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Hayek on tacit knowledge

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Abstract: This paper discusses the place of 'tacit knowledge' in Hayek's writings. How did Hayek understand tacit knowledge? How did his understanding change through time? I address these questions and follow the change in Hayek's works from skills and techniques of thought in the 1930s to the use of 'tacit knowledge' in the1960s. Hayek uses Polanyi's concept in many writings, but remains short of approving its implications. The paper emphasizes that while Hayek was quite aware of the differences between tacit knowing and knowing-how, he was not keen to stress the divergence. In the end, I offer some potential explanations for this preference.

> [I]t is entirely consistent, on the one hand, to deny that 'wholes' which are intuitively perceived by the scientist may legitimately figure in his explanations and, on the other, to insist that the perception of such wholes by the persons whose interactions are the object of investigation must form a datum for scientific analysis. (F. A. Hayek, 1967: 54)

> The ideal of a strictly explicit knowledge is indeed self-contradictory; deprived of their tacit coefficients, all spoken words, all formulae, all maps and graphs, are strictly meaningless. An exact mathematical theory means nothing unless we recognize an inexact non-mathematical knowledge on which it bears and a person whose judgement upholds this bearing. (M. Polanyi, 1969: 195)

1. Introduction

Inarticulate dimension of knowledge is central to understanding the emergence, evolution, and nature of market institutions. If knowledge properties of economic and social institutions play a fundamental role in the relative success of alternative orders, then a better understanding of whether we can articulate knowledge and its extent should take a more prominent place in the study of institutions.

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The concept of 'tacit knowledge' has become part of the jargon for both Institutional economics and the Austrian school since the 1970s, referring to Hayek and Polanyi in most cases approvingly. The meaning of the concept is still ambiguous and interpretations differ. There is a need for a closer look at Hayek's understanding and use of the concept.

Tacit knowledge has played a central role in the revival of modern Austrian economics. Hayek's writings shaped the way Austrian economists deal with the knowledge problem and tacit knowledge in market processes. How did Hayek understand tacit knowledge? Moreover, how did his understanding change through time? This paper follows these questions and discusses the transformation in Hayek's analysis from skills and techniques of thought in the 1930s to the use of 'tacit knowledge' in the 1960s and 1970s.

Hayek's socialist calculation papers started with 'dispersed information' and 'knowledge of the particular time and place'. As time passed, he made tacit knowledge a key part of his work on spontaneous order and evolution. The impossibility of conveying tacit knowledge of market participants to a higher authority became central to his defense of decentralization and free market. His grasp of the concept has evolved through time. Michael Polanyi developed the concept of tacit knowledge in the 1950s within an existentially oriented structure of 'indwelling'. Interestingly, Hayek stopped short of endorsing all implications of tacit knowledge.[1]

The literature on Hayek takes the concept of tacit knowing usually given. Most studies take Hayek's rendition of the concept with reference to Polanyi and Ryle, sometimes inadvertently. For a long time, the distinction between Polanyi and Ryle did not matter much. It was enough to state that they were 'essentially' the same. However, recent debates over the role of tacit knowledge in organization theory and economics, not to mention many other disciplines, have brought forward the significance of the distinction.

The paper starts with a brief discussion of tacit knowledge and knowing-how. Emphasizing the differences between Polanyi and Ryle makes it easier to follow Hayek's view from this paper's angle. It will also help us to see the differences between Polanyi and Hayek on tacit knowing. The next section discusses Hayek's understanding of tacit knowledge extensively. Finally, I draw on the secondary literature on Hayek on tacit knowledge and raise some questions on Hayek's view.

Hayek's writings on tacit knowledge are important for many modern debates. The recent debate over the possibility of articulation is a good case in point.[2]

1 Even though, Hayek felt closer to Polanyi at some point, it is very difficult and, in many cases, fruitless, to discuss who influenced whom and to what extent. In this paper, I do not deal with the influence question. However, see Bladel (2005) and Jacobs (1999). See also Mirowski (1998) for a 'reconstructed' critique of Hayek from the perspective of Polanyi's writings.

2 For some contributions to this literature, see Ancori *et al.* (2000), Cowan *et al.* (2000), and Nightingale (2003).

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It is about the role and magnitude of inarticulate knowledge in economic activity. The existence of tacit dimension complicates the process of transforming knowledge into information. Technological innovations and advancement of computation and the dominance of analytical philosophy over more existential approaches support the view that codification of knowledge is legitimate and feasible. The question is whether we can codify the context, including the narrator, of information. The codificationist view accepts that it all depends on costs and benefits. The opposing view resists this simplification and argues that personal dimension makes knowledge categorically different from information. The personal dimension makes a satisfactory level of codification impossible.

Hayek's writings have relevance for this debate. As his thinking evolved from the 1920s to the 1970s, he began to see widespread consequences of tacit knowledge. Unfortunately, this debate does not make much use of Hayek's experience. Understanding how and why Hayek came to appreciate tacit knowledge as a central aspect of economic life may shed some light for modern debates on articulation and tacit knowledge.

2. Tacit knowledge or knowing how?

Hayek usually cites Polanyi and Gilbert Ryle on inarticulate knowledge. Let us clarify the meaning of tacit knowledge as Polanyi uses it and discuss briefly the difference between Polanyi and Ryle before discussing Hayek in detail.

According to Polanyi, 'we can know more than we can tell'. Tacit knowledge is an active and personal involvement in knowing. One dwells in the way he/she knows the world. It means to be at home with something, based on experience and skillful coping. In other words, to understand something is to master it, to know practically how to use it. As unexpressed mastery, this does not allude to any kind of articulate knowledge. It is with the person all the time. One understands, for example, how to get along with people, to care for things, to kill time and so forth. This everyday understanding remains implicit most of the time.[3] In Polanyi's words, 'tacit knowing is the fundamental power of the mind, which creates explicit knowledge, lends meaning to it and controls its use' (Polanyi, 1969: 156).

In the vocabulary of Polanyi, when we understand (learn-how-to-use) or master something, we begin to dwell in it (1969: 148). In this way, we interiorize those things. They extend our bodily existence and the world. For example, when a blind man first faces a stick, he attempts to understand it. He learns how to use it, tries to master it. After learning how to use a stick, he no longer pays attention to it. It becomes an extension of his bodily existence. He directs his attention to things the stick touches. He begins to find his way with the help of

3 Practical ability or skill is not limited to individual. It also includes social skills. I will not delve into this important dimension in the paper.

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the stick. The stick becomes transparent for him. It remains there and shapes the blind man's explicit understanding of entities that he experiences in his world through his understanding of the stick. He begins to indwell in it.

Ryle had introduced a similar concept in the 1940s (Ryle, 1949). He was addressing the same distinction from a different angle. Being against the 'intellectualist legend' which accepted knowing-how as a special case of knowing-that, Ryle described knowing-how as an ability to do something as a distinct way of knowing.

At this point, it would be helpful to elaborate on the distinction between Polanyi's tacit knowing and Ryle's knowing-how.[4] What Ryle means as knowing-how refers to a distinct realm of knowledge, not necessarily a primary understanding (Ryle, 1949: 40). Tacit knowing, as Polanyi puts it, refers to a process rather than a kind of knowledge. In this sense, tacit knowing is an extension of indwelling.

In Polanyi's view, 'knowing that' also includes a tacit dimension. Economics literature tends to overlook this aspect of tacit knowledge. Economists, for example, use knowing-that in the sense of prepositional knowledge, without no tacit component. In this process, it becomes theory or information easily.

There is not a one-to-one correspondence between tacit knowledge and knowing how.[5] Most knowing-how includes tacit knowledge, such as the joking capability of a humorist (Ryle, 1949: 30). Some knowing how is simple unarticulated local knowledge and can be subject to cost–benefit calculation of codification.

Polanyi's analysis goes beyond the argument that there are things we know but we cannot tell. It provides an ontological structure that relates knowing to indwelling.[6] Among other things, Ryle's conception excludes the subsidiary awareness from practical coping, which is crucial for the connection between tacit knowing and indwelling.[7] When economists use tacit knowing, they refer to Polanyi in most cases, yet they mean 'knowing-how' instead, as it provides the necessary distinction between skills and explicit knowledge, without any complications.

4 For Polanyi's criticism of behaviorism in general, and Ryle in particular see Polanyi (1969: 211–224). Polanyi's criticisms can be seen as part of a more general debate between analytical philosophy and phenomenology. Polanyi and Ryle were at Oxford around the same time. However, they did not have any substantial exchange of ideas. They came together a few times, yet there were no philosophical discussions.

5 However, see Polanyi (1958: 56) where he relates subsidiary awareness to knowing-how without citing Ryle. Apparently, Polanyi used the term not in Ryle's sense.

6 Polanyi says that his concept of 'indwelling' has the same meaning as Heidegger's 'being-in-the-world' in the preface to the Torchbook edition of *Personal Knowledge* (1964). Polanyi draws from the existentialist tradition in many places, including Dilthey, Merleau-Ponty, and other phenomenologists. Moreover, both criticize Gestalt psychology from a similar angle.

7 See Scott (1971) for an extensive comparison of Polanyi and Ryle.

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3. Hayek on tacit knowledge

This section discusses Hayek's understanding and use of tacit knowledge from a historically oriented perspective. My emphasis is on the definitional content of tacit knowledge. I place *The Sensory Order* to the center as it plays a central role in Hayek's use of tacit knowledge.

Before The Sensory Order

Hayek studied psychology very early on and wrote an essay on the nature of consciousness and mind in 1920.[8] It prepared the ground for *The Sensory Order* and contributed to his critique of socialism (Vaughn, 1994: 121n). However, Hayek did not have an understanding of tacit knowledge at that time, given the state of psychology (Caldwell, 2004: 136–139).

Hayek, then, turned to economics for practical reasons. Until the mid 1930s, his work on psychology and cognition did not play a role in his work in economics. Apparently, Hayek was not aware of the radical implications of his views on psychology over economics.[9]

Inarticulate knowledge, without any emphasis on the possibility of articulation, plays an important role in Hayek's thinking since his early writings on the role of knowledge in economic processes. His 1935 essay, 'The Socialist Calculation II: The State of the Debate' (1948c), offers one of the first discussions of local knowledge and inference to inarticulate knowledge. Here, Hayek argues that no single person has all the knowledge necessary for economic calculation inside her head at any time, including practical ability to do things. He writes:

> Much of the knowledge that is actually utilized is by no means 'in existence' in this ready-made form. Most of it consists in a technique of thought which enables the individual engineer to find new solutions rapidly as soon as he is confronted with new constellations of circumstances. To assume, the practicability of these mathematical solutions, we should have to assume that the concentration of knowledge at the central authority would also include a capacity to discover any improvement of detail of this sort. (1948c: 155)

8 The paper was a positivist critique of Ernst Mach's theory of sensations (Caldwell, 2004a: 242). At this time, Hayek was working toward his law degree and put the paper aside for practical reasons. He was under the influence of logical positivism and the paper reflected this to some extent. However, the paper included two themes that came to the front in his later work on evolution. The first one was the connection between mental patterns and consciousness. The second one was the evolutionary structure of sensory experiences. He began to work on the paper in 1945, when he returned to the subject of mind and evolution.

9 The literature has mostly overlooked the absence of a link between Hayek's psychology paper and his economic theory. Hayek did not relate his work in economics and psychology directly. However, he was not very sympathetic to neo-classical modeling; for example, in his conventional work on monetary theory, Hayek's use of concepts like 'equilibrium' was apologetic, both literally and analytically. He offered excuses for the use of 'equilibrium' in *The Pure Theory of Capital* (1941). He distrusted the concept in his earlier writings as well. He lost his interest in equilibrium altogether during socialist calculation debate (Caldwell, 2004: 224).

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The phrase 'techniques of thought' gives the impression that Hayek had some practical ability in mind. However, it refers to techniques of production, which is a repertoire of alternative ways of doing things (Vaughn, 1994: 53). Don Lavoie interprets 'techniques of thought' as knowing how, or skill (Lavoie, 1985: 162; see also, Ioannides, 2000). A similar concept is 'relevant knowledge' as Hayek used in 'Economics and Knowledge'.

Two years later, in 'Economics and Knowledge' (1948b), Hayek argues that dispersed knowledge is crucial in disequilibrium situations. This work brings up a new understanding of what economics is all about. Hayek claims that the dissemination of knowledge is central to economic phenomena. Economics is more than the pure logic of choice. His conception of 'relevant knowledge' refers to dispersed knowledge in the sense that different people have access to different bits of knowledge implicitly (p. 51). Hayek does not push forward the impossibility of articulation at this point.

This provides the ground for the achievement to spontaneous order. By the use of practical and 'relevant' knowledge, which also includes 'skills',[10] it becomes possible to reach equilibrium through disequilibrium processes. Spontaneous interactions of people in the society make adaptation into change possible. This kind of knowledge is local in its essence rather than 'tacit'. Although Hayek refers to skills in a footnote (p. 51), he makes no use of it.

Hayek refers to subjective and dispersed knowledge of individuals with 'relevant knowledge' (Caldwell, 2004: 213). It does not necessarily refer to non-conscious knowledge. Hayek states that individuals 'possess' or 'acquire' this knowledge and implies that an individual is consciously aware of this knowledge, even though it is dispersed and subjective (see particularly, pp. 52–53).

A more explicit discussion of 'the knowledge of the particular circumstances of time and place' takes place in the 1945 paper, 'The Use of Knowledge in Society' (1948a). This essay shows that the success of the market comes from its effectiveness to bring private and local knowledge into use as opposed to scientific and propositional knowledge. The efficient use of the details of everyday economic life, or the knowledge of 'the man on the spot', makes the market system superior to any kind of planning. In his own words (1948a: 80):

> The shipper who earns his living from using otherwise empty or half-filled journeys of tramp-steamers, or the estate agent whose whole knowledge is almost exclusively one of temporary opportunities, or the arbitrageur who gains from local differences of commodity prices-are all performing eminently useful functions based on special knowledge of circumstances of the fleeting moment not known to others.

10 While Hayek uses 'skills', he does not emphasize its practical nature. Instead, he uses it narrowly and means 'the knowledge of which a person makes use'.

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This passage, and many others in the text, refers to local, but essentially codifiable, knowledge. Hayek makes it clear that his intention is not to bring subjective knowledge under conscious and central control. He emphasizes the ability to make best use of dispersed knowledge, without distinguishing between local and tacit knowledge.

In a dynamic market environment, this kind of knowledge is too costly to profitably transform into information, but not impossible. Local knowledge does not necessarily have the connotations of 'knowing one's way around', or indwelling, which is valid for *all knowers*. Local and codifiable knowledge is also based on practical understanding of the situation. Hayek, here, explicitly argues that much of economic knowledge is embedded in practices, shared skills, institutions, and habits. Existing knowledge, thus, is not limited to statistical 'data'. However, he does not say anything about the primacy of this knowledge. What Hayek has in mind is 'dispersed' knowledge, without any allusion to the role of consciousness. Dispersed knowledge can become part of skillful coping. It may become, as Hayek states, embedded in skills. Yet, it is different from skills. Hayek advances his analysis on inarticulate knowledge in *The Counterrevolution of Science* (1952a). His distinction between social and individual knowledge refers to the domain of tacit knowledge, even though he does not explicitly refer to the concept yet. For example, he writes:

> Indeed any social processes which deserve to be called 'social' in distinction to the action of individuals are almost *ex definitione* not conscious. In so far as such processes are capable of producing a useful order which could not have been produced by conscious direction, any attempt to make them subject to such direction would necessarily mean that we restrict what social activity can achieve to the inferior of the individual. (p. 88)

The Sensory Order

The Sensory Order includes Hayek's most elaborate discussion of non-conscious ways of knowing. Although published in 1952, it developed themes of a paper he wrote in 1920. This book shows the limitations of explicit knowledge and its dependency on tacit knowing, even though Hayek did not use these concepts.[11]

The book deals with the interpretation and constraints of knowledge. Knowing the world is a classification of sensory qualities by the mind. The way one knows the reality is based on the mind's abstraction. In Hayek's approach, mind's ability to organize its own activity, by following some abstract rules, refers to a mental order. One understands external reality through this construction.

11 While Hayek drafted *The Sensory Order* very early, the conception of tacit knowledge was not clear to him, even in *The Sensory Order*. In the book, he refers only to Ryle, not to Polanyi. As Vaughn (1994: 122n.) argues, Hayek did not see widespread implications of tacit knowledge until he wrote 'Competition as a Discovery Procedure' (1978).

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In this view, experiences are based on 'a set of relations by which our nervous system classifies them' (Hayek, 1952: 142).

Hayek uses a map-model structure to explain learning. Experience shapes the map. It is an active memory and represents the individual's past (Smith, 1997). However, the map does not provide any guidance to the future. Model refers to the current interpretation of the environment (Butos, 1997: 228). The map-model framework appears to be similar to experience-based behavior models.

Hayek argues that one cannot state abstract rules of the mind explicitly. As one learns, a new interpretation of reality takes over the old one through reclassification. Both Polanyi and Hayek would accept that one's experience in the world shapes mind's classificatory structure. However, Polanyi does not follow the mind–body dichotomy. For Hayek, the rule-based structure enables one to act coherently in new situations. This is fundamentally different from the phenomenological account of skills.

Both Merleau-Ponty and Polanyi use skill-acquiring as a practical and tacit process (Polanyi, 1969: 144; Merleau-Ponty, 1962: 143). Like Polanyi, Merleau-Ponty argues that experience is not represented in the mind. The individual finds himself in different situations. Experience is a circular flow between the person and the world. He calls this an intentional arc. One does not take perceptions and then process them. Rather, things already have a perspective when they are received. This creates an intentional arc between the person and experienced reality.[12] Rules no longer stay there as separately describable entities. Rather, the experience is holistic. It is part of being in the world. Hayek (1952: 142) would put it as 'perception is thus always interpretation, the placing of something into one of several classes of objects'. In a similar vein, Hayek has a model of how the mind works through the analysis of map and model.

Hayek's discussions are closer to Polanyi in some parts of *The Sensory Order*. The following, for example, is his rendering of 'we can know more than we can tell':

> The order of the sensory qualities is difficult to describe, not only because we are not explicitly aware of the relations between the different qualities but merely manifest these relations in the discriminations which we perform, and because the number and complexity of these relations is probably greater than anything which we could ever explicitly state or exhaustively describe, but also because, as we shall see, it is not a stable but a variable order.

Hayek refers to this set of relations as 'knowing how', which may not be explicitly stated (p. 39). He is cautious about the domain of tacit knowledge at this point and prefers to use words like 'probably'. Hayek accepts the 'logical possibility' of

12 While the differences between Polanyi and Merleau-Ponty deserve a more extensive discussion, this paper is not the place to pursue it. Here, we only refer to similarities between Polanyi and Merleau-Ponty on the analysis of experience and action. They are important in terms of a comparison with Hayek, particularly with respect to the primacy of tacit knowing.

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replicating brain's activities with a machine (1952: 189). His reluctance to give evolutionary views a more prominent role reflects that he still has some belief in the possibility of 'building of a machine fully reproducing the action of the brain and capable of predicting how the brain will act in different circumstances' (1952: 189). Hayek does not seem to give priority to unconscious experience against conscious action. They seem to be on the same level (e.g., 1952: 23–24). It is, in a sense, a two-part classification (Butos and McQuade, 2002: 116).

This takes us to the distinction between two characteristics of tacit knowledge: inarticulability and pervasiveness. Since 1935, Hayek is expressly aware of the fundamental role of skills. The inarticulate nature of skills and local knowledge is central to his many arguments. However, the pervasiveness of tacit knowledge is new.

Toward the end, he explicitly states that:

> A certain part at least of what we know at any moment about the external world is therefore not learnt by sensory experience, but is rather implicit in the means through which we can obtain such experience; it is determined by the order of the apparatus of classification which has been built up by presensory linkages. What we experience consciously as qualitative attributes of the external events is determined by relations of which we are not consciously aware but which are implicit in these qualitative distinctions, in the sense that they affect all that we do in response to these experiences. (1952: 167)

This passage implies that our ability to know the external world is the result of some kind of tacit understanding of how the world works. It is impossible to state explicitly the classificatory rules that shape mind's activity. In a sense, 'knowing that' stems from 'knowing how', often called as 'private knowledge' (Butos and McQuade, 2002; O'Driscoll and Rizzo, 1996).

The Sensory Order reflects a shift in Hayek's thinking.[13] Philosophy begins to shape his thinking more extensively. The themes that permeates his later writings can be found in this least cited of Hayek's works. We begin to see Ryle and knowing-how in this book (e.g., pp. 19, 39).

It is very difficult to measure the 'influence' of Ryle and Polanyi on Hayek.[14] We also do not know to what extent Wittgenstein's texts were among the resources Hayek used in his explication of the tacit domain. Hayek did not

13 In his words (Hayek, 1979: 199, n. 26), 'the work on it [The Sensory Order] has helped me greatly to clear my mind on much that is very relevant to social theory. My conception of evolution, of a spontaneous order and of the methods and limits of our endeavours to explain complex phenomena have been formed largely in the course of the work on that book.'

14 According to Caldwell (2004: 294n), Hayek gets the idea of 'tacit knowledge' from Polanyi. It 'complements' Hayek's notion of 'knowledge of time and place'. Apparently, Caldwell assumes that Hayek's understanding of tacit knowledge evolved in the 1950s. However, we do not have enough evidence on this issue.

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go further in his analysis of practical knowledge, maybe because he, like Wittgenstein (Dreyfus, 1991: 7), saw practices as a 'hopeless tangle'.

After The Sensory Order

The 1950s were the turning point in terms of Hayek's use of 'tacit knowledge'.[15] He went to Chicago in 1950 and remained there until 1962. He gave seminars and wrote *The Constitution of Liberty* (1960) there in the second half of the 1950s. An unpublished paper, 'Within Systems and about Systems', reflects the change in Hayek's thinking during his stay at Chicago. Hayek published some parts of the paper in 'Degrees of Explanation' (Hayek, 1967a). The concept of 'evolution' became more central to Hayek during this decade.

Around the same time, in 1951, the Committee on Social Thought at the University of Chicago offered a position to Michael Polanyi. However, he could not obtain a visa, and finally withdrew his application. While he gave lectures at the University of Chicago from time to time, he was not a full time researcher there.[16]

Hayek makes tacit knowing part of his social theory in *The Constitution of Liberty*. He notes the transformation of his thinking in the 1950s in a letter to Chester Bernard (Caldwell, 2004: 302n). The evolutionary view becomes more dominant in Hayek's thinking, and tacit knowledge, naturally, takes a more central place. In terms of the role of tacit knowledge, *The Sensory Order* shows the shift in Hayek's thinking and contains both traces of the old thinking and the beginning of a new understanding.

Hayek focuses on the important role of 'ignorance' in the advancement of civilization in *The Constitution of Liberty*. Hayek writes:

> [T]he knowledge which any individual mind consciously manipulates is only a small part of the knowledge which at any one time contributes to the success of his action. (1960: 24)

Later he offers a more explicit presentation of 'knowing more than one can tell':

> [Our habits and skills, our emotional attitudes, our tools, and our institutions] are as much an indispensable foundation of successful action as is our conscious

15 Bladel, on the other hand, argues that Hayek already had the understanding of 'tacit knowledge'. Polanyi provided only the terminology (Bladel, 2005: 25). Bladel believes that Hayek cited Polanyi 'to be generous to old friends' (2005: 26).

16 Hayek remembers Polanyi's years at Chicago with the following in his 1978 interview with James Buchanan (quoted in Mirowski, 1998): '[Polanyi] was for a few years my colleague on the Committee on Social Thought (at the University of Chicago], and there was an interesting relationship for a period of ten years when we happened to move from the same problem to the same problem. Our answers were not the same, but for this period we were always just thinking about the same problems. We had very interesting discussions with each other, and I liked him personally very much.' They were colleagues at Chicago but the second part of the sentence refers to the 1940s. They did not have much contact during the 1950s. See Mirowski (1998) for a comparison of their views.

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> knowledge ... [E]ven the successful employment of our intellect itself rests on their constant use. (p. 26)

Even when we accomplish a simply activity we implicitly use a huge amount of knowledge and this knowledge remains in the background. As the above quotation implies, Hayek's reference to unarticulated knowledge remains in the form of a different realm of knowledge.[17] We may not even know whether we have it; but still make use of it. We do not know the whole of knowledge that is necessary in order to do anything (p. 27). It is another realm of knowledge, like propositional knowledge. A good example of this is the knowledge of the expert. Hayek reminds us that what makes someone an expert is not the substantive and scientific knowledge, but the practical knowledge of skillfully using the right kind of information (1960: 25).

In *The Constitution of Liberty*, Hayek makes a distinction among three kinds of knowledge: scientific knowledge, non-scientific explicit (localized) knowledge, and expert knowledge. He describes expert knowledge as 'knowledge of where and how to find the needed information' (p. 25). Hayek differentiates 'conscious knowledge' and expert knowledge, which includes 'our habits and skills, our emotional attitudes, our tools and our institutions'. Conscious knowledge means, roughly, codified and codifiable knowledge (i.e., knowledge that can be transformed into information) and expert knowledge refers to tacit knowledge, without a distinction on the possibility of articulation.

The distinction between propositional and inarticulate knowledge becomes a central point of the discussion in his 1962 paper (Hayek, 1967) and later in *Law, Legislation and Liberty* (1973).

Hayek offers one of the most detailed discussions of issues relevant to inarticulate knowledge in 'Rules, Perception and Intelligibility'. Here, he defines 'know-how' in the following way:

> the 'know-how' consists in the capacity to act according to rules which we may be able to discover but which we need not be able to state in order to obey them. (1967: 44)

A few pages later, he writes:

> we are not in fact able to state all the rules which govern our perceptions and actions ... [W]e *always* know not only more than we can deliberately state but also more than we can be aware of ... and that much that we successfully do

17 From a phenomenological perspective, knowing-how in the sense of being-at-home with something is with us all the time. This practical understanding is *existential* because it shapes our way of existing. We know our ways around in the world and define ourselves through them (Grondin, 1994). Polanyi's concept of 'indwelling' also refers to this kind of practical understanding. Hayek was against the existentialist dimension of Polanyi's argument. I touch upon possible reasons for his opposition toward the end of the paper.

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> depends on presuppositions which are outside the range of what we can either state or reflect upon. (pp. 60–61)

He seems to make a distinction between tacit knowing and knowing-how, but presents no explicit discussion of the distinction. Hayek does not use the concept of 'tacit knowledge' in the text. However, his discussion comes as close as possible to Polanyi in this paper.[18]

In this paper, tacit dimension refers to a certain realm of phenomena that one knows how to deal with, but does not know what this realm is exactly. In the case of skills, we may not be able to state explicitly how we act. For example, a child can speak his native language flawlessly without any apparent knowledge of its grammar. He can even correct grammatical errors. Then, Hayek asks, why should we not be following social rules without knowing anything about the rules that we follow? This question takes us to the role of tacit knowledge in social coordination. Inarticulate rules not only help us follow formal rules, but also shape our perception of other people's actions. This means that the way we see the world is also rule-shaped. Having a non-conscious understanding of these rules, we can grasp the meaning of following a rule, and notice, intuitively or instinctually, when we see an irregular act.

Toward the end of the article, Hayek asks whether inarticulate rules always guide our mental activity. A positive answer shows the limitation of explicit knowledge in understanding the world (p. 60). He seems to accept this as reasonable, and potentially true. He argues that if we understand others because we share with them some unexplained common rules of understanding, then it means that we always know more than we can say. Any attempt to formalize these rules will necessarily presuppose a higher level of rules since explicit statements require some presupposed rules of conduct. This creates an infinite regress in explanation. Articulated knowledge becomes meaningful because of the unarticulated background.[19] Hayek, thus, brings in another dimension to the discussion of tacit knowing. As Polanyi puts it, 'all knowledge is either tacit or embedded in tacit knowing'.

This takes us to Gödel's proof, which is a common theme in both Hayek and Polanyi.[20] Hayek uses Gödel's theorem to show that since mind cannot

18 One reason may be that both Polanyi and Hayek (in this paper) start from Edward Sapir's theory of language. Hayek's use of Gestalt psychology is also visible in the text.

19 The importance of inarticulate knowledge shows itself in at least two dimensions. First, as Hayek shows, every conscious process requires an unconscious framework that determines the meaning of the conscious process. Second, tacit knowledge is closely related to experience and skill, which makes it possible to compare with rationality. Experienced, or expert, behavior does not require or follow rational rules. Rather, it is a practical process and different in nature from rational behavior (Dreyfus, 1991).

20 Jones and Wilson (1987) offers a simple yet accurate description of Gödel's theorem. In their words, 'Kurt Gödel demonstrated that within any given branch of mathematics, there would always be some propositions that couldn't be proven either true or false using the rules and axioms . . . of that mathematical branch itself. You might be able to prove every conceivable statement about numbers within a system by

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contain itself, we cannot know our mind. This argument has implications for the role of rules. It also helps us to make a distinction between Hayek and Polanyi on the source of incompleteness of any mathematical statement. For Polanyi, understanding a statement, mathematical or verbal, requires pre-understanding and background knowledge. A tacit 'interpretation' gives its meaning to the statement. In Polanyi's terms, subsidiary awareness makes any formula understandable (Polanyi, 1958: 94, 260). On the other hand, in Hayek's words:

> It would thus appear that Gödel's theorem is but a special case of a more general principle, namely the principle that among their determinants there must always be some rules which cannot be stated or even be conscious. At least all we can talk about and probably all we can consciously think about presupposes the existence of a framework which determines its meaning, i.e. a system of rules which operate us but which we can neither state nor form an image of and which we can merely evoke in others in so far as they already possess them. (1967: 62)

While Polanyi (1958: 259) sees the fundamental place of 'personal judgment' on the formulation of any formal statement, Hayek remains short of attaching the personal dimension. He rather emphasizes the role of inarticulate or unconscious rules that govern the conscious and rational processes (1967: 62). This seems to be a crucial difference between Hayek and Polanyi's renditions of tacit knowledge. In both cases, a tacit 'component' takes over the formal statement and makes it meaningful. Yet, their understanding of 'tacit knowing' remains at odds.

'The Primacy of the Abstract' is another place where we find a detailed discussion of inarticulate and explicit knowledge, although with a different accent. Here, Hayek argues that it is the mind that 'possesses' [the ability of] abstraction (1978a: 37).[21] He mentions Ryle and Polanyi on the role of 'mental factors which govern all our acting and thinking without being known to us, and which can be described only as abstract rules guiding without our knowledge'. Hayek seems to be in opposition to Polanyi here. For Polanyi, everyday world is the origin of explicit knowledge. By contrast, Hayek thinks that everyday world

going outside the system in order to come up with new rules and axioms, but by doing so you'll only create a larger system with its own unprovable statements. The implication is that all logical system of any complexity are, by definition, incomplete; each of them contains, at any given time, more true statements than it can possibly prove according to its own defining set of rules.' This suggests that our knowledge is fundamentally unformalizable. An inarticulate component always accompanies articulated knowledge.

21 On the other hand, 'the formation of abstractions ought to be regarded not as actions of the human mind but rather as something which happens to the mind, or that alters that structure of relationship which we call mind' and 'while every appearance of a new rule (or abstraction) constitutes a change in that system, something which its own operations cannot produce but which is brought about by extraneous factors' (1978: 43).

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may entangle our understanding of abstract rules and abstract rules make our understanding of 'concrete' possible.

Hayek's late addendum (1978) to his early essays on knowledge and competition presents an explicit discussion of local knowledge in the context of competition and discovery. For him, economic competition 'is a method of discovering particular facts relevant to the achievement of specific, temporary purposes'. He later explains what he means by this kind of knowledge (p. 182):

> The knowledge of which I speak consists rather of a capacity to find out particular circumstances, which becomes effective only if possessors of this knowledge are informed by the market which kinds of things or services are wanted, and how urgently they are wanted.

'The capacity to find out particular circumstances' requires a unique combination of individual knowledge and skills. This capacity remains tacit most of the time (1978: 182). Hayek does not refer to 'tacit knowledge' in this paper, except this brief mention. He takes it as an instrumental factor in the background and does not bring it to the forefront until *Law, Legislation and Liberty*, where he distinguishes orders and organizations in terms of the role of tacit knowing in their structure. Here, Hayek relates tacit knowledge and practical learning to the evolution of rules (Hayek, 1973: 17). In his words:

> So long as individuals act in accordance with rules it is not necessary that they be consciously aware of the rules. It is enough they know how to act in accordance with the rules without knowing that the rules are such and such in articulated terms. (1973: 99)

Hayek does not present a discussion of the possibility of articulation. Yet, he seems to accept the possibility of articulation, even though this is not necessary for social action. He makes a distinction between primitive and advanced societies, in terms of the nature of rules. While in the primitive society 'inarticulate rules' dominate, in the advanced society they are only part of the rules set (p. 19).

According to Hayek, human mind cannot control which aspects of the reality to be singled out. Non-rational abstraction, as he puts it, creates the environment where reasoning takes place. Therefore, articulate and codified knowledge is a product of practical understanding of the situation (pp. 30–1). Hayek pays particular attention not to imply psychological connotations about practical action and avoids using 'intuition'.

In his last work *(Fatal Conceit)*, this distinction shows itself. Here he writes (1988: 78):

> there is a difference between following rules of conduct, on the one hand, and knowledge about something, on the other ... The habit of following rules of

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> conduct is an ability utterly different from the knowledge that one's actions will have certain kinds of effects.

A clarification comes some pages later (1988: 89):

> so much knowledge of particular circumstances is unarticulated, and hardly even articulable (for example, an entrepreneur's hunch that a new product might be successful) that it would prove impossible to make it public quite apart from considerations of motivation.

Hayek thinks that it is not impossible to articulate tacit knowledge.[22] He takes a practical path and uses tacit knowledge in the sense of any inarticulate knowledge as opposed to articulated (or, codified) knowledge. This does not necessarily indicate the impossibility of codification. In this sense, Hayek does not take tacit knowledge as background knowledge and skills that shapes both 'knowing how' and 'knowing that'.

In sum, Hayek refers to two different kinds of 'practical knowledge' in his early economic writings and later more philosophical works. On the one hand, he refers to non-tacit local knowledge, which is not primordial, as in the case of an entrepreneur's knowledge of some particular localities of the market, as 'the man on the spot'. We may describe this kind of knowledge as subjectively held objective information. On the other hand, tacit knowledge resists articulation and is not subject to cost–benefit calculation. An entrepreneur's experience-based understanding of what distinguishes a profit opportunity from mere price differences is a good example of this kind of knowledge.

Non-tacit local knowledge can be a substitute for articulated knowledge. However, tacit knowledge is complementary to all other kinds of knowing, local or articulated. Without a primary understanding of the world, or indwelling, local or articulate knowledge would not be possible. Hayek comes to this conclusion gradually.

In earlier writings, before Polanyi's *Personal Knowledge*, Hayek' sources were Ryle on the distinction between 'knowing how' and 'knowing that'. After 1960, Hayek began to cite Polanyi in a larger context. Tacit knowledge became a central element of a liberal order for him. Inarticulate knowledge provided a reason why a liberal order is superior to alternatives. Moreover, a liberal order creates a 'perfect' environment for making use of tacit knowledge. Spontaneous order is a means and an end because of the dispersed and tacit nature of most knowledge that keeps a society together.

22 On the other hand, 'it seems to me that if we ask whether we can ever strictly be conscious of an abstraction in the same sense in which we are conscious of something that we perceive with our senses, the answer is at least uncertain' (1978: 45).

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4. Discussions of Hayek on tacit knowing

It is contentious among Hayek scholars whether he understands tacit knowledge as primordial.[23] John Gray (1982: 28, 1988: 59), for example, sees Hayek's understanding of practical knowledge as a 'version' of the thesis of the primacy of practice as he sees it in the work of Wittgenstein, Heidegger, and Ryle. Lavoie (1985, 1995) and Mufit Sabooglu and Richard Langlois (2001) also support this interpretation. They read Hayek's tacit knowledge as the primary form of knowledge. Interestingly, there was no talk over Hayek and tacit knowledge before 1980s. It began with Lavoie's book in 1985. Now, when we go back to Hayek's early writings, we find many examples of tacit knowledge. This has the danger of reading Hayek under the influence of later interpretations.

The primacy of tacit knowledge plays a crucial role in comparison between Hayek and his mentor Ludwig von Mises.[24] Those who see tacit knowledge as the central contribution of Hayek to economic calculation debate tend to emphasize the evolutionary structure of economic activity (Ioannides, 2000). On the other hand, Misesian economists tend to downgrade the role of tacit knowledge and see economic calculation as a property problem (Hoppe, 1996). For Misesian economists, tacit knowledge is a dubious concept and in incongruence with Misesian praxeology (Yeager, 1997). For example, Murray Rothbard is against a knowledge-based interpretation of Mises (Rothbard, 1991: 66).

While most of the scholarly literature on Hayek refers to tacit knowledge, we do not see important clarifications of this issue. Some Austrian economists tend to interpret it as a different realm of knowledge. To make the case clearer, let us look at how Gerald O'Driscoll and Mario Rizzo (1996: 104–105) describe tacit knowledge. They discuss tacit knowing as another realm of knowledge. Tacit knowledge refers to 'non-deductive and non-scientific' kind of economic knowledge. It is knowledge that either one does not know one has it or does not know how to articulate it. They see it on the same level with scientific knowledge. It may take the place of scientific knowledge as a substitute. They argue that much of economic knowledge remains tacit and private. This kind of

23 Explicit knowledge as a way of mental representation requires a primary understanding of the world. For Polanyi, tacit knowledge and articulate knowledge are not two ends of linear space. Being already in the world, any articulation necessarily requires a primary understanding, which is another way of saying that tacit knowledge is primordial.

24 Here I deliberately focus on how modern Austrian economists tend to see Mises and Hayek. While Mises was comfortable within the Cartesian world, Hayek tried to go beyond it. It would not be fair to compare and contrast two men by just taking them out of their environment and time. This is one reason why I tend not focus on Mises. For example, Ludwig Lachmann would see a more 'hermeneutical' Mises, yet many others tend to read him within the Cartesian rationalism. Some sections in *Human Action* and *Epistemological Problems of Economics* would support a more appreciative approach to tacit knowledge. His early uses of 'intellectual division of labor' and 'economic calculation' also reflect an understanding of practical knowledge, even though the distinction between knowledge and information was still blurry, not only for Mises but for the discipline as well.

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knowledge cannot (and does not) get articulated. The reason is that it may take too much time to articulate, which does not mean it cannot be, just that it is not, articulated. It may still be subject to cost–benefit analysis if the cost of articulation falls. On the other hand, we cannot convey 'intuition' to others and some part of knowledge remains tacit all the time (1996: 104–105). This reading of tacit knowing implicitly assumes that it is not essentially primordial. It is about a *qualitatively* different kind of knowledge (Rizzo, 2005). Karen Vaughn's (1994: 122) brief discussion of tacit knowledge also supports this thesis. Apparently, Fleetwood (1995: 97) also embraces this interpretation.

Some interpreters tend to downplay the role of tacit knowledge in Hayek's system with an emphasis on rationality. For example, Victor Vanberg's (e.g., 1991, 1994) attempts to find 'rationalism' in later Hayek do not leave much room for tacit knowing. From a different angle, Carlo Zappia (1996) claims that Hayek's tacit knowledge can be reduced to 'private information'. In this way, he argues, modern contract theory can include Hayekian themes of knowledge.

The debate around 'Austrian' hermeneutics reflects this tension. Many Austrian economists reject most of Polanyi and all of hermeneutics because of apparent relativism.[25] Relativism would give way to questioning a priori certainty of truth. The offensive criticisms of hermeneutics from Misesian circles point to this direction.[26]

5. A recapitulation: tacit knowledge or knowing how?

Hayek uses tacit knowing and knowing-how indiscriminately.[27] He disagrees with phenomenology. While there is no clear textual evidence about his choice, we can suggest some 'speculative' reasons.

To begin with, in terms of Hayek's agenda, the difference between tacit knowing and knowing-how did not play an important role. Hayek took tacit knowledge as an instrument to support his investigations into evolution and spontaneous order and was not anxious about the existential connotations of Polanyi's conception. Polanyi argued that interpretation is an important part of rule following. A free society requires more than just following abstract rules.

Another reason might be that Hayek was agnostic and Polanyi's concept would give way to moral and religious notions. Their discussions of spontaneous order reflect differences between them. Polanyi sees spontaneous order not as an ideal system. Rather, it has to be supported by dedicated professionals and

25 I prefer to use 'apparent' with quotation marks because it is a fundamental debate within philosophical hermeneutics to what extent hermeneutics is relativist.

26 See Gordon (1986) and Rothbard (1989) for scholarly criticisms. For a non-scholarly attack, see Hoppe's comments at the 1994 Mont Pelerin Meeting (Hoppe, 1994).

27 Many commentators on Hayek follow this position. For example, Caldwell (1997: 1866) equates tacit knowledge with 'knowing-how', even though in the passage that he cites, Hayek (1978: 38) does not talk about a specific concept but rather discuss a 'direction' in thinking.

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commitment.[28] A free society is a kind of dedicated community for Polanyi. This brings us to another important distinction between Polanyi and Hayek. Dedicated communities are created to reach transcendent ideals for Polanyi. They are not simply 'unintended consequences' of self-interested human action. Hayek would stop short of endorsing this view. For him, a free society is a society free of pressure of value judgments on others.

From a more hermeneutical angle, tacit knowing, and the concept of indwelling, would support questions about ideological reasons behind the superiority of free market arguments, and open doors to relativity. Polanyi rejects the concept of 'utilitarianism'. He repeatedly criticizes utilitarian logic in *Personal Knowledge* (e.g., 1958: 142, 182, and 234) and other places. For him, utilitarianism has the problems of positivism. It excludes tacit knowledge. In turn, the crucial function of the market turns into maximizing social welfare rather than coordinating human action.

These issues, we believe, led Hayek to take tacit knowing at its face value and leave aside its further implications. This may be one of the reasons why he did not see much difference between tacit knowing and knowing-how.

6. Summary

To sum, what we see in Hayek is an awareness of 'inarticulate' and 'tacit' knowledge even in his early writings. Yet, because of the lack of a theoretical structure to analyze this theme, Hayek was not able to deepen his work in this direction. As he moved to philosophy, he began to use the insights of Gestalt psychology. This provided him with a framework to locate his insights on the primacy of practice and the founded mode of formal and scientific knowledge in a theoretical framework. Though he registered the inarticulate dimension of all articulated knowledge, Hayek did not go further in this direction. However, the existence of dispersed knowledge and impossibility of conveying it to a central planner have become central tenets of the market process theory.

Hayek does not offer a satisfactory discussion of whether articulation of tacit knowledge is possible. One reason has to do with his reluctance to accept practical holism. While he argues that some rules are impossible to articulate, Hayek does not relate this to the primacy of practical understanding, probably under the influence of Gestalt psychology. In a sense, his analysis assumes that tacit knowledge and explicit knowledge are substitutes in some cases and complements in some others. The reason behind Hayek's standing on this issue needs further research.

28 In this sense, the existence of tacit knowledge does not necessarily give way to the superiority of a liberal order, even though empirically it has given for the last century (Khalil, 2002). The lack of dedication is also related to the absence of a common goal in a spontaneous order.

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While Hayek's view on tacit knowledge changed considerably through his Chicago years and later, the modern Hayek scholars do not always follow the change consistently. Many understand and use tacit knowledge in a narrow sense related to knowledge about particular time and places. Some others push Hayek's understanding to its limits and argue for a practical knowledge-based market society. In any sense, a more careful thinking on how Hayek understood tacit knowledge would help to understand the use and abuse of tacit knowledge in economics literature.

The recent debate over codification reflects the controversial nature of the concept of tacit knowledge. This literature neglects Hayek's writings to some extent. The tension between explicit (i.e., codified) and tacit knowledge has not changed much since Hayek. The debate gives the impression that they deal with issues Hayek faced half a century ago. Many proponents of the codificationist view prefer to assume away inarticulable tacit knowledge as irrelevant to social sciences (e.g., Cowan *et al.*, 2000: 230). Unfortunately, disregarding tacit knowledge does not solve ontological and epistemological problems of economics, as Hayek would remind us incessantly.

References

Ancori, B., A. Bureth, and P. Cohendet (2000), 'The Economics of Knowledge: The Debate about Codification and Tacit Knowledge', *Industrial and Corporate Change*, **9**(2): 255–287.

Bladel, J. (2005), 'Against Polanyi-centrism: Hayek and the Re-emergence of "Spontaneous Order"', *Quarterly Journal of Austrian Economics*, **8**(4): 15–30.

Butos, W. N. (1997), 'Hayek and Rational Expectations', in W. Keizer, B. Tieben, and R. van Zijp (eds.), *Austrian Economics in Debate*, London: Routledge, pp. 220–242.

Butos, W. N. and T. J. McQuade (2002), 'Mind, Market, and Institutions: The Knowledge Problem in Hayek's Thought', in J. Birner, P. Garrouste, and T. Aimar (eds.), *F.A. Hayek a Political Economist*, London and New York: Routledge, pp. 113–133.

Caldwell, B. (1997), 'Hayek and Socialism', *Journal of Economic Literature*, **35**(4): 1856–1890.

Caldwell, B. (2004), *Hayek's Challenge*, Chicago: University of Chicago Press.

Caldwell, B. (2004a), 'Some Reflections on F. A. Hayek's *The Sensory Order*', *Journal of Bioeconomics*, **6**(3): 239–254.

Cowan, R, P. A. David, and D. Foray (2000), 'The Explicit Economics of Knowledge Codification and Tacitness', *Industrial and Corporate Change*, **9**(2): 211–253.

Dreyfus, H. L. (1991), *Being-in-the-World*, Cambridge, MA: The MIT Press.

Fleetwood, S. (1995), *Hayek's Political Economy*, London: Routledge.

Gordon, D. (1986), 'Hermeneutics and Austrian Economics', Mises Institute, Auburn, available at http://www.mises.org/etexts/hermeneutics.asp.

Gray, J. (1982), 'F. A. Hayek and the Rebirth of Classical Liberalism', *Literature of Liberty*, **5**(4): 19–101.

Gray, J. (1988), 'Hayek, the Scottish School, and Contemporary Economics', in G. C. Winston and R. F. Teichraeber III (eds.), *The Boundaries of Economics*, Cambridge: Cambridge University Press, pp. 53–70.

https://doi.org/10.1017/S1744137409990312 Published online by Cambridge University Press

Grondin, J. (1994), *Introduction to Philosophical Hermeneutics*, tr: J. Wensheimer, Yale.
Hayek, F. A. (1941), *Pure Theory of Capital*, Chicago: University of Chicago Press.
Hayek, F. A. (1948a), 'The Use of Knowledge in Society', in his *Individualism and Economic Order*, Chicago: Chicago University Press, pp. 77–91.
Hayek, F. A. (1948b), 'Economics and Knowledge', in his *Individualism and Economic Order*, Chicago: Chicago University Press, pp. 33–56.
Hayek, F. A. (1948c), 'The Socialist Calculation II: The State of the Debate', in his *Individualism and Economic Order*, Chicago: Chicago University Press, pp. 148–180.
Hayek, F. A. (1952), *The Sensory Order*, London: Routledge & Paul Kegan.
Hayek, F. A. (1952a), *The Counterrevolution of Science*, Indianapolis: LibertyFund.
Hayek, F. A. (1960), *Constitution of Liberty*, Chicago: University of Chicago Press.
Hayek, F. A. (1967), 'Rules, Perception, and Intelligibility', in his *Studies in Philosophy, Politics and Economics*, Chicago: The University of Chicago Press, pp. 43–65.
Hayek, F. A. (1967a), 'Degrees of Explanation', in his *Studies*, pp. 3–21.
Hayek, F. A. (1973), *Law, Legislation and Liberty: Rules and Order*, vol. 1, Chicago: University of Chicago Press.
Hayek, F. A. (1978), 'Competition as a Discovery Procedure', in his *New Studies in Philosophy, Politics, Economics, and the History of Ideas*, Chicago: Chicago University Press, pp. 179–190.
Hayek, F. A. (1978a), 'The Primacy of Abstract', in his *New Studies*, pp. 35–49.
Hayek, F. A. (1979), *Law, Legislation and Liberty: The Political Order of a Free People*, vol. 3, Chicago: University of Chicago Press.
Hayek, F. A. (1988), *Fatal Conceit: The Errors of Socialism*, W. W. Bartley III (ed.), Chicago: The University of Chicago Press.
Hoppe, H. H. (1994), 'Comment on Don Lavoie', Presentation at the 1994 Mont Pelerin Society Meeting, available at http://www.hanshoppe.com/publications/hoppe_lavoie.pdf.
Hoppe, H. H. (1996), 'Socialism: A Property or Knowledge Problem', *Review of Austrian Economics*, **9**(1): 147–154.
Ioannides, S. (2000), 'Austrian Economics, Socialism and Impure Forms of Economic Organization', *Review of Political Economy*, **12**(1): 45–72.
Jacobs, S. (1999), 'Michael Polanyi's Theory of Spontaneous Orders', *Review of Austrian Economics*, **11**(1): 111–127.
Jones, J. and W. Wilson (1987), *An Incomplete Education*, New York: Ballantine Press.
Khalil, E. (2002), 'Information, Knowledge and the Close of Hayek' System', *Eastern Economic Journal*, **28**(3): 319–341.
Lavoie, D. (1985), *National Economic Planning: What is Left?*, Cambridge, MA: Ballinger.
Lavoie, D. (1995), 'The Market as a Procedure for the Discovery and Conveyance of Inarticulate Knowledge', in D. L. Prychitko (ed.), *Individuals, Institutions, Interpretations*, Avebury.
Merleau-Ponty, M. (1962), *Phenomenology of Perception*, London: Routledge.
Mirowski, P. (1998), 'Economics, Science, and Knowledge: Polanyi vs. Hayek', *Tradition and Discovery*, **25**(1): 29–42.
Nightingale, P. (2003), 'If Nelson and Winter are only Half Right about Tacit Knowledge, Which Half?', *Industrial and Corporate Change*, **12**(2): 149–183.
O'Driscoll, G. and M. Rizzo (1996), *The Economics of Time and Ignorance*, London: Routledge.
Polanyi, M. (1958), *Personal Knowledge*, Chicago: University of Chicago Press.

https://doi.org/10.1017/S1744137409990312 Published online by Cambridge University Press

Polanyi, M. (1969), *Knowing and Being*, M. Greene (ed.), Chicago: University of Chicago Press.
Rizzo, M. (2005), 'The Problem of Moral Dirigisme', *NYU Journal of Law and Liberty*, **1**(2): 781–835.
Rothbard, M. (1989), 'The Hermeneutical Invasion of Philosophy and Economics', *Review of Austrian Economics*, **3**(1): 45–59.
Rothbard, M. (1991), 'The End of Socialism and the Calculation Debate Revisited', *Review of Austrian Economics*, **5**(2): 51–76.
Ryle, G. (1949), *The Concept of Mind*, New York: Barnes & Noble.
Sabooglu, M. and R. N. Langlois (2001), 'Knowledge, and Meliorism in the Evolutionary Theory of F. A. Hayek', in K. Dopfer (ed.), *The Evolutionary Economics: Program and Scope*, Dordrecht: Kluwer, pp. 231–251.
Scott, W. (1971), 'Tacit Knowing and the Concept of Mind', *The Philosophical Quarterly*, **21**(82): 22–35.
Smith, B. (1988), 'Knowing How vs. Knowing That', in J. C. Nyiri and B. Smith (eds.), *Practical Knowledge*, New York: Croom Helm, pp. 1–16.
Smith, B. (1997), 'The Connectionist Mind: A Study of Hayekian Psychology', in S. F. Frowen (ed.), *Hayek: Economist and Social Philosopher*, New York: St Martin Press, pp. 9–29.
Vanberg, V. (1991), 'Spontaneous Market Order and Social Rules: A Critical Examination of F. A. Hayek's Theory of Cultural Evolution', in J. C. Wood and R. N. Woods (eds.), *Friedrich A. Hayek: Critical Assessments*, **4**: 177–201.
Vanberg, V. (1994), 'Hayek's Legacy and the Future of Liberal Thought: Rational Liberalism versus Evolutionary Agnosticism', *Cato Journal*, **14**(2): 179–199.
Vaughn, K. (1994), *Austrian Economics in America*, New York: Cambridge.
Yeager, L. (1997), 'Calculation and Knowledge: Let's Write Finis', *Review of Austrian Economics*, **10**(1): 133–136.
Zappia, C. (1996), 'The Notion of Private Information in a Modern Perspective: A Reappraisal of Hayek's Contribution', *European Journal of the History of Economic Thought*, **3**(1): 107–132.

https://doi.org/10.1017/S1744137409990312 Published online by Cambridge University Press