound to be more universal, but as a result it is more abstract and less rich. Awareness of this problem was one of the reasons Bo Göranzon and his colleagues have mainly worked with case studies over long periods, case studies that have developed on the basis of very close links with "the subjects of study."[24] It is essential that the feedback gained from the research findings, descriptions and analyses is passed on to the individuals who are being described and analysed. This is, Göranzon writes, "not just a matter of moral concern. *It is an important part of the hermeneutic method itself*."[25] In order for this kind of process to succeed, a number of preconditions have to be met. I will mention four, which overlap one another to some extent:

1) a conviction that every area of knowledge has its own special character;
2) mutual confidence in one another's' knowledge;
3) a common interest in the development of knowledge among the parties involved;
4) long duration.

24 Ibid., 13–14, 73–74.
25 Ibid., 14.

Meeting these requirements does not, of course, guarantee success. Each individual case becomes a sort of experiment, nevertheless one can develop and learn to exploit a basic knowledge of experimentation.

I shall make a few comments about each of these points, starting with the first. Anyone convinced that there is a *universal way of capturing knowledge* will adapt the material to her own language and methods, i.e. she will only see what her language and her methods manage to capture. (Schön pointed out that a technical-rational expert forces her categories, theories and techniques onto the situation she is confronted with). Anyone who believes that there is a universal *form* for knowledge—e.g. definitions or mathematically formulatable systems—cannot focus their attention on what is specific to the situation; in her search for the general, she will always be *heading away from* the living knowledge within the field. Instead, it is *case studies* one should take seriously, i.e. respect what is specific and unique—the physiognomy of the field of knowledge. Situations have faces. In general, case studies also lead to interesting comparisons between different fields.

The second precondition is mutual confidence in one another's knowledge. One cannot start by doubting, neither one's own knowledge nor anyone else's; *particularly* not that of other people when dealing with research into professional knowledge. Cartesian doubt is an impossible starting point. Learning presupposes the "willing suspension of disbelief." It is essential that *mutual* trust exists between the researcher and the individual being studied. This second point should be understood in direct connection with the third.

The third requirement is for a common interest in developing knowledge among the parties concerned. The process of research is one of reciprocal learning and teaching. An individual who believes that she is already fully proficient, will not participate in a knowledge process of this kind. The learning process also applies to knowledge of the individuals' particular areas of proficiency, for both parties. "The subjects of study" can learn more about their own skills, through reflection on them. Reflection is a dialogical process. For the researchers, this means that their methods and concepts *also* form part of and are subject to the common learning process. A requirement for fixed categories *prior* to the research process nullifies it. Such was the demand made by the systems engineer above. A hermeneutic insight into the significance of pre-understanding and into the conditions for a dialogue should be present in every element of the research process.

Shared learning requires a long time, which is part of the argument behind the fourth point. A common communicative competence has to be developed.[26] This can hardly take place without some serious disagreements and these have to be permitted to express themselves. A common interest in developing knowledge also presupposes, if the formation of knowledge is to continue and deepen, an agreement about the nature of "the good" being sought. This is part of the truth in Plato's requirement (in *Gorgias*) that art should strive to achieve the best or the good.

Finally, what the fourth point states is that there should be plenty of time. A shared development of knowledge takes time. The reflection which is a necessary part of the process requires periods of deliberation and time to mature. On occasion this may involve a very long time-scale, so long in fact that the duration of a standard research project, which rarely lasts longer than 3–5 years, will be far from sufficient.

In practice, case studies based on a hermeneutic perspective of this kind can be designed in a variety of different ways, this is part of the nature of things. At this point I will not be going in detail into the way Göranzon and his colleagues have proceeded. Nevertheless—an extended historical perspective, diversity and the drawing of comparisons have been consistent features. This diversity applies, above all, to the various ways problems, knowledge and experience are *portrayed*. The various forms of art provide access to an incredibly rich diversity of portrayals of experience. This is one of the key points in the research carried out by Bo Göranzon and his colleagues. This strategy is both exemplified and made the subject of fairly exhaustive discussion in *The Practical Intellect*.[27] This is the context in which Peter Gullers refers to pictures and says, as I have quoted on several occasions, that understanding requires a portrayal rather than a description.[28]

The research perspective may be reduced to a few key terms: case studies, hermeneutic research process, the reciprocal development of knowledge based on portrayals and comparisons. One cannot make a strict distinction

26 This point is made more forcefully in Göranzon ed., *Datautvecklingens filosofi*, than in *Practical Intellect*.

27 Such discussions are taken up at intervals starting in chapter 3 in Göranzon, *Practical Intellect*.

28 Göranzon, *Practical Intellect*, 74.

between the findings and the process in a research procedure of this kind. The value of the findings becomes clear primarily through the *continued* reflection and knowledge formation they have led to—this is an aspect of the hermeneutic circle. In large measure, knowledge formation has to do with learning to see new things, with focusing the attention. Here we meet once more those old campaigners in the field of knowledge in action: learning and attentiveness. The emphasis on case studies and comparisons puts *examples* back in the spotlight. Explanations and concept formation occur primarily through examples in the research process I have sketched out here, with particular reference to Göranzon.

Every attempt to carry out research may lead to failure in individual cases. There are no guarantees. If one emphasises reciprocity and dialogue, the consequence may be that disagreements fail to be expressed, with the result that no knowledge formation takes place. It is therefore appropriate to make use of provocative and dramatic portrayals and comparisons. This is the perspective in which Bo Göranzon quotes a few words from Shakespeare; "I will teach you differences."[29] Referring to a concept of dialogue that is rather too undifferentiated, he says:

> Our perspective is that it is the *diversity*, the manifold nature of dialogue which is the point. We have been given an idea of the breadth of different meanings. It is inconsistency which gives the concept of dialogue its vitality, the paradox being that if we accept the meaning which confirms our preconceived notions, "what we recognise," then we find ourselves in a different area—the area of the monologue.[30]

This applies both to the dialogue as a concept, and *within* the dialogue.[31]

The Double Grasp: Routine and Expertise

The double grasp represents the unity of the ability to make calculations and the ability to make judgements. Or put in rather more general terms: expert calculations cannot be separated from routine operations. This insight has both an empirical dimension and a conceptual one, the latter is

29 Ibid., 102.
30 Ibid., 100–101.
31 Cf. what Göranzon says about *friction* between the different perceptions people have in a dialogue, ibid., 83, and what Wittgenstein says about "smoothness," quoted in ibid., 82.

connected to Wittgenstein's reflections on the following of rules and practice. The empirical and conceptual sides are also linked together in the kind of "double grasp" highlighted by Göranzon. We will start by considering the empirical aspect.

The case studies carried out by Bo Göranzon were concerned with the long-term consequences of computerisation, particularly in terms of what happens to professional knowledge and professional culture. The first signs of the erosion of professional knowledge may not be manifest until a relatively long time, 4–5 years, after computers have been introduced into a particular field. The case of the forest rangers serves to exemplify this.[32]

Previously, forest rangers had gone into the forests in person to take measurements and to carry out surveys; the value of the timber and the afforested land was calculated on the basis of these and other data (from maps, etc.). In addition, the duties of the forest rangers included the subsequent purchase and sales negotiations. This meant that the assessments made by the forest rangers could be contrasted with those made by others. The work of the forest ranger included making advanced qualitative judgements, complicated calculations and having to *stand for* their findings—as individuals—to argue for their valuations and defend them.

A single valuation of a forest property involved almost a thousand calculations, to which seven to eight hours of manual calculation work were devoted (which does not mean that they counted using paper and pen but with calculators, and in some cases, with the help of assistants). The majority of these calculations were considered to be routine.[33] As a result, they were deemed suitable for calculation by a computer system instead. However, in the course of making these calculations a number of plausibility judgements and corrections had also to be made. This led to the idea that the terminals should be manned by the forest rangers themselves. This was not how things turned out. Instead, a new staff category, with a mediating role between the computer system and the forest rangers, was invented to man the terminals.[34] There was certainly more than one reason for this. Some five years after the introduction of computerisation, the forest rangers

32 The presentation of this case study takes up the whole of chapter 2 in ibid.
33 Ibid., 19–20.
34 Ibid., 25–26.

were working "more as lawyers than technicians," they spent more time on purchasing and selling at the expense of their forest valuation work. Their skills at forest evaluation were eroding.

Bo Göranzon held a large number of conversations with forest rangers and others, about the extent to which the division of labour between calculation and judgement tended to weaken the ability to make judgements. One of the heads of the Forestry Division at the County Board of Agriculture said: "The manual calculations they do in the office teach them which factors are important and which are less significant. The cause and effect relationship throughout the sequence of operations becomes apparent to them. This is the best way of seeing clearly how some factors in the process affect the final result. This is essential experience for people who are going to make judgements out in the forest."[35] The importance of making manual calculations for maintaining professional skills in the valuation of forests was a recurring theme among forest rangers. One forest ranger said. "When we were doing the calculations by hand the valuation was more "alive." One knew what each step meant and how much weight each factor carried. Errors could be corrected. But EDP is more anonymous. Systematic errors can remain hidden."[36]

Why was manual calculation so important? Bo Göranzon brings the threads together in the following way;

> Firstly, it was not a question of purely mechanical calculations but of calculations that were interspersed with plausibility judgements. Calculations combined with judgement to form a whole. One could not therefore draw a clear line between routine and complex operations.
>
> Again, calculation can give one *a deeper knowledge* of the data collected at the inventory stage. When the forest ranger uses this material in his calculations—and not until this point—he gets a total picture, an *overview*.
>
> This overview emerges naturally, effortlessly; the forest ranger sees the proportions, the factors that weigh heavily, the effect a variation will have.
>
> The overview produced by the calculation process is also important when the forest ranger makes his inventory in the field, enabling him to take into the forest,

35 Ibid., 24.
36 Ibid., 31.

so to speak, the impression of his in-depth understanding and the result of his reflections.[37]

Bo Göranzon has put his finger here on something I would call an illusion with a great many negative consequences (in mathematical didactics to name but one of the areas affected); that is, the belief that—because one can learn to count as an isolated activity—*that* is what one is doing when one counts (makes calculations) *as part of* various other activities. This is not what one is doing, "calculation" cannot be *separated* out. As a result, one aspect of the holistic character of action can be seen very clearly in the case of the forest rangers. Belief in the separability of calculation is bound to have been strengthened by the mechanisation and computerisation of the process of calculation. "The mechanisms of calculation" have been projected *into* the human being, which is why it appears *as though* there were a separate process going on there. This is one form of introverted thinking.

The summary made by Bo Göranzon and quoted above provides a useful illustration of what Donald Schön calls reflection-in-action but which I prefer to call attentive action with several living alternatives—attentiveness in action alternating with reflection leads to *learning in action*. Learning to recognise the importance of different factors, and what variations may occur, in order to have access to living alternatives is important in all fields of activity. This is a precondition for a (creative and imaginative) capacity to make flexible judgements in the course of action. Routine calculations or routine judgements are never *simply* matters of routine to the attentive practitioner. Attentiveness is kept alive in action by continual practice. It may, however, survive a period of passivity, which is why negative consequences may only reveal themselves in the longer term, perhaps after several years—and why erosion is such a good term.

The case of the forest rangers may also serve to illustrate the significance of rhythm *in* work, since what is required are different phases for different long thoughts and the opportunity to make comparisons and to reflect in peace and quiet. If one considers the work of the forest rangers with the help of the two concepts of technical and orientational knowledge, one can see how the technical (mapping/charting, calculation) and the orientational

37 Ibid., 32; italics added according to Göranzon, *Praktiska intellectet*.

(acquiring an overview, the weighing of different factors, the evaluation of different goals) are interdependent, here one might also refer to two sides of the same coin.

Yet another of Göranzon's case studies also shows a clear connection between routine and expert judgement. It concerns a study of administrators working in the Social Insurance Offices. Their day-to-day work with the implementation of rules, in this particular case with the rules affecting the system of social welfare payments, is essential for keeping their insurance skills and judgement alive. These are maintained by the never quite finished process of adaptation between *varying* cases and rules. Routine is far more than simple routine. It does not consist solely of the "mechanical" application of a rule, not even in routine cases. The meaning of different rules and their connections with different cases are *maintained* in and through the work process.[38]

The double grasp also provides insight into the dangers of a view of knowledge which is dominated by a perspective founded on means-end rationality, i.e. that pre-determined ends should be achieved by efficient means, instrumental knowledge. A perspective of this kind would probably consider accurate forest valuations as an (objectified) goal while everything else is considered to be the *means*, e.g. calculation and overview. What is missed, as a result, is the *interplay* between different forms of judgements. We have to learn to *see* quite different connections than those between ends and means, in order to understand professional skills and, more generally, knowledge in action—how the whole determines the parts, for example, and how processes of creation, judgement and orientation are present in every element of skilful practice (knowledge in action). *The form* such connections take in various activities is, of course, an empirical matter. Investigating this requires case studies. But it also requires concepts, patterns and metaphors which make epistemological reflection possible, that is, make it possible to see, to bring out and discuss the concept of living knowledge. The double grasp is just such a pattern-forming concept (and such a metaphor). At this point let us turn to the conceptual aspect.

38 See Göranzon, *Practical Intellect*, 74–78.

Bo Göranzon links his thoughts on the double grasp to Wittgenstein's reflections on rule-following and practice. The most important message (in chapter 8 above) was that rules and concepts cannot be based solely on interpretation and choice, they have to be linked to immediate action. It is through practice that one learns what it means to follow a rule, and *by virtue of this* that a rule exists with the meaning it has. It has no purely abstract meaning. The rules of arithmetic and algorithms provide us with clear examples. They can also be used to illustrate the difference between rules of action, which I have been referring to hitherto, and a mechanised, objectified concept of rule. The illusion referred to above confuses them. We can formulate an arithmetical rule or algorithm such that a computer can be programmed to carry out calculations, think of addition as the simplest possible example. In which case, it is *the rule* which literally *governs* the process.[39] *We*, however, do not have some "inner rule" governing us, we learn to *obey rules* by learning a practice. We can both learn and teach certain activities—through practice and by being given instruction. The rule which we follow, irrespective of whether and how accurately it can be formulated, only *exists* as a result of *our* following the rule. Our actions support the rule, not the other way round. If one considers the calculations of the forest rangers on this basis, it is easy—given a sound pre-understanding of their activity—to see and understand essential features of the work of the forest rangers.

Learning (to follow) rules (instructions, hints, etc.) is never a purely abstract matter. It always occurs in connection with learning *judgements* of various kinds. Although we learn to do "pure" arithmetic—with "pure" numbers, this is a very special activity. It is not *pure* arithmetic of this sort which is being "applied" when the forest rangers make their calculations. The illusion I mentioned persuades many people that this is, in fact the case.

In real-life activities, numbers are never just numbers. What numbers tell us belongs to reality: numbers can be *directly* connected with experience, when a forest ranger makes a valuation, for example. Thinking about reality and making calculations are not two *distinct* activities. This makes it advisable in certain cases to make use of mechanical calculations.

---

39 Cf. ibid., 61.

The fact that application is not a mechanical process may be more easily understood if one thinks of the work of the administrators with implementing the rules for social welfare payments. An understanding of the rules, and hence of the judgements, comes from an understanding of the cases. There is, however, a very powerful ideology which encompasses all fields of activity and which says that the rules are primary in relation to their *application*. Once again we come up against what is, fundamentally, the same illusion we have encountered previously. Think instead of how the rules *are kept alive*, which happens as a direct result of "application"—that network of *activities and judgements* which are involved in following the rule, breaking it, seeing the rule as plausible *and so on*. The administrators may not, of course, interpret a legal regulation any way they choose; rules and their implementation are rooted in a much broader complex of activities which I will not attempt to describe here. But legal rules are always rooted in a complex of activities, it is here they are kept alive.

Bo Göranzon emphasises the fact that one does not learn to master a profession or a field of knowledge simply by learning technique but rather that one learns "proper judgement acquired through personal experience."[40] It is *by virtue of this* that one *also* acquires technique.

Göranzon extends the scope of the debate about the primary role of experience and judgement in relation to (formulated) rules when discussing Wittgenstein's view of rules and the following of rules.[41] The link between language and reality is maintained by experience and judgement, which can be communicated to others—in a professional community, for example. Göranzon points out that this link can be broken, by interposing—almost literally—an abstract computer system between rules and action, which leads in turn to an erosion of knowledge. Nevertheless, many people continue to look in the wrong direction, even when skills are eroding within a field of activity. They focus on the abstract system of rules and believe that the fault must lie there. Instead, they should consider the complex interplay between human judgements and activities which turns something into *rules in practice*. A practice is maintained by means of rules *and* examples *and* other things.

---

40 Ibid., 40.
41 Ibid., 80–81.

The empirical aspect of the unity between skilled judgement and routine (calculation) is linked with the conceptual aspect in a kind of double grasp, as highlighted by Göranzon. Wittgenstein's conceptual reflections are concerned in part with rules, interpretation and action. They take on meaning through empirical examples, even though they may not depend on any particular example. In order to understand what Wittgenstein's examples are telling us, outside of his rather restrictive sphere of examples, we need to supplement them with helpful *examples* of the way *rules* and *judgements* are used, what happens when rules are formed and abolished, how the various proficiencies at making judgements can be dissolved by the dissolution of connections-in-action and so on. This is the way in which to make Wittgenstein's thoughts come *alive*. It is here that Göranzon's examples prove their worth.

Developing Certainty—"So That You Know What You Are Doing"

"Certainty in action" and "certainty in a practice" are key terms in *The Practical Intellect*. Certainty exists in a strained relation with criticism and a critical tradition of enlightenment. Göranzon is aware of this and takes the "paradoxical" view of knowledge of the enlightenment as his starting-point, in order to reflect this tension. He considers it a tension between two ways of relating to knowledge—linked with a practical and an abstract intellect, respectively—and, hence, a tension between two professional cultures.[42] Certainty in action is not an unambiguous concept but rather a many-faceted and more or less coherent complex of concepts.

Wittgensteins's ideas on the connections between words, action, rules and practice throw light on the definitive and tangible in practical knowledge. Direct (immediate) action is at the heart of the knowledge of practice, there can be no space for doubt or hesitation. What is definitive in an action, what is "blind," may be the result of—and the expression of—knowledge and insight acquired through many years' experience. This has nothing to do with any lack of reflection. My view of this linkage (which was formulated in the preceding chapter) has been inspired by Göranzon. He mentions an

42 Ibid., 4.

"*imperative aspect* to following rules in a practice."[43] Göranzon makes bold—sometimes rather too bold—links between Wittgenstein's philosophical reflections and the empirical experience of professional skills. He quotes the following words of Wittgenstein: "When I know how to act in every particular case, this means that I can act without hesitation, it is self-evident to me. I say 'Of course'. I can give no reason."[44]

The heading for this section was taken almost word for word from a statement by Gun-Marie Forsberg, a cartographer and calculation assistant at the County Agricultural Board in Umeå, who became a computer operator and, as such, one of the new category of intermediate personnel between the rangers and the computer system when computers were introduced to help with the forestry valuations. She says: "When they talk to us about training, it sounds as if they were discussing a five-year programme. That is not what it is about at all, it is a question of building up certainty so that you know what you are doing."[45] Certainty—and knowing what one is doing, as a result—is a key element in professional skills and identity. Maja-Lisa Perby emphasises the same point in relation to the certainty of meteorologists at work.[46] Certainty does not depend on sophisticated technical forms of assistance. It comes about as a result of the meteorologist building up her own well-founded notion of the weather—a well-founded internal weather picture. It is only when she has acquired this picture that the meteorologist is also able to answer such questions as "fall a little outside the expected ones" during a briefing—i.e. it is only then that she has living knowledge.[47] Bo Göranzon writes:

> The question of certainty when acting in a practice lies at the core of the practical intellect. In the two case studies, from the County Agricultural Boards and the

43 Ibid., 81.

44 Ibid., 82. He cites Ludwig Wittgenstein, *Remarks on the Foundation of Mathematics*, 3rd ed., trans. G. E. M. Anscombe (Oxford: Basil Blackwell, 1978), 326, in a (free) Swedish translation, retranslated here into English. This is the actual text in question: "I have a definitive concept of the rule. I know what I have to do in any particular case. I know, that is I am in no doubt; it is obvious to me. I say "Of course." I can give no reason."

45 Göranzon, *Practical Intellect*, 26.

46 Perby, "Den inre väderbilden," 110–112.

47 Perby, "Computerization and Skill," 49.

> Social Insurance Offices, the employees felt that they were less certain in their judgements than they had been before computers were introduced. A reorganisation of the Social Insurance Offices introducing broader work tasks resulted in a fall in the level of certainty in work.[48]

A whole family of concepts are to be found orbiting this core issue: certainty in action, following a rule (blindly), immediacy, "the definitive" in practical knowledge, an "imperative aspect." More of these could easily be added. How are we to distinguish the most important aspects?

Bo Göranzon explains the conceptual complex of "certainty in action" by setting it in different contexts. An important dimension is the way people talk about their own work. Another, which we shall soon be considering, is the way the complex is mirrored in the history of ideas starting from the Age of the Enlightenment. A further dimension is furnished by the link with Wittgenstein. Fundamentally, Göranzon's strategy is a good one. Occasionally what appear to be "indirect methods" prove to be the most direct. It is quite pointless to try to define (both in words and in general) the kind of certainty involved. On the other hand, Göranzon entirely overlooks a number of key issues in this complex of concepts. I shall be filling in a number of these.

Madmen are able to act without hesitation, without being able to see any alternative and, in so doing, they follow a rule "blindly" and experience "imperative aspects." Ignorance is not always characterised by hesitancy, unfortunate though this may be. It is obvious that a subjective element exists which is covered by many of those terms which belong to the conceptual complex of certainty in action; this subjective element is no guarantee that a person possesses knowledge. Göranzon has nothing to say about this.

Referring to acting "blindly" and pointing out that one does something one cannot provide reasons for are perfectly appropriate within the framework of Wittgenstein's reflections. Wittgenstein thinks that *there comes a point* where one can no longer "give a reason for one's action," when one can no longer think in terms of choice and interpretation. At the heart of language games and justifications exist "ungrounded ways of acting." What these involve is a fundamental *unity* of language with reality and action, a unity which is to a large extent *shared* by the knowledgeable and the ignorant (in terms of specialist skills)—in a shared lifeworld.

---

48 Göranzon, *Practical Intellect*, 82.

However, to set Wittgenstein's problems aside and start to think in terms of blindness and the absence of reasons as signs of knowledge in a specific field of knowledge involves the risk of completely losing one's way. There are several occasions when Göranzon comes very close to this. A misconception which may be readily available is that *linguistically formulated rules, interpretation and theory* are less crucial in general terms than immediate action. Göranzon invites the reader to share this misconception when he discusses insurance skills in relation to the case studies of administrative staff in Social Insurance offices.[49] Let us consider what this example involves. It is essential that the legal rules are *formulated*, this is important both from the point of view of legislation and implementation. *How* laws are formulated is crucial, the requirement for *exactness* is rightly prized. It would be misleading to make the implementation of the rules by the administrators more important than "the letter of the law." Equally, it is important that the administrators can provide reasons for what they do, that they do not act blindly. This is part of the requirements *within* professional practice. Jurisprudence is an obvious example of an area in which professional activity (practice) itself consists largely of *interpretation* and *formulation*. This is entirely in keeping with what Wittgenstein says.

When one is referring to rules and pointing out that rule-following is primary, it may prove easiest to exemplify this with fairly "robust" examples. There are, however, *many* kinds of rules. In some of these, formulations play an absolutely decisive role, as in legal texts for example. In other kinds, formulations are largely unnecessary. You tell someone to hold the hammer with a firm grip at the end of the handle—not close to the head of the hammer—in order to gain power and to find the proper aim for the blow. This is a rule for how to bang in a nail with a hammer. Words may be of help by way of explanation. But, strictly speaking, this rule need never be formulated, one can *demonstrate* what to do: hold it *this way*, do it *this* way. In this instance, rule-following does not require any formulation. In other cases, that is exactly what is necessary. It is therefore pointless to generalise about how important language is for rule-following in various activities, the variations are too great.

---

49 Ibid., 81.

We have now considered a number of problems and possible misunderstandings in relation to the conceptual complex of certainty in action. I shall add a few words about how to deal with some of the problems mentioned. The link to Wittgenstein will be maintained. It is pointless to try to make a rigorous division of certainty and knowledge into subjective and objective elements. This is the very thing which cannot be done, since "the ungrounded way of acting" is the basis for all that is usually referred to as "objectivity." Knowledge is "subjective" in the sense that there is no *ultimate* ground on which it can be based. There are only human ways of judging knowledge and ignorance. The key book in this regard is Wittgenstein's *On Certainty*.

As far as individuals are concerned, knowledge is rooted in action and thinking but it is not "a private possession." It is individual subjects that act, but rule-following, and hence knowledge in action, presuppose, as Wittgenstein says "an established usage, a custom."[50] What is presupposed is a shared lifeworld (in action) and a common language (in action).

No "pure" element of knowledge can be separated from an emotional aspect. Living knowledge, knowledge in action, cannot be picked apart into subjective and objective parts. This is another reason why "certainty" is a good term. The concept of "objectivity" is specially suited to theoretical forms of knowledge and there is no reason to consider such knowledge as the most basic. It is, however, also important that the subjective—here primarily in the sense of the sphere of the subject's own authority—should be weighed against another aspect, namely the way people *other* than the agent herself see her action and their knowledge in action. At which point we return to the theme we have already touched on, namely intentional actions and decisions about what a person does. A key idea here is *knowing what one is doing*. Knowledge of this kind is maintained and determined in a dialogical relationship. My own knowledge about what I do and *the ideas and descriptions of others* have to be made to coincide—otherwise the acting subject is split into internal and external elements. If a gap of this kind opens, a split also occurs in my own knowledge. The computer operator Gun-Marie Forsberg said that "it is a question of building up certainty so that you know what you are doing." She wants to stop the *gap* forming—the distance between what

50 Wittgenstein, *Philosophical Investigations*, § 198; I have quoted the larger part of this paragraph in chapter 8 above; see also ibid., § 199.

she sees herself doing and how others (both in and outside the organisation) describe and understand it.

Descriptions of what a person is doing, when she claims to act skilfully, lead to questions of the appropriateness and reliability of the procedures used. This gives rise to the question of whether there are better alternatives. The way other people *represent* an action and its alternatives is contrasted with the *certainty* of the agent herself, which includes the conviction that she *acted correctly*. These viewpoints must be made compatible if we are to be able to talk of knowledge in a shared reality. Strictly speaking, knowledge belongs *inbetween* people in a community. A community is therefore always presupposed when we refer to intentional actions, dialogue, knowledge and rules. A tension will, however, always remain: my *certainty* is my own—and yet it depends on *descriptions*, the validity of which I do not have the sole authority to determine. This is a genuine tension. We shall now describe the way Bo Göranzon presents what is, fundamentally, the same tension, even though it does not appear to be similar at first sight.

Bo Göranzon emphasises the tension between what is sensual and alive, on the one hand, which all abstraction must lead away from, and what language is capable of capturing, on the other. In this way he indicates a boundary, a cultural boundary, between an abstract—*descriptive and calculating*—and a practical—*producing a portrayal*—way of relating to knowledge.[51] The two sides are given different weight in different "cultures of knowledge." Göranzon portrays the tension between them. He achieves this by seeing the tension between certainty in action and criticism as a dilemma of enlightenment, in doing so he makes use of a frame of reference from the history of ideas in which "the dream of the exact language" and "the paradoxical view of knowledge within the Encyclopaedia project" are the key terms. Here I will only be suggesting some of the main themes in Göranzon's portrayal, which is, on the whole, a very convincing one.

The dream of the exact language is also the dream of being able to present every truth exactly and in such a way that it is made accessible to human reason and to human argument. This is the dream of being able to *describe*, and thus understand, the world exactly as it really is. Language, theory and

51 Cf. Göranzon, *Practical Intellect*, 70.

the world should coincide. This dream is present throughout the Western tradition of knowledge. Time after time in the course of the intellectual history of the West, different notions of this kind of ideal language, "a universal language," have been put forward.[52] One of the most famous examples is the idea of the seventeenth century philosopher Leibniz of a universal system of signs in which all concepts are clearly defined. This system of signs was intended as a form of calculus based on the model of mathematics. Where disagreement arose, the parties would be able to sit down and literally *calculate* what was correct.[53] The dream of the exact language is also the dream of perfect logic.

The dream of the exact language can also be found to some extent among the French *Encyclopédistes*, which brings us to our focal point: the enlightenment. Göranzon makes particular reference to Diderot and d'Alembert. The belief in the exact language, with the help of which one can describe (in words, formulae and images) every aspect of reality and every context, is in some sense identical with the ideas behind the Encyclopaedia. Self-evidently this goes hand in hand with a powerful belief in language and the value of clear definitions. According to Diderot both logic and metaphysics would "be very close to perfection if the dictionary of language were well done."[54] On the other hand, Diderot is suspicious of definitions and linguistic descriptions; they are abstract while knowledge about the world is sensual and alive.[55] Göranzon quotes a passage from Diderot's *Rameau's Nephew*: "… you can't imagine how little I care about methods and rules. A person who needs rules will never get anywhere. Geniuses read very little, practise a great deal and create themselves."[56]

Göranzon finds a tension existing among the *Encyclopédistes* between a view of knowledge, on the one hand, in which knowledge is *founded* on calculation, description and representation, and on the other, a view of knowledge in which calculation, description and representation *distance* us from living and authentic knowledge. This tension touches on a central

52 See chapter 3, "The Dream of the Exact Language," in ibid.
53 Cf. ibid., 41–43.
54 Ibid., 48.
55 See ibid., 48, 52–53.
56 Quoted in ibid., 101.

point in the critical project of the enlightenment. Knowledge founded on traditions and various other unarticulated presuppositions was to be given a thorough airing, which meant that a claim to knowledge should be presented in public and made the object of criticism and argument, because everyone should be able to decide for themselves on what was right. (From the viewpoint of modern science) this was considered to require calculation, description and representation. Here, too, we see the tension between the "certainty *in action*" of living knowledge and "enlightened" certainty which *presupposes* calculation, description and representation and hence a level of abstraction that leads us away from the sensual and away from certainty.

Diderot chooses to preserve this tension between both aspects, it is the *dialogue* which provides him with the opportunity. With particular reference to *Rameau's Nephew*, Göranzon writes:

> The brilliance of Diderot's Rameau's Nephew lies in the fact that Diderot does not take sides in the struggle between the senses and the intellect, but retains the complexity and the contradictory essence of the interaction between the different layers of one's own person. This may be seen as a portrayal of the paradoxical view of knowledge in the *Encyclopaedia* project.[57]

To all intents and purposes, this is the point at which Göranzon leaves the relationship between different ways of relating to knowledge. On the one hand, there is certainty *in action*. On the other, there is the dream of the exact language, or at least the *exact linguistic expression*. This tension and polarity are to be found everywhere, including various professions. And there are more people than just Diderot, who are divided in their *hearts*.

We can also see a resemblance—or, perhaps, even the very same tension—in the relation of each and every one of us to our individual knowledge. On the one hand, I have to *rely* unconditionally on my knowledge. On the other, I know that I may have made a mistake, I may be seeing things from the wrong perspective, etc. There is no lack of possible sources of error. We see ourselves "from the inside" as acting and knowing, we see ourselves "from without" as fallible individuals in fragile traditions. Both sides are true and, to some degree, incompatible. They have to be kept together, otherwise we can no longer know what we are doing.

---

57 Ibid., 53.

Knowledge Cultures and the Culture of Knowledge

Knowledge in action requires that different tensions be kept together—at breaking point. Theories are of no great help in this regard, since they have to be kept together *in action*, in other words—in or within a culture. In this regard professional and vocational cultures are vital. The various bodies of knowledge of the lifeworld are created and maintained *within* the framework of a common culture which is not particularly homogeneous. Specialised knowledge is maintained within various sub-cultures. Obviously there are also innumerable cultural boundaries *within* the framework of a particular professional culture. There are often conflicts about who—which group—should be in charge of an area of work. Computerisation has entailed many conflicts of this kind, which is one of the things that the studies carried out by Bo Göranzon and his colleagues make clear. One example is the clash between the systems engineer and the heating, water and sanitation design engineers. I conclude this chapter with a few reflections on knowledge and culture.

It is obvious that the social cohesion of subcultures—the different professional cultures, for example—depends on a multiplicity of different factors. A determination to retain professional power over certain issues and tasks can be encountered in every field. It may contribute to the development of knowledge, by providing motivation for improving the execution of tasks by a particular profession. The struggle for power can also involve the obstruction of knowledge development when it is initiated from without; the tackling of critical questions about the state of knowledge within the group can be obstructed in this way. One can investigate various (social) factors of this kind and what one fairly soon discovers is that most of them can be *thought of* both as contributing to knowledge development and serving as barriers to knowledge. In order to find out what is really happening, empirical studies are required instead of philosophical reflections.

On several occasions I have asserted that one cannot define a pure knowledge component in knowledge in action and, in this particular chapter, I have emphasised that research into professional knowledge requires confidence in the knowledge which "the subjects of study" possess. Does this not entail "knowledge" becoming an increasingly hazy factor, difficult or impossible to distinguish from other factors. In some sense, knowledge *is*

impossible to distinguish from others factors. However, strictly speaking, knowledge is not a *factor* at all, not a thing.

Knowledge should be understood through knowledge formation (learning and training). Knowledge formation starts with questions and tasks (in a broad sense). We do arrive, to some extent at least, at correct answers and we execute tasks in a reasonably successful way. We can compare different answers and different solutions critically, in part with reference to how well they *lead us onward*. Continued learning-and-teaching is always, or almost always, a meaningful *task*. And to the extent that we can refer to continued learning, we can also refer to living knowledge.

Whether knowledge processes in this sense really exist or not is a meaningless question. Knowledge appears in so many different guises. The concept of knowledge appears to be based on family resemblances. If we consider learning to be possible, i.e. if we consider knowledge improvement possible—one may *reject* this possibility, but one can hardly *argue* against it—what we will see, for example, are various sociological findings about the ways in which groups maintain coherence as a *source* of knowledge improvement. In this way, we can introduce *these* questions into critical learning. And this is the way in which we *maintain* a culture of knowledge. At which point we also encounter the problem of modernity I have discussed on several occasions. We encounter a great deal that is difficult to survey. Maybe, in practice, only local knowledge can be well-founded knowledge. To a great extent, I think that this is the case. However, if we can find good grounds for *this*, then we possess a good deal of knowledge which is *not* purely local. To *create* cultures of knowledge in which criticism, coherence and certainty can be encountered in action is an open-ended project.