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Arguments in favour of a general image science

Abstract

In this paper I want to make an attempt at responding to the question how the claimed interdisciplinary image science can be systematically promoted and finally established. This is not a question of how further interdisciplinary conferences and publications can be realised. Rather this paper intends to offer suggestions how existing cooperation might and should be organised independently from individual scientists in order to generate a remaining academic appreciation. In clarifying such conceptual questions I see a specific philosophical contribution to image science.

Der folgende Beitrag möchte den Versuch einer Beantwortung der Frage unternehmen, wie eine interdisziplinär ausgerichtete Bildwissenschaft systematisch gefördert und schließlich etabliert werden kann. Es soll hierbei nicht darum gehen, wie sich weitere interdisziplinäre Tagungen und Sammelbände realisieren lassen, sondern darum, wie die bereits bestehende Zusammenarbeit organisiert werden müsste, damit sie (auch unabhängig von den einzelnen Forscherpersönlichkeiten) einen bleibenden theoretischen Mehrwert erzeugen kann. In der Klärung solcher konzeptioneller Fragen sehe ich einen spezifisch philosophischen Beitrag zur Bildwissenschaft.

0. Introduction

Regarding the much cited abundance of pictures, efforts to theoretically fathom the possibilities and limits for the employment of pictures have dramatically increased over the past few decades. This is obvious not only owing to many conferences and publications devoted to picture theory, but also on an institutional level. Numerous disciplines have already formed specialised groups that analyse the phenomenon of images from their specific scientific perspective. There is, for example, the Visual Communication Group (see Knieper & Müller, 2003) in the German Society for Journalism and Communication Science that has been active for

some years now. Additionally, discussions between the individual sciences have increased (see Sachs-Hombach 2003b and 2005; see also the virtual institute of image science (VIB) under www.bildwissenschaft.org). As expected, it turned out that the views of the various scientists and disciplines are fundamentally different. Conceptual as well as methodological questions are concerned. So it is unclear, for example, whether and in what way phenomena as models, world views or self-images should be subjected to image science. Furthermore, it is contentious what the essential qualities are that pictures are thought to possess: can such a set of properties be determined uniquely for all kinds of pictures? After all, currently there exist competing views on the competencies of the single disciplines. Provided that there is a possibility of assessing an image science positively, only one assumption appears to be indisputable, namely that a general image science – if it is going to be established – has to be drawn up in an interdisciplinary fashion in order to guarantee an appropriate comprehension of the various phenomena (see Sachs-Hombach 2004).

In this paper I want to look upon this position as a starting point and make an attempt at responding to the question how the claimed interdisciplinary image science can be systematically promoted and finally established. This is not a question of how further interdisciplinary conferences and publications can be realised. Rather this paper intends to offer suggestions how existing cooperation might and should be organised independently from individual scientists in order to generate a remaining academic appreciation. In clarifying such conceptual questions I see a specific philosophical contribution to image science.

I am going to outline my considerations with reference to four theses. According to the first thesis, the contribution of philosophy to an image science should be seen in the way it allows the construction of a conceptual map. I call this method “conceptual cartography” (1). According to the second thesis, a general image science is not a new, nascent science. Rather it consists of a theory frame providing a descriptive language that enables the different disciplines and points of views to correspond to each other (2). According to the third thesis, such a theory frame arises from the assumption that pictures are perception-based media (3). According to the fourth thesis, the meaning of concrete pictures can only be defined in relation to the type, medium and function of the image at hand (4).

1. Philosophy as conceptual cartography

(T1) The contribution of philosophy to image science is, above all, of a conceptually cartographic nature.

To ask what images *are* corresponds to the traditional ‘what’-questions that nowadays are normally understood as questions of conceptual clarification. A conceptual clarification ideally takes place with the definition that includes the necessary and sufficient conditions of a certain phenomenon. Hereby it is supposed that those conditions describe characteristic features that objects have to show in order to belong to the field of application of the concept in question. Therefore, the definition allows, in connection with the corresponding methods, to decide on

a methodologically reflected basis whether or not a (certain) object comes under the concept. Often, however, it is rather difficult to define the basic concept satisfactorily. If the demands made on conceptual clarification are too high, the chances of success are limited, as experience has shown. If, however, insufficient demands are accepted, the results remain ambiguous in the end. To find their way among all these obstacles, philosophers tend to restrict themselves to an explication that comprises profound, sufficient or just characteristic conditions of a concept covering a core area which is considered to be paradigmatic.

A successful explication of the concept of visual representation should make classification possible as well as enabling an appropriate understanding of the possible thematic objects. Whether a conceptual clarification has been successful is indicated by the adequacy conditions (see for example Poser 2001: 37ff). The demand for the coherence and consistency of the resulting conceptual statement in particular belongs to them. Only those statements that meet this demand can be introduced into complex theories and serve the derivation of general statements. Hereby, the everyday use of language and the related intuitions normally serve as a corrective. Divergences from the everyday use of language have to be justified (if, for example, cases are that are normally included are excluded by the conceptual characteristics).

Philosophical analysis of concepts is first of all a guiding method. Applying it, logical proof of the general structures of concepts is achieved, which our linguistic usage is based upon. Supported by such an analysis, concepts are organised into fields or networks of concepts and their mutual relation is illustrated. As conceptual cartography, philosophical analysis does not divide concepts into their anatomic constituents, but makes explicit the associations that are implied with the concept to be explained as well as all the further concepts that are needed for the explication. At the same time, the conceptual cartography illustrates how the structure of a phenomenological field as well as of related questions takes shape in relation to our conceptual instruments. It explains therefore as well what problems and possibilities have to be taken into account.

If this work on concepts, as Hegel called it, is central for philosophy then the metaphor of the map means that philosophical rationality is first of all concerned with orientation. If an unknown theoretical field is to be explored, philosophy offers therefore information on the relevant relations and the theoretical consequences that are to be expected under certain conceptual conditions. Applied to empirical science, philosophical analysis takes on the function of scientific guidance. And insofar as the thematic conceptual networks often contain views from different scientific fields, philosophy is challenged in particular to reflect on and promote the structures of interdisciplinary enterprises.

2. General image science and theory frame

(T2) An interdisciplinary constructed, general image science mainly consists of a theory frame.

The term “general image science” follows the very successful establishment of a general linguistics. It expresses the conviction that a similarly lasting development is also possible in

the field of images. Accordingly, the image is assigned (similar to the language) a fundamental function in our relation to the world as well as to ourselves. Yet, images must not be understood as being linguistic signs or as being looked at like linguistic signs. Such an assumption is a fundamental misunderstanding that is sometimes mistakenly attributed to semiotic image theories. Without any doubt images possess peculiar structures that in many respects differ from linguistic expressions and cannot be covered adequately by the traditional semiotic theories within structuralism. Consequently, the independence of the visual is completely undisputed. Yet, this does not mean that linguistics in general and semiotics in particular cannot contribute to an understanding of images. This is especially important with respect of the mutual relation between text and image. Additionally, semiotics can offer general theorems that derive from a descriptive language that is set above images and texts. A decidedly interdisciplinary approach does in any case have to scrutinise the practicability of approaches based on theories of communication and signs. Ideally it should lead to an integration of them.

Still, how do these different approaches, theories, and disciplines correspond to each other? Or in other words: how can a general image science be established? In my opinion, that is possible only if a theory frame can be developed, which provides an integrative research programme for the different disciplines. It has to consider the various concepts of pictures, and it has to open up sufficient points of contact for the views of the diverse disciplines. This can only be accomplished if the demands made on the theory frame are kept rather general. At the same time, however, they have to remain as specific as possible to allow the researchers the generation of empirical questions. The theory frame therefore has to explicitly express the minimal conditions that every picture theory meets or should have to meet. The development of such a theory frame is first and foremost a task of conceptual cartography. As this term might evoke the impression of an inflexible scaffold, it has to be kept in mind that such a theory frame does not claim to already explain all the different visual phenomena or every aspect of an image. Above all, specific phenomena, for example photography, are not supposed to be characterised within the theory frame. Yet, this does not mean that those phenomena are located outside that frame. The theory frame just supplies the general characteristics of the visual, while the specific visual phenomena must of course be characterised by a more precise and complex explication.

The term “theory frame” denotes a set of assumptions comprising different theories. A theory frame is not a meta-theory. While a meta-theory is a theory about theories, in which the essential conditions of theories are determined, a theory frame has to deal with content matters. It is an integrative, generalising approach that characterises and marks certain terms that are contained, if only implicitly, in the different theories of a field of phenomena as crucial for the research of that very field. In this way the conceptual instruments are determined that are indispensable for the investigation of a phenomenon. To what degree such a determination should be seen as rational depends on how the relevant concepts are introduced. This is a basic task of philosophy: developing a theory frame requires on the one hand an explication or definition of the relevant concepts, and on the other hand a justification of the conceptual structure it has established.

In particular, this first step includes a comparison of the various conceptualisations of pictures as they are dealt with by the different disciplines. Since the explication of basic concepts is

normally concerned with very complex connections between the relevant terms, a concept should be defined in relation to the theory it comes from: it cannot be made explicit independently of the theory. To explain a concept means to imbed it within a theory, and thus into a systematic and ordered framework of statements. The comparison of the various concepts of pictures is always a comparison of different picture theories. The analysis that has been named “conceptual cartography” operates therefore already on the level of theory description and theory construction. In order to move from a specific theory to a theory frame one has additionally to examine which are the essential assumptions: the assumptions shared by the different theoretical approaches that can provide a common ground.

A general image science must at least offer a model that can not only connect the different visual phenomena systematically, but can also link the various image sciences without questioning their independence. If the term “science” is to be taken narrowly, methodological guidelines have also to be developed. A general image science is therefore not a newly developed discipline that stands next to the already existing image sciences, but consists of a theory frame, which supplies the basic theoretical reflections within the conceptual cartography that every special approach to pictures should contain, and by which they are mutually referred to.

For the purpose of illustration, it is helpful to have a closer look at cognitive science, which has only recently been established as an interdisciplinary, but independent science. The concept of cognition, the vagueness of which was often commented on, is of overriding importance here. Cognitive science has been promoted to the status of an independent science by the suggestion that the concept of cognition has to be explained through the concept of representation, which is connected to the concept of information processing. The result is the so-called computational model of the mind, which for some time has been the most influential paradigm of cognitive science. It is mainly based on the analysis of existing psychological theories, as for example Fodor has demonstrated in “The Language of Thought”. That paradigm has turned out to be problematic in many respects and nowadays is barely promoted in its classical form as physical symbol processing hypothesis. Yet, the cognitive science approach has turned out to be relatively robust insofar as it is also able to integrate the different views of the critique of symbol processing (for example by connectivism).

3. Perceptual and medial conditions for Pictures

(T3) Pictures are perception-based media.

The example of cognitive science shows many characteristics specific to phenomena in cognitive science that question its model function for a general image science. Yet, this does not effect the consideration that setting up a theory frame is crucial in order to establish a general image science. The theory frame should distil some important concepts from all relevant theories and structure them consistently and coherently. This, then, should provide us with a common language to describe, and make comparable, questions and theories that are in conflict with each other or have been derived from heterogeneous disciplines.

The thesis that pictures are perception-based media is an attempt to make explicit the conditions of the concept "picture" mutually agreed upon. In order to achieve such an agreement, the medial character and the perceptual aspects of pictures have to be emphasised. The thesis argues that the term "picture" should only be used to refer to such phenomena that, firstly, are associated with a „content“ or meaning, and that, secondly, are interpreted at least partly according to standards of perception. This explication remains general on purpose. It is only intended to mark out the conceptual field from which conditions of adequacy can be defined for the different concepts of pictures. The medial and the perceptual aspects hereby provide two components that, by themselves, are not special to pictures: they also appear in contexts that do not refer to pictures. Together, however, they constitute a network of perception-based references. Thus, picture use is only given if the two components appear together. The fascinating element in that suggestion lies in the possibility to analyse the special performance of the different types, functions, and usages of pictures as the result of a variable combination of the two components (see Sachs-Hombach 2003a).

Central to the suggested theory frame is the concept of the medium. In its relevant meaning here, the concept designates the physical vehicle of a sign system (see Posner 1986). Media and signs are mutually conditional. The concept "media", like the concept of the sign, can then be split up into the concepts of the linguistic and visual medium (among others). It is systematically productive if, initially, arbitrary media are distinguished from perception-based media. While linguistic signs (as well as abstract or pure conventional symbols) are undoubtedly the most important class of arbitrary media, visual images in particular can be described as paradigmatic cases of the sub-class of visual perception-based media. That is, the class of perception-based media should be subdivided according to the different perception modalities. For auditory media, which are partly arbitrary (the ringing of a bell, for example) or partly perception-based (the imitation of a bird's voice), there was no development of special concepts: we even speak of auditory images (see for example Lakoff 1987: 444). Within the scope of such a structure it becomes clear that it is solely the sign aspect that suggests the orientation towards linguistics (which nowadays is considered to be the best-developed sign theory). Yet, the specific property of visual media, which lies in the perceptual aspect, is not acknowledged here. If it is to follow the suggested approach, an image science must include the investigation of the specific perceptual aspects. This is one of the main reasons why an image science has to be necessarily developed through interdisciplinary engagement.

With a view towards the referential character of the pictures it has to be emphasised that a picture does not need to refer to a real existing object, nor does the representation have to show concrete objects. As terms like "unicorn" or "harmony" suggest, this is also true for linguistic signs. A referential character already exists when an object is attributed with a meaning, as for example a bell ringing can mean that the lesson starts. In arguments, such a semiotic component is often unjustly criticised on the basis of being too narrow a sign concept. In the more recent works in semiotics on picture theory, which critically position themselves more often against a semiotic picture theory as Goodman has promoted it (see also Scholz 2004), a close

connection can be seen to questions of pragmatics as well as perception theory and cognitive science (see for example Blanke 2003 or Sonessen 1989).

To differentiate the system of visual media from the multitude of other media, the perceptual basis called for serves as the specific difference. It is vital that the recourse to perceptual faculties is constitutive *also for the interpretation* of visual media. Thus, the concept of perception-based media does not only imply that a medium is perceived in the process of communication, as this condition generally applies to media usage. At least some aspects of meaning that are to communicate by perception-based media have to be motivated by the structure of the medium itself, while the media of arbitrary signs do not normally indicate the relevant meaning.

In addition to the referential and the perceptual aspects, the thesis that images are perception-based media indicates an essential interaction between semiotic and perceptual viewpoints. The most important task of an image science is, thus, the clarification of those connections in which both aspects are interconnected according to type, medium or function of the picture at hand. That interplay is not only important for attributing a meaning to a certain object, but also for answering the question of what is referred to and what characteristics are relevant or irrelevant in describing type and usage of the picture in question.

The perceptual aspect emphasises the difference to language because perceptual faculties are of little importance for the understanding of a linguistic sign. Of course, to interpret linguistic signs, the signs also have to be first perceived in their peculiar medial form. But, unlike images, the further interpretation of those media does not rely on perceptual faculties. The contrast is especially obvious in illusionist pictures: one certainly has to have understood in advance that there is a medium (being presented). Yet to determine what is actually depicted we basically fall back on unconscious processes that we already employ when perceiving objects (or more precisely: the kind of objects depicted).

While a *trompe l'oeil* is the most extreme case of a picture where semiotic aspects play a minor role within the process of interpretation, all other types of images, up to pictograms or ideograms, can be distinguished by the gradually increasing complexity of the semiotic aspects. In order to be able to decide what characteristics of non-illusionary images—such as caricatures, children's drawings or maps—are relevant and in what way, some knowledge of representational conventions is needed beside the perceptual competences. For realistic drawings such a convention would be: all those visual characteristics of the image are relevant for representation that can be systematically interpreted as characteristics of known objects. A widely drawn shape of a figure would therefore not be interpreted as cover or aura of



Fig. 1:
Children's drawing: Bat (Rosa, 7 years)



Fig. 2:
Archaic Chinese sign as ideogram for
"roof"

the object (as it indeed could be the case), but would be ascribed to the special way of representation or intention or faculty of the producer (see figure 1).

The determination of the characteristic features relevant for representation becomes the more difficult the more we deal with unknown objects since general principles of perception have to replace perceptual competences specific to a known object. This especially becomes a problem with form-reduced images that partially limit themselves to the representation of only one relevant respect and can

be deciphered only contextually. The most extreme, semiotic borderline case of such a picture is provided by an ideogram. Here, the perceptual competence finds no sufficient support anymore to be able to handle the extreme ambiguity of the image. Still, a certain characteristic form might be relevant for representation (and can be interpreted visually). Yet, the specific meaning of the ideogram can only be revealed by the knowledge of the relevant convention (see figure 2).

4. Meaning of pictures and semantic levels

(T4) The semantics of pictures is regulated according to type, medium and function of the image.

The theory frame, as it has been outlined, does not say anything about special types of pictures (like diagrams) or media (like photography). Nor does it predict anything about the specific functions or the meaning of pictures. Yet, some general distinctions can be deduced that are helpful for more specific theories. Of special importance is here the conclusion that different levels of meaning or phenomena of meaning can be distinguished. For those, the context becomes relevant in different ways. In the following, I want to differentiate between the phenomena of pictorial content, pictorial reference, symbol meaning, and illocutionary function.

Pictorial content is what somebody sees "in" a picture. It depends on specific mechanisms of perception. As is illustrated in the phenomenon of ambiguous pictures, there is sometimes vagueness even on the level of pictorial content. Yet, we seldom realise that fact, because normally a certain interpretation is determined as the most probable by the contextual conditions. What content is attributed to a picture depends therefore sometimes on context and typicality of the characteristics represented (see Blanke 2003: 96).

Pictorial content is made up of the visual properties of the picture vehicle. But it does not, as fictional pictures show, coincide with pictorial reference nor is a referent at all required. The reference of a picture is always and on principle uncertain, because it is always possible to construe several different objects that cause similar perceptions when viewed under a certain perspectives. To determine the reference, the content provides only a necessary condition, which has to be specified by the context of use, but does not provide a sufficient condition. Thus, pictorial reference is always a contextually anchored function.

A third important phenomenon of meaning is the symbolic meaning. It is attributed to a picture or to an element of a picture by means of the content. The symbolic meaning is what a picture “alludes” to or what it symbolises. This is sometimes referred to as “connotation” and is often object to iconographic analysis. An understanding of symbolic meaning always requires to determinate first of all the pictorial content. It assumes in addition a sophisticated knowledge about the social, historical and cultural context of the picture use and production. Therefore, the symbolic meaning is certainly not revealed automatically.

The illocutionary function is to be clearly differentiated from the three phenomena of meaning mentioned so far—content, reference and symbolic meaning. It consists of the “message” that the picture is to carry or of its intended purpose. The pictorial content provides only one premise for deriving the illocutionary function. Additionally, the message is influenced by a complex net of visually indicated allusions the experienced pictures user can rely on in order to convey a more or less subtle message visually.

What has been said up to now is so general in nature that it can also be applied also to a concrete pictorial media, e. g. to photography. For the photographic picture, too, the levels of content and of reference as well as the levels of symbolic meaning and illocutionary function can be differentiated. But this does not yet describe the specific properties of photography. What is special about photography is the connection between its indexical and iconic character. Depending on how the components and their relation to each other are assessed, an accordingly distinguished assessment can be made for the different levels of meaning. Thus, photography is said to have secure reference because of its indexical character. This is by no means unproblematic. The assumed indexicality is a result of the underlying physical and chemical processes, but at the same time, there are several creative possibilities that can partly be applied later, partly already by selection, arrangement, lighting, etc. or by depth of focus and exposure time. The selection of a detail or the focussing (foreground/ background) can, for example, put emphasis on objects or set them in an order. With normal perception this would need a special effort (see Buddemeier 1981: 88). Above all, the specific parameters of photography (such as diaphragm, lighting or grain of the photographic positive) allow an additional communicative meaning to become manifest in the picture. These rather too short comments on photography are only meant to illustrate that a general theory frame does not provide answers concerning media-specific properties. Nevertheless, questions related to the meaning of photography cannot be answered independently of the described levels.

5. Conclusion: Image sciences and image science

In my considerations I have assumed that image science can only be developed appropriately on an interdisciplinary basis. This assumption seems to be shared by most of the image researchers. Yet establishing an image science faces special difficulties because science is normally organised in a disciplinary manner. If it is possible to overcome the problem of interdisciplinary co-operation then an image science could, as hardly another field of research, embody a new, integrative type of science whose importance will doubtlessly increase in future.

Consequently, the reader should not only expect an orientation for empirical research from a clarification of the conceptual basis of an image science, but connect it with the vision of a novel type of science. A general, interdisciplinary-based image science opens up the possibility of a paradigmatic solution for the problem of interdisciplinarity in general (a problem that has entered the consciousness since Snow's dictum of two cultures): like no other theme, the question of pictures can be found in the various levels of society. It connects culture and technology, art and science. In the yet to be established image science, reflection and application are related to each other to a high degree. But often a shared effort is needed to benefit from such a relation.

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