Zagreb International Review of Economics & Business, Vol. 3, No. 2, pp. 1-16, 2000

ISSN 1331-5609; UDC: 33+65

A History of the Concept of Knowledge

Hans Siggaard Jensen*

Copenhagen Business School

Abstract: The paper discusses the relationship of concept of work and concept of knowledge. It attempts to give an outline of such a history. The guiding thread throughout the history of the concept of knowledge has been 'linguisticness', the ways in which we were able to recognise or express cognition in language. Over past centuries incredible emphasis has been placed on understanding knowledge as allowing the facts to take the floor, letting them speak for themselves. With a social system that increasingly bases itself on the fact that more and more of those who supply a contribution to value generation in society also do so by producing and handling knowledge, changes to this are being made.

JEL Classification: B0, Z0

Key words: Aristotle, belief, doxa, episteme, knowledge

In his book Post-Capitalist Society from 1993, the author Peter F. Drucker has a little footnote relating to a discussion of the concept of work, which is something most cultures have cherished but always looked down upon. Discussing the relationship between the concept of work and the concept of knowledge, he writes:

> 'And there still is no history of work - but then also, despite all the philosophising about knowledge, there is no history of knowledge either. Both should become important areas of study, within the next decades or at least within the next century.' (Drucker 1993: 34)

---

* Hans Siggaard Jensen is Professor at the Copenhagen Business School, and Chairman of European Doctoral Programmes Association (EDAMBA).

Drucker presumably means neither that there are no historical notions of the theory of cognition (epistemology) – for there are – nor that there are no historical notions of science – for they too are available in abundance. Surely what he has in mind is histories about what we have perceived as knowledge down through the ages. For neither epistemology nor science, for example, would perceive divine revelation as knowledge, and that after all is a source of "knowledge" that has played a great role in purely historical terms.

Below, I shall attempt to give an outline of such a history. It is not a history of a knowledge that has actually been had or not had, nor is it a history of the philosophical theories about what knowledge is, though these play an essential part, for knowledge has sometimes been established in contradistinction to the precepts of the philosophers. Nor, of course, is it an account of what has been understood by knowledge in a large number of societies and cultures, where no accounts of such have been bequeathed.

In a Stone Age society one had knowledge – otherwise one could hardly survive – and possibly also deliberations as to what knowledge was, what knowledge was acceptable and suchlike, but of that *we* know nothing. We can only conclude certain things on the basis that they survived, that they used implements etc. We have therefore to examine where deliberations were made about knowledge, or it was attempted to pick up something thought to be knowledge or to convey, transmit, efface or in some other way act in relation to something that might be called knowledge. As when once, at the end of antiquity, the Christians burned the library at Alexandria because it contained dangerous knowledge. There will always be an interesting relationship between what is regarded as knowledge and its consequences for the way others' claims about knowledge are regarded. Modern-day astrologers are convinced they know something, but most scientists are convinced they actually know nothing, but only believe they know something. Conversely, most scientists are sure they know something, and many others are merely sure they are convinced that they know something. Knowledge is a concept that is used, but for all that not everyone agrees what knowledge is by any means.

In Drucker's post-capitalist society knowledge is something entirely central – a knowledge society with a knowledge economy – yet at the same time the authorities of knowledge are weakened. It is also a post-positivist and post-modern society in which knowledge as 'religion' has been secularised.

All former cultures had knowledge and probably also methods for collecting and disseminating it. Myths and mythologies, large-scale narratives and symbolic depictions certainly served the purpose of collecting and disseminating knowledge. This function was integrated with several others linked to child-rearing and education and to assuring the continued existence of society; what is done, when and possibly why. The Babylonians and Egyptians, who lived several millennia ago, certainly had

forms of knowledge we might characterise as scientific or something approximating it. They had numbers and were able to perform calculations and keep books and make calendars.

Ancient Greece

However, it is not until ancient Greece that more systematic forms of knowledge are developed and reflection is devoted to what knowledge actually is. An altogether decisive perception and distinction that would eventually colour our view of knowledge for ever more is the one between 'doxa' and 'episteme'. We normally translate these words as 'belief' and 'knowledge'. The central theoretician is Plato, and we find his deliberations on the concept of knowledge in the dialogue Theaetetus. 'Doxa' denotes our subjective impression of the world, as it appears to us with all its change and inconstancy, and when we formulate 'doxa' the product is statements that cannot be ascribed great weight, let alone any truth. For what is true at one moment is false the next, and what is true for one is false for another. Knowledge, on the other hand, pertains to that which is constant, that which has stability, on which consensus and certainty can be achieved. Knowledge, therefore, does not pertain to the existing perceived world, but a more stable world. Indeed, statements of knowledge are not merely true, they are necessarily true. They pertain, Plato thinks, to objects that exist of necessity, or where knowledge about them and their mutual relations is necessary knowledge, i.e. statements about knowledge have necessary truth. For Plato, mathematical – i.e. in his case principally geometric – propositions are examples of statements that can convey knowledge. Geometry concerns abstract immutable objects and their relations. We do not just think something about geometrical cases, we establish facts (deeds, i.e. actions associated with knowing something), and we do so with the aid of objective procedures, evidence. When dealing with the existing world, we speak, talk, persuade one another and think something. That is now knowledge. When we engage in geometry, we prove, and once a proof has been established, there is agreement – then it has to be accepted – then the truth is eternal and unalterable.

Pythagoras' theorem was true, is true and will always be so. For it pertains to abstract, objective conditions linked to the phenomenon of a right-angled triangle, to all right-angled triangles at all that have existed or will exist. Knowledge requires truth, then, and truth demands the involvement of certain immutable objects about which we are then able to know something. In the process, the object of knowledge becomes not the existing changeable world but rather unchangeable abstract objects such as 'the right-angled triangle'.

A red post-box cannot be an object of knowledge, but of course I may think I am now looking at a red post-box in the sunlight. But that same post-box is a completely different colour at night when the light has faded. There is no constancy, and therefore no possibility of knowledge. Perhaps I could 'construct' a kind of abstract post-box – the post-box as it really is – but it would be just that, abstract, a kind of theoretical entity, whose existence I endorse on the basis of what I see and otherwise observe. But such conclusions are by no means of the same certainty as those we find in a geometrical proof.

At the same time as Plato was evolving his philosophy, mathematicians were also devising comprehensive geometric theories and studies. Euclid summarised these in one of the most important works in the history of science, Elements, some decades later. This work established an influential model for what knowledge is. Knowledge is certain knowledge, and certainty stems above all from logical proof. We conclude from something true to something else true. Logic is a preserver of truth. The true thing from which we conclude is the self-evident, or that which is true by definition. Mathematics becomes a model for knowledge. Assertions of knowledge are credible, i.e. express actual knowledge, if we have proof, and proof is logical evidence. That makes for truth and certainty. And that is what separates knowledge from mere conviction or belief. Geometry produced knowledge, and because there were specific relations between the objects studied by geometry and phenomena in the world, e.g. between a right-angled triangle and the properties of an upright mast that casts a shadow, geometrical reasoning can be used of actual conditions and thus solve practical problems connected with calculation, triangulation, charting or navigation.

Plato's pupil Aristotle formulates a general logical view of knowledge based on these ideals, only without the special metaphysics we find in Plato. We may say that during the second century BC, Aristotle and Euclid establish a logical and mathematical/geometrical concept of knowledge. It by no means excludes empirical investigation or empirical science, but stresses that only when we speak out on abstract objects – as is the case in logics and mathematics – do we express actual knowledge – 'episteme'.

In a world scheme that consists of a volatile and changeable earthly world and an immutable divine world controlled by ideal geometrical forms, the most "empirical" science becomes astronomy. Geometry, astronomy and Aristotelian logic were the most outstanding scientific products of antiquity. They had some, but few, practical applications - theoretical knowledge first and foremost. Antiquity also created certain forms of organisations whose job it was to produce knowledge. Plato founded the Academy, Aristotle a more empirically orientated research institute, the Lyceum, and finally, in Alexandria, the Museum was founded, which was both a large library and an active centre for research.

Essentially, the Romans contributed nothing new, more or less taking over the Greek forms of knowledge generation and dissemination. But it is clear that their engineering and organisational capabilities were huge. Military leadership, logistics, architecture and planning were of a very high standard. But there are few deliberations as to what knowledge or which forms of knowledge were involved in such activities. The Greek notion of what knowledge is presumably acts as a restraint. The practical field of knowledge most closely approaching something we can recognise as practically orientated science is within medicine. Often we still understand problem-solving based on an ancient conceptual pattern, wishing for classification, diagnosis, and cure or solution, therapy, having made a prior study of the sequence of things up to the present stage of the problem - an anamnesis or case-history - and we pronounce on the future based on diagnosis and possible therapy too - we give a prognosis or forecast. We try to say what will happen if we do nothing and what will happen if we intervene. All this is concepts linked to practical medical knowledge; and it is typically experience based. The physicians of antiquity, the best-known one being Galen, not merely formulated these concepts but, more particularly, attempted to position medical experience in a philosophical system of concepts. It created great difficulties and misunderstands whenever an experience-based area of knowledge had to be classed under a logical-geometrical ideal of knowledge.

Both the museum in Alexandria and Plato's academy were closed at the end of antiquity, the museum perhaps burned down directly. Centuries later new forms of knowledge emerged.

The Middle Ages

The Middle Ages created not only new institutions in terms of knowledge and knowledge production but also entirely new forms of knowledge. The massive technical advances that take place in the central Middle Ages result in the writing of practical manuals and hands-on knowledge not merely being formulated but also included in a knowledge dissemination system. This is done primarily through the monasteries. The monasteries were spread throughout Europe and attached to 'universal' institutions like the Christian church, the papacy and the lingua franca, Latin. The large orders were highly extensive. The most important one in this context, the Cistercians, commanded something like 1,000 monasteries, and with it a comprehensive network of competent individuals and institutions. Each monastery was a centre not only of religious activity but also of practical activity. The Lord could be served not only through prayer and devotion, but also by work – spiritual work and practical work. But the monasteries were not the only new institution – the university was also created in the central Middle Ages. Around the early decades of the 13th

century they are present in Europe: Bologna, Paris and Oxford; and in the space of a relatively short time, all over Europe. They trained masters, and subsequently doctors, lawyers and priests. They created lots of research and lots of large and erudite works. Their method was *not* empirical research. Above all, they were places where discussion went on. Their labours have subsequently been much derided. They discussed trivial and otherworldly issues, and their use of logic did not lead to truths, bur rather to idiotic absurdities. The assessment is one that typically looks at them from a modern empirical, scholarly point of view. Lots of our notions about academia stem from the university of the Middle Ages and are alive and well. A dissertation is still defended and is based on a thesis, and there are still opponents. Professors have the right to profess, i.e. assert something, while lecturers and readers are people who read aloud. Dissertations were one of the methods used. Others were the close reading of authoritative texts, which were then commented on and hence also discussed. This was not the philological or humanistic work with texts of the Renaissance, but rather a logical analysis and more grammatical and structural approach. The key notion was that a group of people, by discussing and analysing texts already in existence – after the mid-1200s, typically the Greek philosopher Aristotle's texts – could produce knowledge collectively. The painstakingly logical and discursive work could create cumulative knowledge and by means of discussion a form of authority could be established.

This took place within the framework of independent collective organisations, which had extensive freedom – academic freedom – and were only occasionally taken to task by other authorities such as the church or king. Out of the system also grew the notion of profession-based knowledge, for doctors, lawyers and priests were professions with specific entitlements and duties in relation to the production and use of knowledge. At the same time, a system of legal rules was also created for the authorisation of knowledge, typically linked to academic degrees. In the process an organisation was also created, based on hierarchy and rules for advancement within this – a kind of tiered fraternity. We still have that notion intact when we use the verb to 'promote'.

The Scientific Society

The medieval notion of knowledge and knowledge production was not superseded by modern science's notion until the 17th century. But prior to that, the Renaissance had supplied not an alternative - for universities were 'scholastic' well into the 18th century – but a supplement: humanism. The humanist did not view knowledge as connected to strictly logical argumentation, or discussion as attack and defence in a logical dialogue, but rather as conversation and dialogue in the sense the rhetorician

sees it. It is a matter of use of language and text as an effective means of influencing and convincing. The Renaissance humanist is not a researcher, and anything but a logician, but has a more aesthetic approach to knowledge.

Knowledge is not necessarily systematic or formal, but may be expressed in images or narratives, for example. It is a poetic concept of knowledge. A person often acclaimed for his genius – as one who displays this form of knowledge - is Leonardo da Vinci. He was regarded both as a great scientist, a great inventor and a great artist, though certainly not systematic and by no means mathematical. Like artists, architects and engineers, the humanists of the Renaissance were active and acting rather than discussant and contemplative. Brunelleschi is a good example. He invented linear perspective and thus characterised for all time our idea of what is a picture and what a depiction[1]. But it is not primarily a theory of optics, perception and depiction, but of finding a precept for the way in which pictures are produced. One might say that he knew what a picture is in as much as he knew how to make one.

During the 1500s and 1600s the notion of knowledge changed radically. By the end of the 1600s the most essential parts of what is the scientific society of today had been created. During the 1700s and 1800s it was expanded with new institutions and would eventually dominate our notion of knowledge and what constitutes use of knowledge. Some decisive traits of the new concept of knowledge include the fact that the focus is now on knowledge as something that must empower action and provide power. Knowledge is no longer theoretical in the sense that it serves solely reflection – particularly reflection on that which necessarily is as it is and therefore renders action (practice) impossible. The focus now is also on knowledge as connected to the empirical, to observation and experimentation. Knowledge is a particular inner cognitive state that makes possible particular types of actions, above all effective actions. Knowledge is now understood as abstract, certainly, in the sense that it is expressed in equations, but also connected to empirical reality via measurements. Measurements thus define operations, which can translate features of reality into figures, which in turn can form the input for equations – in which miscellaneous variables occur.

Thus knowledge also becomes linked to the notion of regularities – laws of nature. It is precisely familiarity with these that makes possible effective actions, in that prediction and monitoring are possible. That means that a mechanical and causal viewpoint is also adopted, in which particular causes have particular effects. Through knowledge, the free agent can thus influence the course of things, alter them or achieve certain states. Knowledge can be used. The theoretical and the practical thus become interlinked.

The 1600s also see the formation of certain basic features of social organisation that produce knowledge. Knowledge must be communicated and checked. Thus there is a group of people who can understand it and verify it. If it has been attained through

observation or experimentation, others must be able to make the same observations and obtain the same experimental results. Observations and experimental results are objective in as much as they are accessible to a majority of qualified subjects who are in a very position to make a judgement on the outcome of experiments or the reliability of observations.

Scientific *society* is linked to the establishment of scientific *societies* and the publication of scientific journals. It is a society into which one is not born, nor is it one which is merely joined. It is a society to which one is admitted. As such, it resembles a fraternity. It is not necessarily connected to the universities, but affiliation with them is not precluded. During this period the universities are still primarily places of education for priests. It will take a while before they define themselves entirely as parts of scientific society. During the 1700s the scientific society becomes not just a society directed in on itself, but a more common ideal. This comes about through the concatenation of the scientific and the political, and above all the French enlightenment movement is the chief player. The publication of the Encyclopaedia from the mid-18th century onwards illustrates the new concept of knowledge, and the political movement towards a democratic and free society. Political and economic freedom are the corresponding trend.

With the French Revolution a new series of institutions is created that will 'scientify' society. These are museums, scientific academies in the service of the people and educational establishments with a practical objective. During the 1800s models are then created for the kind of research institutions we know today: the research-based university, which is a natural part of scientific society, in which all faculties profess a scientific ideology; and the industrial research laboratory, that does research of significance to a company or industry – a good Danish example is the Carlsberg Laboratory, the government research institute that supplies knowledge of significance to state players. Of course, there have been research institutions under governmental auspices before, e.g. observatories, because particular forms of practical knowledge were needed, e.g. astronomical tables for navigation – important to maritime trade and naval warfare alike. But it is not till the 1800s that a cohesive system of knowledge production is developed, involving research institutions, state institutions and an emergent private – and science-based – business community, as we see with the chemical and electrical industry, for example. Research must deliver knowledge to doctors, engineers and scientific research experts of many kinds – some of the first being chemists, who revealed the adulteration of foods, and some of the most well-known being forensic pathologists, who used scientific methods to detect criminals.

From knowledge, as in the case of Descartes and Locke, perceived as a specific cognitive state, knowledge became more and more of a dual structure. It had been structured into attendance in such a way that it could be systematised and reproduced

in an encyclopaedia; it was in circulation and useful because there was a network of people and institutions committed to a particular scientific ethos[2] and method. Slowly, both new types of institutions and new applications of scientific knowledge were devised. Civil servants, albeit scientifically trained experts, created public hygiene and scientific supervisory bodies, and industry created industrial research – as well as the development laboratory, which in turn resulted in new types of production and products. Knowledge and skill have always been a prerequisite of handicrafts and farming; now industry became increasingly based not merely on knowledge but also on science.

An important consequence of the growing dominance of the scientific concept of knowledge was that other forms of cognitive activity that had previously been understood as knowledge assumed a modified status – 'relegated' either to the emotive or expressive, or to the almost mythical or mythological. Religious knowledge based on revelation assumed an entirely modified status, as either morally instructive or expressive of insight into essential existential conditions for mankind. Art, which had been viewed as fruitful knowledge, was now perceived as being linked to expression of emotions more than of insight. Not merely did the perception of art change but the actual practices associated with art and religion changed. Painting, writing and acting were done differently – we often call it, slightly misleadingly perhaps, modernism, a modernism that is perhaps a result of modernity rather than an expression of it. It can also be seen in the way the scientific concept of knowledge segregated a number of areas of experience as being outside the field of knowledge and thus created extensive fragmentation.

Romantic philosophy and holistic thinking could thus be seen as one last attempt to create precisely a cohesive understanding of reality, a type of understanding rendered increasingly impossible from the end of the 1800s. As a result, areas of knowledge that were 'not in the nature of nature' called to be understood in relation to our comprehension of scientific knowledge. It had to be a question of a discipline having an object – existing independently - and a method for describing and explaining circumstances surrounding that object. In this way linguistics and philology, social sciences (sociology), psychology and economics each created their own object field and their own methods for use in studying that object.

The field of knowledge thus became fragmented, and problems arose with its structure. Was a unified science possible? Were there various forms of science and hence knowledge and, if so, which? Philosophy, which until the mid-1800s could be understood as the queen - not to say the mother - of sciences became the theory of cognition and science, which above all had to take a stance on these problems of knowledge. At the same time, however, social and technological development led to the emergence of new fields of knowledge. Knowledge arose about how to control, monitor and use the complex new technical and social systems engendered by the use

of scientific knowledge. One of the major experiences gained was that in a relatively short time it was possible to work up the ability within large social contexts to handle and grasp (notice the metaphor associated with 'grasping') complex systems. Learning was more possible than one would think. This is what Drucker, in his book from 1993, calls the second industrial revolution, linked to the management and control of large, complex systems like modern companies and organisations.

We can thus say that the actual development of our reality as a result of the scientific knowledge we have - the technological influence – creates new objects for knowledge. It is knowledge that is not linked to the interaction between man and nature, with nature as object, but rather with that interaction precisely as object. Such knowledge is conceptualised practices, which are well founded and analysed. As such it is a case of systematic reflection on complex cases of a non-natural nature, i.e. conditions where one cannot ignore acting and conscious people as parties to the case. Take as an example, say, reflection on the cognisant man/woman of science who certainly knows a thing or two about nature but who, in his or her concept of nature, does not include either him/herself as knowing, or the knowledge in question (the person in question can, of course, include him/herself as a material body, as a body in the biological sense, but as a by no means knowing, thinking, feeling and acting body).

The Present

During the 17th and 18th centuries the laboratory and the observatory were places where new world pictures were created, new pictures of our ranking in the Universe, and the ways in which we ourselves and parts of this Universe were constructed; but they were also places where the knowledge created could make possible new actions. The industrial laboratory of the 1800s created new products and productions. The century saw the emergence of companies that not only applied knowledge, or produced it themselves for their own 'modest needs', but companies that were involved in producing knowledge. Knowledge became a service. We find former examples of scientific expertise applied in this way in chemical knowledge, making possible entirely new revelations of crimes, be it the adulteration of foods or murder. Sherlock Holmes is a fine example of this scientific-thinking pundit, available as a private consultant (usually in dealings with London's public police, at no charge whatsoever – glory alone is what counts, a relic of the 17th-century ideal of the gentleman-scientist of independent means), whereas Jules Verne's Captain Nemo is an example of the problems associated with having technologically superior knowledge.

In the world of reality, Pasteur was in many ways a model for the researcher whose basic causal insight enables him to solve essential practical problems. But Pasteur operated only 'in his spare time'. However, it also became possible to set up more and more comprehensive economic activity, which as a result did not have products, but knowledge that could take on the nature of a product by forming part of a direct exchange on a market.

In the classic industrial society the researcher is an indispensable figure. There is a dependence on knowledge because more and more becomes science based, just as there was a dependence on knowledge because a policy of objectivity and expertise was being sought. It took rational means to achieve the goals that had been democratically set or posited on the basis of a notion about what citizens wanted. It was utilitarianism, the greatest possible happiness for the greatest possible numbers. But industrial society also needed competence in many other forms. It required contractors and capitalists, politicians and entertainers. They were primarily not researchers with the values and standards that such researchers had inherited from the Middle Ages, the Renaissance, the scientific revolution or subsequent developments.

But researchers were the only ones able to create knowledge. Others could learn lessons through experience, and they were able to be rhetoricians or merely debate. Since the scientific revolution the power of facts had virtually reigned supreme. Experts do not discuss like politicians, and researchers do not entertain like well-known Renaissance pornographers. Dialectics, logic and rhetoric had been ousted by objectivity and respect for facts. This was what was understood by science. The free intellectual could be critical of officialdom, the church or the state, precisely because he or she had objectivity and facts on his or her side. Zola is the best known example of a scientifically orientated intellectual who was both artistically and politically active – the efforts he deployed in the Dreyfus Affair bring that into sharp focus[3].

There is no doubt that, in contemporary society too, there is a need for experts and knowledge producers. For there is still an incredible amount of social activity based on the application of knowledge produced within the framework of research institutions. There are many areas in which theory in the form of abstractly defined specialist disciplines still provides knowledge that is particularly usable. But the interesting thing is that social development is heading in a direction where the essential features of industrial society are changing. No longer is knowledge merely a 'raw material' used to manufacture products or to supply non-knowledge-orientated services. Knowledge is the actual product. That means that the socially interesting activity – where value creation takes place – becomes not so much application of knowledge as production of knowledge. Products are produced with the aid of knowledge, raw materials, capital, machinery and human labour. Economists and social critics have described it - no one better, perhaps, than Karl Marx. Knowledge is

produced with the aid of other knowledge. It is not a case of production, but perhaps something more along the lines of a transformation, in which different forms of abstract and cognitive material are changed and turned into knowledge through a long series of complex social processes. That, in turn, involves dissemination, though not in the form of knowledge diffusing out into society as a flow, but rather of knowledge through a series of translations becoming accessible in many social contexts and being shaped to match the 'languages' spoken in those social contexts.

In a society where the most essential value-adding activity is knowledge production, other changes will also be on the cards. Knowledge is no longer being produced just within the framework of a monopoly, as universities and research institutions may have. The technology of the industrial society is based on knowledge about nature. It is technology which in many ways can be ideally characterised as applied science. But many other technologies are essential today. There is organisation of work, which is information technology, which is about abstract semantic phenomena to a far greater degree than natural phenomena, and there are out-and-out meaning and significance-creating technologies, like those we see in operation in the expanding world of the media.

Indeed, the natural science technologies are also changing; it is no longer nature itself but rather our relationship with it and use of it that becomes the object of regulation, as happens in environmental technology. Technology and knowledge application is actually changing radically; and with it also the requirement for qualifications and competences.

We may say that the focus on knowledge as the establishment and knowledge of facts characterising the scientific revolution is being broadened so as also to make room – again – for the type of qualifications that have otherwise characterised intellectual and abstract work. Room is being made to allow research work to comprise discussion, and the experts are being forced to the point in the media world where they can no longer give the appearance of a ministerial department. There will also be room for rhetoric, for significance generation and interpretation are important in the type of knowledge production that takes other forms of knowledge as input and transforms them.

The laboratory – according to classical understanding – is the place for knowledge production, if knowledge is primarily just facts about the nature of universality, i.e. the shape of universal laws of nature. If that is not the case, knowledge must be discovered and produced in contexts where it arises or is to be found. Knowledge thus arises through interpretation of experiences, abstractions and conceptualisations. Knowledge arises through the creation of myths and narratives, and through new symbols, which may almost take the form of the ritual. We see it in the new expanding areas of knowledge in informatics, biotechnology and management, the great

expansive areas of knowledge that are closely bound up with the creation of added value in the post-industrial knowledge society – as it is often referred to.

Conclusion

The guiding thread throughout the history of the concept of knowledge has been 'linguisticness', the ways in which we were able to recognise or express cognition in language. Over past centuries incredible emphasis has been placed on understanding knowledge as allowing the facts to take the floor, letting them speak for themselves. With a social system that increasingly bases itself on the fact that more and more of those who supply a contribution to value generation in society also do so by producing and handling knowledge, changes to this are being made.

Experts and scientifically trained people will no longer be an elite vested with special power and authority by virtue of their knowledge and skills, an elect few who perform their work solely through language. Given that manual labour is increasingly being done away with or moved to other societies as part of the global division of labour – as it is so nicely called – abstract work will be inserted as a substitute. That alters power and authority. Qualification in research and science is now no longer any guarantee of automatically occupying positions at the top of society, merely of being able to get involved in vital production. Qualification will not necessarily grant access to power and leadership too.

Conversely, the relationship between leader and led will change. The person who produces knowledge with knowledge has an entirely different relationship with his superior than the manual labourer. He or she actually knows more about what is being worked with. At the same time, the relationship with knowledge as something that can be owned will also become different. In industrial society it was crucial that knowledge be publicly available – a free commodity, so to speak, and that the necessary products could be produced or services supplied with the aid of this knowledge. The library was the model. It was public and free. But when knowledge becomes a product in its own right, it must also take on a different nature. Patents were a part of the notion in the age of enlightenment of the free knowledge that was embodied in a market-economic society and guaranteed both free access to it and a free economy, since payment was made to use knowledge, but not to access it. When knowledge becomes a product, it will invariably assume the nature of the society it functions in as a product, of course. That is to say that knowledge becomes a part of the market-economic system rather than a prerequisite for it. Equal access to information and knowledge was an essential precondition for the classical ideal of democracy, again a central reason for the public libraries that were supposed to safeguard citizens' scope for exercising their rights. In this system the researcher and

knowledge producer are ranked as a custodian of the system, a servant of the system, rather than a player in the system.

There were workers and capitalists, or however you divided them up. The researcher was on the outside and had to make sure the rules of the game were observed. As mentioned, some of the first scientific experts were attached to chemical supervision of food authenticity. That is only reasonable, seen through the eyes of one who pays for bread and milk as a poor labouring urban denizen, but also those employer's eyes that watch the health of the labour force being eroded and therefore witness increasingly less work being obtained for the minimum wages paid out.

In the knowledge economy, the knowledge producer is in a completely different situation relative to society's value generation. The knowledge worker attains the status of one who creates values, rather than one who enables others to create values. In his works on the theory of added value, Marx had already struggled with some of the problems associated with what he called theoretical work, in as far as he saw and foresaw the role that science would come to play as what, in Marxist terminology, may be called a 'productive force'. What he scarcely foresaw was that societies might arise in which value generation was correlated to the production of abstract and theoretical material to such an extent as is the case today.

What, then, is the condition for this value generation? It is terribly complex, of course, and must inevitably involve human action of one kind or another – value cannot be created purely by spiritual activity. But one vital factor is that a kind of knowledge added value can be created. Whereas industrial production was only able to form the basis of a society with enough economic growth and wealth for freedom in as much as there was constant accumulation that could be invested in development and innovation, the knowledge economy is based on the individual employee and the individual knowledge-producing organization not merely using and dispensing knowledge in their activities but also acquiring it as and when knowledge production takes place. *That is to say that any knowledge production is also knowledge acquisition.* But that is the same as saying that the former distinction between producing knowledge and acquiring knowledge must be waived. We have typically seen this distinction between those who, on the one hand, do research and make new knowledge and those who, on the other hand, disseminate and learn, working solely with knowledge already available - or rather "soul-ly" available. Learning and research therefore become two sides of the same coin. But that also alters our concept of knowledge from a concept linked to produced structures – objectively existing abstract systems – to social and cognitive processes, which have possibilities and potentials per se for influencing or instigating other processes.

Epistemologically, there may perhaps be said to be a move from a positivist-empiricist concept to a pragmatic concept of knowledge, a transformation of a powerfully empirical and cognitively orientated concept of knowledge with its

jumping-off point in Descartes and Locke into a concept characterised by Dewey and Wittgenstein, in which experience, learning and linguistic-social communality are vehicles for knowledge.

To an increasing extent, therefore, knowledge is being produced at many points in society. It takes the shape of experiences linked to complex social processes of an abstract nature. Software production in large teams or consultant companies are good examples. Knowledge is both supplied and acquired in the same process. For, after all, it is impossible to advise someone without also learning something about their problems and hence acquiring knowledge. But an ability to conceptualise and interpret is required to assemble components into meaningful entities - what someone has called narratives. The source as a metaphor can therefore be supplemented with the work of harvesting, where that which grows sparsely in the fields is gathered together and through a number of processing operations is transformed into useful products such as bread and beer.

It is these transformational or spiritual processing operations that will be central in future. Efforts will be required from the whole gamut of competences for which historical developments in the concept of knowledge have created scope. We move, then, from a uni-paradigmatic exemplification of the knowledge worker – the scientific working expert – to a multi-paradigmatic exemplification with a whole repertoire of instrumentalities and modes of operation, whose competence is based quite fundamentally on the ability to administrate those instrumentalities and modes of operation – competence of another order. Socially speaking, it also entails a new division of labour, in which management is no longer a question of the distinction between manual labour and brainwork, but between types of brainwork, where management is linked to the deployment of a variety of possibilities for intellectual work in different contexts.

If there is only one possibility, there *is* no choice; if there are several, there is a decision-making situation. It is these decision-making situations that will characterise the knowledge work of the future, and that calls for new competences and new forms of organisation. There will be many facets to that abstract work other than just being a medium pleading the case of objectivity. Science will become knowledge creation.

NOTES

[1] Brunelleschi is thought to be the first to have created pictures with a central perspective and to have formulated the rules for such pictures, rules first found committed to writing by Alberti in about the 1430s, which include determination of the vanishing point and horizon as well as the degree of reduction in relation to position in space, i.e. the distance from the person implicitly assumed to be observing in the picture. A good example of a perspective picture is the depiction of a chequered floor on a two-dimensional surface.

[2] What is meant by "ethos" here is a special set of rules defining a form of conduct, where these rules not merely lay down a practice but are also linked to a specific notion of values. A profession, a sport or a religious group can thus have a particular ethos. The difference from an ethic is primarily that an ethic is normally regarded as being common, whereas an ethos is specific to a particular group.

[3] Zola was not just a well-known author but also active as a journalist. As editor of a prominent newspaper he took an active part in the political debate and contributed to qualifying it. A Danish intellectual comparable with Zola is Georg Brandes, though unlike Herman Bang, say, he was not an author as such. The Danish newspaper most influenced by Zola's journalistic ideas was *Politiken*.

REFERENCE

Drucker, P. F., (1993), *Post-Capitalist Society*. Oxford: Butterworth-Heinemann.