Clashes of Knowledge

Knowledge and Space

Volume 1

Knowledge and Space

The close interrelation of knowledge and power, knowledge and socio-economic development, the conflicts between orthodox and heterodox knowledge systems, and the economisation of knowledge play a decisive role in society and has been studied by various disciplines. The series "Knowledge and Space" is dedicated to topics dealing with the production, application, spatial distribution and diffusion of knowledge. Science Studies, Actor-Network Theory, research on learning organisations, studies on creative milieus, and the Geographies of Knowledge, Education and Science have all highlighted the importance of spatial disparities and of spatial contexts in the creation, legitimisation, diffusion and application of new knowledge. These studies have shown that spatial disparities in knowledge and creativity are not a short-term transitional event, but a fundamental structural element of economy and society.

The volumes in the "Knowledge and Space" series will cover a broad range of topics relevant for all disciplines in the humanities, social sciences and economics focusing on knowledge, intellectual capital or human capital, e.g. clashes of knowledge, milieus of creativity, Geographies of Knowledge and Science, the storing of knowledge and cultural memories, the economization of knowledge, knowledge and power, learning organizations, the ethnic and cultural dimensions of knowledge, knowledge and action, and the spatial mobility of knowledge. These topics are to be analysed and discussed at an interdisciplinary level by scholars from various disciplines, schools of thought and cultures.

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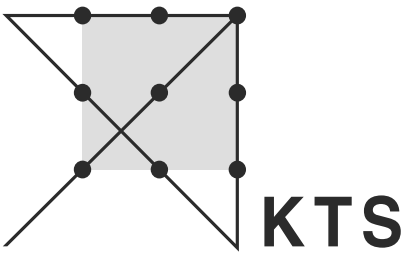
Clashes of Knowledge

Orthodoxies and Heterodoxies in Science and Religion



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Introduction to the Book Series "Knowledge and Space"

Peter Meusburger

This book is the first in the series entitled "Knowledge and Space," which is dedicated to topics dealing with the generation, diffusion, and application of knowledge. The series stems from the identically titled Klaus Tschira Symposia, a set of ten conferences that began in Heidelberg, Germany, in spring 2006 and that will continue through autumn 2010. These symposia, financed by the Klaus Tschira Foundation, are intended to bring together scientists from various disciplines, schools of thought, styles of reasoning, and scientific cultures in order to bridge some of the gaps between disciplines and to intensify communication beyond disciplinary boundaries. The symposia and the book series focus on the relevance of spatial settings, contexts, and interactions for the generation and diffusion of knowledge; the situatedness of science in space and time; the causes and consequences of spatial disparities of knowledge; the spatial mobility of knowledge; relations between knowledge and power; milieus of creativity; the storing of knowledge and the role of cultural memories; the distribution of knowledge in organizations; the relations between knowledge and competitiveness; the ethnic and cultural dimension of knowledge; the ambivalent relation between knowledge and action; and many other associations between knowledge and space.

These topics play a decisive role in society and are studied in various disciplines and in interdisciplinary research on organizations, creative milieus, learning regions, networks, and clusters. All this inquiry has highlighted the importance of spatiality in the creation, legitimation, diffusion, and application of new knowledge. The widespread assumptions that scientific results can be generated everywhere, that knowledge can be easily and rapidly disseminated throughout the world by electronic communication, and that everybody is able to gain access to the knowledge he or she needs, have proved illusory. In the age of telecommunication, spatial disparities of knowledge have not become irrelevant. Quite the contrary, their significance has increased.

In the second chapter of this volume, it is explained that spatial disparities of knowledge, professional skills, and technology can be traced back to early human history. It is shown that new communication technologies facilitated and accelerated access to freely offered and easily understandable information. They also changed the spatial division of labor, the structure and complexity of organizations, the asymmetry and spatial range of power relations, and the ways in which social

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systems and networks are coordinated and governed in space. But none of these inventions has ever abolished spatial disparities of knowledge between the centers and peripheries of national or global urban systems.

The generation of various kinds of knowledge (scientific knowledge, orientation knowledge, indigenous knowledge, and other forms of knowledge as described in Chapter 1) was eventually accepted as being situated in time and space. Truth claims, too, came to be seen as being influenced by the social environment. These two changes in thinking sparked new research questions about the meaning of space and place within the processes of knowledge production and dissemination, paving the way for geographies of knowledge, education, and science. Collectively, the contributors to this volume point out that various categories of knowledge are not as mobile in space as is often maintained. The history of science abundantly documents that up to 20 years may lapse before outstanding results, creative ideas, or original theories in one discipline come to be debated or accepted in other disciplines dealing with the same topic or a similar one. Even within a single discipline it may take a decade or more for the gatekeepers of epistemic communities to accept an innovative idea or a revolutionary new theoretical concept. International journals and electronic communication may accelerate knowledge transfer within homogeneous science cultures, within the same discipline, within established networks, or within groups of cooperating disciplines. With few exceptions, however, they seem to do little to accelerate knowledge transfer between disciplines that have no long history of cooperation.

Research on spatial disparities of knowledge and on the relevance of the spatial context for the generation, diffusion, and application of knowledge is an interdisciplinary and even transdisciplinary enterprise. It has become very fashionable in scientific and political debates to demand such a research mode, but it has seldom been adopted in a satisfactory way. The aim of the symposia and of this book series is to offer a platform to those scholars of various disciplines who are aware of these shortcomings and try to go beyond the limits of their own disciplines.

The logo of the Klaus Tschira Foundation (see Fig. 1) serves well as a metaphor expressing our concern about the situation confronting many scholars when they devote themselves to a challenging new research question and find out that problem-solving cannot be confined by disciplinary boundaries. The image presents a solution to the apparently impossible task of connecting nine dots with four strokes from a single marker without losing contact with the writing surface. Any attempt to connect all the dots within the area they define (e.g., within the limits of one's own discipline) is doomed to failure. The only way to solve the problem is to leave the demarcated field by crossing its boundaries three times and approaching the dots from the outside.

The Klaus Tschira Symposia offer an opportunity to cross disciplinary boundaries, and to create new spaces where theoretical concepts, methods, and issues of other disciplines dealing with the generation, diffusion, and application of various forms of knowledge can be intensively disputed. Because creative milieus cannot be planned and governed, such an endeavor is always risky. It remains to be seen whether and under which conditions the spark will jump over the disciplinary gaps,

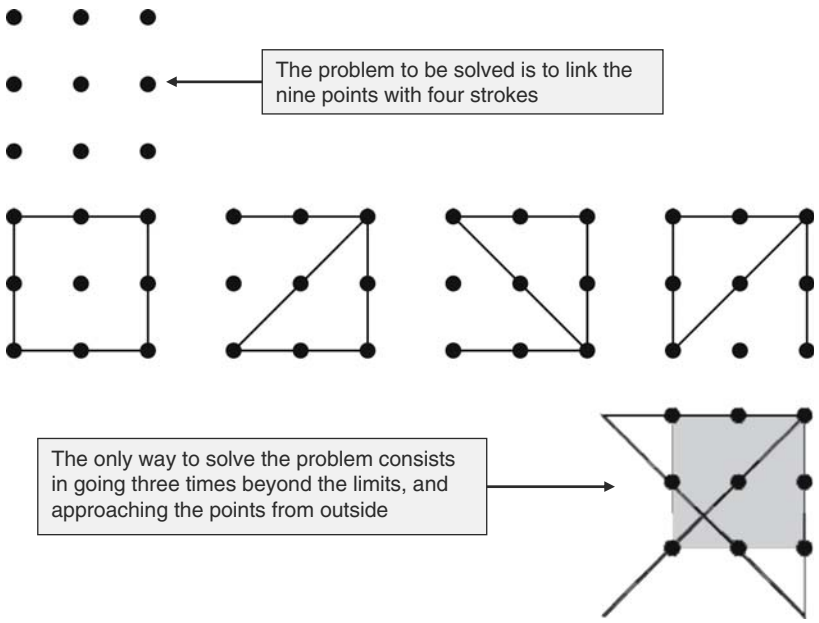

Fig. 1 Connect the nine dots with four strokes

but the experiment is worth a try, and the Villa Bosch offers everything needed for it. We are very grateful to the Klaus Tschira Foundation for providing the "venture capital" for this enterprise. We are equally thankful to Christiane Marxhausen (Department of Geography, Heidelberg University), who is in charge of organizing the first four symposia; to David Antal, who does an excellent job as technical editor of the manuscripts; and to Beate Spiegel, Renate Ries, and Sylke Peters (all of the Klaus Tschira Foundation), who contribute a great deal to the success of the symposia.

Introduction to this Volume

Clashes of Knowledge Inside, Outside, and at the Threshold of Science

Edgar Wunder

The history of science and technology is riddled with examples of outraged ridicule and even outright rejection of new kinds of knowledge and discoveries (e.g., Barber, 1961; Milton, 1996). Highlighting such responses, Truzzi (1990) wrote:

> Some of them are now even silly sounding. Lord Kelvin said that x-rays would prove to be a hoax. Thomas Watson, once chairman of the board of IBM, said in 1943, 'I think there is a world market for about five computers'. … Ernst Mach said he could not accept the theory of relativity any more than he could accept the existence of atoms and other such dogmas, as he put it. Edison supposedly said that he saw no commercial future for the light bulb. … Rutherford called atomic power 'moonshine'. (p. 3)

Although the actors in such historical controversies might have perceived the respective disputes as clashes between "knowledge" and "superstition," such a distinction is a quite tricky problem that is not easy to resolve. The notion of "clashes of knowledge," however, would have been regarded as a futile and absurd idea until the beginning of the 19th century. Up to then, knowledge (*episteme*) was generally expected to be certain and infallible, unlike mere opinion (*doxa*). Hence, there could be no "clashes of knowledge" in a self-consistent world. The agent for revealing such infallible knowledge was called *science*.

> Once one accepts, as most thinkers had by the mid-nineteenth century, that science offers no apodictic certainty, that all scientific theories are corrigible and may be subject to serious emendation, then it is no longer viable to attempt to distinguish science from non-science by assimilating that distinction to the difference between knowledge and opinion. Indeed, the unambiguous implication of fallibilism is that there is no difference between knowledge and opinion. (Laudan, 1988, p. 340)

Even worse, the subsequent attempts to compensate for this loss by finding a special epistemological virtue of science—called *the scientific method*—were ultimately unsuccessful. They failed because there was no agreement on what that universal scientific method might be and because all proposals were actually quite disputable descriptions of what most scientists really do (Collins & Pinch, 1998). As stressed by Laudan (1988), "the evident epistemic heterogeneity of the activities and beliefs customarily regarded as scientific should alert us to the probable futility of seeking an epistemic version of a demarcation criterion [of science]" (p. 348). Therefore, "it is probably fair to say that there is no demarcation line between science and non-science, or between science and pseudo-science, which would win assent from a majority of philosophers" (p. 338).

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Nevertheless, appeals to the myth of the scientific method(s) and the labeling of knowledge claims as "scientific" or "nonscientific" have time and again been powerful rhetorical devices to defend or discredit certain heterodoxies or orthodoxies of knowledge (Bauer, 1992). In scientific communities, as well as in other social contexts, there are always dominant normative systems serving as an instrument to erect the frontier between possibly acceptable knowledge and scientific heresies and to threaten social sanctions against thinkers who dare to cross this borderland (Dolby, 1979). Of course, accepting new kinds of knowledge may necessitate the genuinely unpredictable demolition and reconstruction of whole areas of old knowledge thus far taken for granted, so it is understandable why one is highly motivated to disbelieve unusual knowledge claims. However, few people considering new knowledge claims can afford the time to become familiar with the detailed underpinning argumentation that would make it possible to evaluate their merits properly, so the tendency is to conform to and rely on the norms given in the social environment. Scientists generally do not differ from other people when it comes to being subject to all the biases and self-justifications associated with this herd mentality.

Stigmatization and pejorative labeling reaches its peak when unconventional claims come from outside the established milieu of elite scientists. In the history of science, some powerful gatekeepers have condemned whole areas of research as "pathological science," defined by Langmuir (1968) as "the science of things that are not so," and have exiled their proponents to the remote hell of heretics. Hyman (1980), himself an ardent skeptic to all kinds of unconventional claims, once wrote:

> As a cognitive psychologist, I have tried to reconstruct the thought processes that underlie many of the 'pathological' claims to compare them with those underlying the 'healthy' claims. In most cases I cannot find a difference. And so I was going to argue that there was no 'pathology' in fact involved. The same sort of thought processes that lead some scientists to make claims that Langmuir (1968) calls 'pathological' are just those that have led the very same scientists to make claims, on other occasions, that have found acceptance within the scientific community. … Langmuir's definition of 'pathological science' as 'the science of things that are not so' is colorful but useless. Much acceptable science falls under this categorization. … Although Langmuir's definition is not helpful, his cases do stand out as deviant in another sense. They all involve attempts by the scientific community to reject them out of hand—to prevent by any means their entry into the regular channels for scientific evaluation and argumentation. … [If] there is anything 'pathological' about such cases, the pathology was not to be found by looking into either the truth value of the claims or the manner in which they were justified. Rather the 'pathology' was in the scientific community's reaction to such claims—a reaction that was entirely out of keeping with the scientists' own image of rational, fair, and dispassionate dealing with claims. … We cannot decide, at least as of now, in advance that a particular claim put forth by a scientist will become one of these cases. This is because my indicants depend upon *how the scientific community perceives and reacts to the claim*. Some claims, even ones that are anomalous and controversial, are accepted as legitimate problems for debate and evaluation within the accepted scientific forum. Others are rejected out of hand. They are not allowed further consideration within the regular forum. It is not the claim as such that I labeled 'pathological', but the manner in which the scientific community responds to and disposes of it. (p. 113)

Such findings challenge the traditional essentialist view, which is still based on hopes for methodological demarcation criteria to reveal a "true" nature of science, to differ science from non-science. But in fact science is, first and foremost, a social institution. To approve such a conclusion, it is not necessary to cling to unlimited relativism or "anything goes" fantasy. It simply has to be acknowledged that what counts as valid scientific knowledge is also always a result of social negotiation and power relations. Conflicts between orthodoxies and heterodoxies in science and other knowledge-generating industries are typically settled, as far as possible, by a spatial separation—by banishment of the dissenters to a foreign social territory and by their exclusion from the resources of one's own networks and institutions (e.g., funding, library use, research and citation cartels, and possibilities to publish work or address conferences). The most important aim of this tendency toward closure is to minimize direct relations between proponents and critics of knowledge claims because even "wrong" knowledge can be infectious.

The social factors in such clashes of knowledge become quite obvious when the status of a scientist in the hierarchy of the scientific community is correlated with his or her readiness to tolerate heterodox knowledge. In an empirical study among 497 members of the American Association for the Advancement of Science (McClenon, 1982; McConnell, 1984), it was found that elite scientists were far more inclined to refuse anomalous experimental results than other scientists or the general population, but only for a priori reasons; familiarity with the relevant research was not an important factor.

Expanding our perspective, it has to be acknowledged that knowledge claims rejected by the scientific community usually also fail to achieve generally accepted legitimacy in modern societies as a whole. Reciprocally, to call something "scientific" is the most popular rhetoric for justifying claims of knowledge. That practice was not always the case and is a result of a long-running expansionist policy of science:

> [The] white patches on the explorers' maps were almost never voids, but territories occupied by other cultures. In the same way, the frontiers of science are not the borderlines between knowledge and ignorance; rather, problems newly taken up by science invariably lead to questions to which other forms of knowledge or belief have already provided answers. (Grabner & Reiter, 1979, p. 67)

Besides clashes of knowledge within science, there are also conflicts at the threshold between science and kinds of knowledge that never have been claimed to be scientific—religion or everyday life experiences, for instance. This kind of boundary work, "a combination of rhetorical and social organizational devices to exclude some people and their knowledge claims from science" (Gieryn, 1983, p. 786), varies contextually and historically (e.g., Livingstone, 1987, 2003). As social scientists, we are unable to understand these clashes of knowledge in an abstract way, ignoring the cultural spaces in which science is embedded.

We cannot even exclude the possibility that the knowledge hegemony science has attained in modern societies toward the end of the 19th century will eventually erode and collapse. There is no "end of history" for either science or democracy. Again and again, competing knowledge systems confront the hegemony of science, and some

scholars have already called for intensified efforts in defense of "the scientific worldview" (Perrucci & Trachtman, 1998).

Clashes of knowledge are also abundant between different kinds of knowledge where science, as the hegemonic knowledge system of modern societies, does not seem to be involved at all, as in the sphere of religion (Introvigne, 1995). But the theoretical concepts for studying clashes of knowledge within science can be transferred and applied to other modes of knowledge production as well. The Kuhnian model of paradigm shifts, for example, can be applied to religious change and conversion (Drønen, 2006).

Knowledge created and disseminated by the social institution called "science" (defined here as "scientific knowledge") should not be equated with "analytical knowledge," and "non-scientific knowledge" is by no means the same as "orientation knowledge" (Mittelstrass 1989, p. 21). The function of orientation can be provided by scientific knowledge as well, and even knowledge allocated by non-scientific religious institutions may be of an analytical type. But generally speaking, claims to non-scientific knowledge are more contested than claims to scientific knowledge, and claims to orientation knowledge are more contested than claims to analytical knowledge. One explanation for this tendency is that political, economic, or cultural elites, counterelites, or subcultures can construct and use orientation knowledge systematically to sustain the internal cohesion of their social system and to foster the loyalty of the in-group against an allegedly hostile out-group. This task is facilitated if it can proceed undisturbed by the rather complicated and often normatively cautious considerations of scientists. Consequently, the most severe and violent clashes of knowledge are usually those where non-scientific orientation knowledge is involved. Therefore, contributions to "fundamentalism" and "New Religious Movements" are also included in this volume.

Whether or not knowledge is labeled "scientific," its function of legitimating and fueling processes of social segregation almost always has a spatial dimension. The contributors to this book focus on this spatial dimension and the contextual factors relevant for different kinds of clashes of knowledge. Günter Abel (Chapter 1) and Peter Meusburger (Chapter 2) begin the discussion by trying to clarify some conceptual problems associated with knowledge and space. Thomas Gieryn (Chapter 3), Harry Collins (Chapter 4), and Mikael Stenmark (Chapter 5) then concentrate on clashes of knowledge in the realm of science, with Michael Welker (Chapter 8), Eileen Barker (Chapter 9), and Roger Stump (Chapter 10) focusing on clashes in the field of religion. Aileen Fyfe (Chapter 6) and Wouter Hanegraaff (Chapter 7) discuss clashes of knowledge that jump over the threshold between different kinds of knowledge systems, such as conflicts between science and religion. The last two contributions, by Peter Fischer, Dieter Frey, Claudia Peus, and Andreas Kastenmüller (Chapter 11) and Robert Cialdini (Chapter 12), illuminate clashes of knowledge from a psychological point of view, exploring the question of the circumstances under which individuals may be convinced or manipulated to switch from one knowledge system to another.

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Chapter 1
Forms of Knowledge: Problems, Projects, Perspectives*

Günter Abel

Types and Forms of Knowledge

Knowledge is a basic word not only in connection with the current discussions of the *knowledge society*. Different forms of knowledge play an important role in people's lives. This is the case with everyday habits, customs, competencies, and practices as well as in science, technology, and institutions of the modern civilized world. Therefore, the different forms of knowledge and in particular their interactions at the interface of human cognition, communication, and cooperation (hereafter, the CCC triangulation) deserve increased attention and should be analyzed and reflected on thoroughly.

The point in this article is not to give an airtight definition of knowledge, as is still the case, for instance, in the endeavor to define knowledge as "justified true belief" (as Plato, 1990c, 201c–201d, did in his *Theaitetos*). Such a definition meets with criticism, as can be made clear by the following two easily construable examples: (a) cases that are not concerned with knowledge but in which the definition given complies with the requirements for knowledge, or (b) cases that deal with knowledge but where the definition does not cover the case. Gettier's (2000) objection to the conception of knowledge as justified true belief is famous. It contains cogent examples of why that definition is incomplete and why it does not represent any sufficient condition for knowledge (see Gettier, 2000).

It is important to see that it is not vital to come up with a subtle revision of the definition mentioned. As soon as the paradigmatic cases have been taken into consideration, it is a question of elucidating different forms of knowledge, which one does not need to define but which one encounters and presupposes by the very act of meaningfully talking, thinking, and acting. The human activities of communicating, thinking, and acting are always already connected with an understanding and a sense of "knowing." In this sense the word knowledge already has its meaning. Meaning does not have to be bestowed on the word by a definition.

* The following text is a revised version of Abel (2004, pp. 319–348).

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But this assumed and implicit meaning of knowing—and of knowledge (including its different sense-critical presuppositions)—has to be made explicit and, if necessary, examined most critically. In the case of scientific knowledge (which is strongly allied to truth and justification), this requisite leads to the claims of knowledge and the critical examination of the requirements for knowledge in the "logical space of reason" (Sellars, 1997, p. 76).

Research into the cognitive and normative roles of knowledge (including the roles of uncertainty and of not-knowing) is relevant not only in its narrow epistemological sense. It is also relevant because it deals with profiles of worlds of knowledge possibly important in the future, with human self-understanding, and with important aspects of orientation in and the future development of modern societies and human forms of life.

Upon closer examination, it is striking how many different meanings the words knowing and knowledge have, meanings that can be found in very different contexts beyond the fields of science and technology. Just think of expressions such as *to be in the know*, *to let someone know*, *to know how to help oneself*, *to the best of one's knowledge*, *you never know*, *not to know anything*, *to know which way the wind blows*, and many more. As always in thinking about knowing, distinctions have to be made. Let us start with three of them.

In view of the variety just mentioned, it is important to distinguish between a narrow and a broad sense of knowing and knowledge. The narrow notion of knowledge refers to knowledge obtained by a methodically well-regulated procedure bound to justification, truth, and verification. It is essential with such knowledge that one be able to talk about it and that it be communicable, transferable, intersubjectively verifiable, and interchangeable *salva veritate*. This notion of knowledge is particularly applicable with reference to the sciences.

The broad notion of knowing and knowledge refers to the ability to adequately grasp what something is about (e.g., what a sentence or a picture is about) on the one hand and the domain of human capacities, competencies, skills, practices, and proficiencies on the other. People are, for instance, very familiar with this domain within their everyday lives (know-how). For the purpose of orientation in the world, we constantly revert to this notion of knowledge and apply it successfully. The use of this broad notion of knowing and knowledge is normally so self-evident that its cognitive, action-stabilizing, and orienting role is not noticed at all until it fails to function smoothly. Such failure occurs when disturbances or problematic situations arise and when it therefore becomes important to reestablish a clear and failure-free situation.

In elucidating the narrow sense of knowing and knowledge, one also has to say a word about other related aspects, for instance, about beliefs, opinions, experiences, skills, verification, justification, and proof. In addition, such elucidations have to include remarks about the possibility and function of error, doubt, not-knowing, and ignorance. Knowing and knowledge are always loaded with preconditions. It is not possible to conceive of knowledge without preconditions, a point already emphasized by Aristotle. There is more to knowledge than we know. For

instance, the question of the rationality of forms, practices, and dynamics of knowledge includes more than a relation between theory and observation (which was the dominant aspect within the classical epistemology and philosophy of science), and it includes more than structural characteristics of theories (the latter understood, for instance, as deductive systems of interpretation). Without the broad notion of knowing and knowledge (including the features of un-knowing, not-knowing, not-yet-knowing, and no-longer-knowing), it is not possible to give a comprehensive and satisfying philosophy of human communication, thinking, knowing, perceiving, and acting.

Furthermore, one should distinguish different forms of knowledge. They are very familiar to us because we usually understand the differences that are related to them directly and operate successfully with them. Thus, we distinguish in particular between (a) everyday knowledge (knowing where the letterbox is), (b) theoretical knowledge (knowing that $2+2=4$ or, within classical geometry, knowing that within a triangle the sum of the angles equals 180°), (c) action knowledge (knowing how to open a window), and (d) moral or orientational knowledge (knowing what ought to be done in a given situation).

Across these fields of knowledge (narrow/broad sense; different forms) the following important distinctions and pairs of concepts have to be taken into account: (a) explicit and implicit (tacit) knowledge, (b) verbal and nonverbal knowledge, (c) propositional knowledge (that which can be articulated in a linguistic proposition) and nonpropositional knowledge (that which is not articulable within a *that*-clause), (d) knowledge relating to matters of fact and knowledge based on skills and abilities.

Explicit knowledge is articulated and unfolded, that is, displayable—as in a scientific treatise. In contrast, tacit knowledge means those aspects of knowing that are implicit in situations of perceiving, speaking, thinking, and acting but are not made explicit, are not disclosed at surface. In some sense tacit knowledge does not even have to be made explicit for perception, speech, thoughts, and action to be successful. If one knows that a noise coming from the sky is that of an airplane, one knows a good deal of other things not necessarily explicit in that given knowledge, for instance, that it is possible for machines to leave the earth and that they can move in the air.

Verbal knowledge means knowledge that can be and is articulated by using linguistic expressions. In contrast, the representation of nonverbal knowledge (e.g., pictorial or musical knowledge) is not bound to prerequisites characteristic of verbal forms of knowledge (on pictorial knowledge, see Abel, 2004, pp. 361–369). Forms of nonverbal knowledge are not, for instance, bound to the existence of an alphabet or to a linear arrangement of signs, nor are they bound to the requirement of semantic disjunctiveness of the elements of the system of signs that characterize verbal forms of knowledge.

Propositional knowledge is to be understood as knowledge that can be expressed in a proposition, which, more precisely, can be articulated by means of a *that*-clause (as in *knowing that Picasso was a painter*). In contrast, nonpropositional knowledge

is a form of knowledge that cannot be articulated in a *that*-clause. Rather, it is elusive in a characteristic way and cannot really be grasped by words (such as knowing how to understand a bodily movement but not being able to put it into words).

When we speak of knowledge of matters of fact, we mean the form of knowledge that refers to existing objects and events within the world—to tables, cars, molecules, and birthday parties, to that which is the subject matter of a perception, observation, or statement. In contrast, knowledge in the sense of *ability* (know-how) refers to human skills, for instance *knowing how to open a bottle of wine*.

By means of the above-mentioned differences in 1, 2, and 3, a complex matrix and a scaled taxonomy of forms of knowledge can easily be developed. It is a matrix or taxonomy of interest in both a descriptive and a normative sense. Just one of many examples within the field of tacit knowledge is the distinction one can make between the verbal and nonverbal aspects and between those nonverbal aspects that can be propositions and those that cannot, such as the genuine pictorial aspects. With those distinctions one can reconstruct and clarify the correlations between these different forms of knowledge much more precisely, including the possible clashes among them.

Before bringing up some of the problems, projects, and perspectives relating to a comprehensive philosophy of knowledge, I should mention three general aspects that are important when discussing forms of knowledge.

Traditionally, theories of knowledge are understood as answers to the challenge posed by philosophical skepticism. Theories of knowledge and epistemology are—such is the hope—keen to refute the skeptic either through deductive demonstrations (which, for logical reasons, is futile) or through attempts to push the skeptic to the internal limits of reasonable doubt and thus satisfy that person's challenge (which is the much more subtle and successful strategy by far). Conversely, nothing compels the human mind to enter in such a deep sense into the problems of knowledge and epistemology as internal (not external) skepticism does.[1] This statement is true for the skepticism (a) about the outer world, (b) on other minds, and (c) of inner experience, including introspection. When I talk of forms of knowledge in the rest of this chapter, their relation to the problem of philosophical skepticism should *not* be seen at the center of the discussion. The matter is not to refute or to eliminate skepticism by appealing to epistemological certainty. It is rather a matter of critically reconstruing, clarifying, and discussing given forms of knowledge in the sense stated at the beginning of this chapter.

[1] The question of a successful answer to internal skepticism plays a central role in Abel (1995). The answer suggested in that book lies in appealing to the sense-logical presuppositions always accepted in given pragmatic and practical attitudes as well as in the proper functioning of an effective practice of using signs and interpretation. For more details on the antiskeptical capacities of such a philosophy of signs and interpretation (and on its advantages compared to other strategies of refuting skepticism), see Koehne (2000).

The epistemic situation of human beings is not one of an extraterrestrial standpoint or of an absolute conception. It is not a "God's Eye point of view" (see Putnam, 1981, p. 49), from which it would be possible to state in a definitive and generally obligatory way what can be considered metaphysically reliable knowledge and what cannot. As finite beings who are always bound to their particular perspectives within the world, we are cut off from such a standpoint not only for contingent but also for systematic reasons. Such knowledge would not be knowledge of our spirit. Knowledge can only be human knowledge in a human dimension. It cannot be knowledge of a divine dimension.

Explicit attention should be paid to the sense in which the term *form of knowledge*, or rather *forms of knowledge* (guiding this chapter throughout), is to be understood. The suggestion in this chapter is to use form (in line with Kant, 1787/1968, and Wittgenstein, 1980) as a paraphrase for *way* or *mode*. Form*s* of knowledge is then to be understood as ways of knowing/knowledge or modes of knowing/knowledge. Thus, form is *not* to be understood as a ready-made, preexistent, atemporal, and independent system of right order—and that point is crucial. Form is not to be understood as a kind of container into which knowledge has to crystallize to even count as knowledge. Thus form is *not* to be understood as a "universal and atemporal pattern or format of all knowledge."

Nor is it to be understood as a prefabricated or a priori order conceived of as an innate part of knowledge itself, presupposed to exist long before we (as finite and hence perspectivist minds) try to cast such knowledge and *its* "innate and prefabricated form" into one of the forms available to us (e.g., into a language form, a picture form, or an action form).

In both variants of these misleading notions of forms of knowledge (the preexistent atemporal type and the innate type), knowledge is understood as being independent of the form in which it is articulated or manifested. This idea is based on the image that forms of knowledge are just tools, means, instruments, vehicles, vessels, or canals by means of which the contents of knowledge are just transported, communicated, and mediated. But presupposing a pure content of knowledge that is totally unformed is a highly problematic and ultimately inexplicable presupposition. It is at a loss from the very beginning because that which is considered to be the content—the thing to be transported, communicated, and conveyed—cannot be specified without appeal to the underlying system of signs and interpretation. The notion of an epistemological primacy, of a ready-made individuated and specified content of knowledge that is there long before there is any form of signointerpretational articulation, is an empty notion. One should abandon both this notion and the search for a completely unformed content.

But then the interesting question concerning the role and function of forms in knowledge should be asked again in a different way. The thesis is that, for humans as finite and perspectivist beings, contents of knowledge and forms of knowledge *cannot* exist independent of the forms, practices, and dynamics of the underlying representational, interpretational, and sign system. Even for an omniscient and almighty God, forms of knowledge cannot exist completely independent of his

signointerpretational practices (for, among other things, such a presupposition would undermine the cognitive almightiness of God).

Forms of knowledge can be regarded as forms (i.e., ways or modes) of articulation and presentation determined by signs and interpretation. They are always based on a history and genealogy of their semantic and pragmatic features. And further changes might take place in the future. This is the case even concerning questions of possible revisions within the field of logic.

Thus, the crucial aspect with regard to the dynamics, justification, and progress of knowledge is not the appeal to something like "The Universal (The One and Only and the Perennial) Form of All Knowledge." What counts much more is whether communication, cooperation, and reference to the world can be continued smoothly, whether actions can follow or not.

The appeal to actions that can connect to and continue communication, cooperation, and reference to the world can also be made fruitful in the realm of questions concerning the generation and the development of knowledge and science. The transition from one epistemological constellation to another—in other words, to the next relevant one—and the dynamics of knowledge included in such a transition cannot be described as though there were a prefabricated rule or set of rules, the core of which one has hit when progress has been made in knowledge and science. If such description were possible, one would just have to figure out this one definite rule or set of rules governing the production and progress of knowledge in philosophy and other sciences. Strictly speaking, it should then be possible to derive and realize the best possible development of knowledge and science from this rule or set of rules. The fact that there is no such access to the optimal development of knowledge and science has been shown by epistemological reflections in contemporary philosophy, as in the thesis of the "underdeterminacy" of scientific theories (Quine, 1969, pp. 302–304), the thesis of the "indeterminacy" of translation of languages in sciences (Quine, 1960, p. 27) and by Putnam's (1983) model theoretical arguments (see also Abel, 1999, pp. 101–120; 2002). In regard to empirical perspectives, an equivalent point is effectively demonstrated by the history of science. There are always different directions of developments possible that can be successfully connected to a given constellation or that can follow it. The development and dynamics of knowledge and of sciences do not work according to principles like The One and Only and External Rule. Rather, they work given the best and creative brains in a particular field at a given time and according to the currently accepted state of the art and its successor states.

Just as the use of forms of knowledge is to be understood in the outlined sense of a possible plurality of ways and modes of knowing/knowledge, there cannot be the one and only linear and a priori history of knowledge and sciences. At the same time, it must also be recognized that the "history of knowledge" and the "philosophy of knowledge," as well as the "history of science" and the "history of philosophy," should no longer be treated independent of each other; they have to go into alliance. In this chapter some problems, projects, and perspectives will be outlined that could be subjects for future research on questions of forms, practices, and dynamics of knowledge.

Information and Knowledge

Information has become a key notion in our times: in the sciences (especially physics, biology, and the cognitive sciences), in the world of the media, and in what is called the new information technologies. As shown elsewhere (Abel, 2004, pp. 290–302), it is also a central notion in philosophy, particularly the philosophy of mind (where the concept of information seems to be able to bridge between cognition and brain, given that information can be realized both physically and phenomenally). Against this background, modern and highly technological societies are often referred to as information societies, and the present age is described as an information age. When information moves into such a fundamental position within these different levels and the aspects mentioned above, it is tempting to grant information priority over knowledge and to grant an information society priority over a knowledge society. At times, the latter is equated with the former. Information is then considered to be knowledge.

If this equation were justified, an information theory of knowledge would be required. One would then expect knowledge to be defined in terms of information. But what has been said elsewhere (see Abel, 2004, pp. 302–304) about the limits of an information theory of the "meaning" of words, sentences, and the human "mind" can also be said about knowledge. In order to focus on the aspects relevant to information, one has to know what one is looking for and what one wants to do with it. Information is always only information in the light of certain knowledge and of a presupposed (syntactic and/or semantic) system of signs and interpretation —not the other way around. From the sense-critical point of view, it is not possible, strictly speaking, to explain what it means to be able to speak of information independent of any form of knowledge, entirely nonepistemically—completely independent, that is, free of signs and free of interpretation. Forms of information are not yet forms of knowledge, and information spaces are not yet knowledge spaces. This point has to be accented despite the fact that in the picture outlined above (which is predominant within the current information- and media-technology society) information is seen to be prior to knowledge, that the possession of information is the possession of knowledge, that forms of information are actual forms of knowledge, and that people initially and primarily live in information worlds.

The following three research desiderata result from this diagnosis: (a) One needs a precise conceptual clarification of the relation between information and knowledge and between information society and knowledge society. Given that both information and knowledge move within signs and interpretations, knowledge now appears as a fourth element beside the clarification of the relations between information, signs, and interpretation (see Abel, 2004, pp. 302–304). (b) The logic and particularly the consequences of the topsy-turvy world outlined above must be analyzed. Although a priority of knowledge over information should be assumed if their relationship is considered systematically, a priority of information over knowledge seems to be prevalent if today's public social opinion is taken as basic. A superabundance of information can perfectly lead to a reduction in knowledge. (c) The specifically