Collective Cognitive Processes around 1930
Edgar Zilsel's Epistemology of Mass Phenomena

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Radical changes in the natural sciences in the 19th century and at the turn of the century had influenced the theory of knowledge in the first decades of the 20th century in several ways: (1) The cognitive subject was confronted by innumerable, interconnected, and previously unknown kinds of cognitive elements and currents (electrons, neutrons, spins, electricity, masses of individuals as population strata etc.). As a consequence, epistemological theories had to elaborate procedural methods to approach the mass of data and interrelated systems of scientific objects. (2) The said epistemological changes in the natural sciences confronted (scientific) knowledge with its own historicity. Knowledge was afterward understood as a procedural enterprise that did not aim at definite truth propositions. It was, however, considered to have a history and a future. Epistemology therefore needed to integrate the historicity of knowledge into its methodological considerations.[1] (3) Considering the impact of experimental practices and scientific interactions, the act of cognition and knowledge production was not understood as an enterprise of finding the correct relation between a single cognitive subject and a single object of research. Accordingly, epistemology had to define the position and the activity of the cognitive subject in relation to scientific objects as well as to other cognitive subjects. The activity of knowledge production was embedded in the interaction of a collective system. Knowledge was no longer understood as a system of historically independent truths. These epistemological changes brought about a procedural, historical, and collective concept of knowledge.

The emergence of collective conditions and methods of scientific reasoning and activity in this period, however, did not mean a renunciation of exact (scientific) methods in the theory of knowledge. On the contrary, the emergence of collective or interrelational foundations for

[1] Cf. Hans-Jörg Rheinberger, Historische Epistemologie, Hamburg 2007

scientific activity and reasoning can be understood as an epistemological conception aiming at a procedural understanding of the concepts of knowledge, science, rationality, and objectivity. We can find examples of the emergence of a "collective epistemology" in Wittgenstein's linguistic theory,[2] Fleck's thought collective,[3] social and pedagogical aspects in Bachelard's epistemology,[4] or the idea of collaboration and intersubjective comprehension of the Vienna Circle[5]. All of these epistemological theories understood collective characteristics or social interaction as an indispensable condition for the production of knowledge. My broader project is a research of the different conceptions of historical social epistemologies. More precisely, I am trying to work out the constructivist account of these epistemologies, the connection to empirical research and their definition of collective formal procedures of knowledge. I claim that the attention to collective knowledge processes in the first decades of the 20th century is to be understood as the critique of a concept of knowledge that is established in contrast to a previous ignorance. It must be seen in a broader context of the natural scientific and social questions as a shift from a conception of an individual knowledge production to a collectively constituted knowledge. It relates knowledge not only to a simultaneous collective constitution but also to a collective procedure in the course of time and in relation to previous and future acts of knowledge.

In this talk, I focus on Edgar Zilsel's[6] epistemology in the 1920s and 1930s, which integrates collaboration processes as an essential aspect to the production of knowledge. I will first try to give a brief overview of Zilsel's basic assumptions about what kind of nature we are confronted with and then try to draw the epistemological consequences from this cognitive background. I will try to show how Zilsel aimed at establishing the same methodological foundation for the natural sciences, history and the humanistic studies as well as everyday experience. One of Zilsel's basic postulations was that all the sciences (including the humanities) – aiming at accuracy, revisability, and an empiricist foundation – needed to be modeled after the quantitative methods of the natural sciences. This position was related to the epistemological consequence

[2] David Bloor, Wittgenstein: A Social Theory of Knowledge, London 1983

[3] Cf. for example Jan Doroszewski, „A Methodological Discussion of Ludwik Fleck's Concepts of Thought Collective and Thought Style", in B. Choluj, J. C. Joerden (ed.), Von der wissenschaftlichen Tatsache zur Wissensproduktion: Ludwik Fleck und seine Bedeutung für die Wissenschaft und Praxis, Frankfurt am Main, 2007

[4] Cristina Chimisso, „From phenomenology to *phenomenotechnique*: the role of early twentieth-century physics in Gaston Bachelard's philosophy", *Stud. Hist. Phil. Sci.* 39 (2008), p. 390

[5] Ernst Mach Society (ed.), Manifesto „Wissenschaftliche Weltauffassung. Der Wiener Kreis" (1929), in Wiener Kreis: Texte zur wissenschaftlichen Weltauffassung von Rudolf Carnap, Otto Neurath, Moritz Schlick, Philipp Frank, Hans Hahn, Karl Menger, Edgar Zilsel und Gustav Bergmann, ed. Michael Stöltzner und Thomas Uebel, Hamburg 2006, p. 11.

[6] 1891 Vienna – 1944 Oakland, CA

that Zilsel, as I will try to show later, gave up the concept of rigid natural scientific laws, independent of any historical or empirical development and, on the contrary, emphasized their provisional and unstable character.

Rationalizing the irrational and statistics as a cognitive method

Zilsel first considered the production of knowledge in his doctoral thesis of 1916[7] in which he was concerned with the question of how to bridge the gap between rationality and theoretical scientific reasoning on the one hand and the complex variety of the given material on the other hand. How can theories be applied to reality, how can we define the yet undefined, how can rational reasoning be applied to the irrationality of given data? – With these questions Zilsel was concerned when he remarked on the „problem of application". He tried to provide a methodological foundation for the question why the irrational character of nature could be handled rationally. Zilsel's epistemology did not start from an originally ignorant subject that faces the problem of how to gain accurate information corresponding to a reality that is considered to be exterior to her sensual abilities. On the contrary, he started from the opposite concept of knowledge and reality taking the condition of being overwhelmed with a mass of data as the original condition of all cognitive subjects. How can we make definite propositions about reality even though we are overwhelmed with yet undefined data and although we know that there will always be additional material which is yet unknown? On which basis can we ground our knowledge about the complex and mutable multiplicity of reality which can be regarded as accurate, rational, as well as checkable/revisable ("überprüfbar")? Since Zilsel did not formulate any holistic concept as the focus of attention for the production of knowledge, he had to define the process of knowledge production itself including the definition of methods as well as the activity of the cognitive subjects in relation to objects *and* in their interaction. Both come together in the joint collection of empirical data and in the statistical processing of this data with a view to inductive methods. Zilsel proposed to understand the production of knowledge about nature, i.e. the production of reality, as the application of statistical induction and probability calculation to empirical data. Any knowledge about "reality" can thus never be fabricated from single empirical facts but always needs to be understood as the result of an extrapolation from big

[7] Edgar Zilsel, Das Anwendungsproblem. Ein philosophischer Versuch über das Gesetz der großen Zahlen und die Induktion, Leipzig 1916

quantities of data to assess future developments. Zilsel's epistemological position must therefore be understood from the angle of mass phenomena. Probabilistic propositions can only explain a mass of data but not individual phenomena. They express the probabilistic and temporal relation between two entities: the known data content and the expected data content. Propositions about reality can thus only be understood as theories about the properties of a large number of interrelated empirical data. Zilsel's statistical epistemology avoids predefining the results of a scientific investigation but only points to methods of how to implement an infinite process of reducing the yet unknown.[8] Since Zilsel understood the production of knowledge as the rational processing of mass data it is methodologically inherent to his procedural account of epistemology that a single cognitive subject cannot handle the mass of data. Producing knowledge by ways of collecting and processing manifold data is connected to the idea of cooperation or collaboration aiming at a "rationalized" understanding of processes in nature.[9]

In his mathematical article "Attempt at a New Foundation of Statistical Mechanics", Zilsel elaborated the statistical methods for the production of knowledge considering complex physical processes. By discussing the application of statistical mechanics to the theory of gases (mainly referring to the theories of Ludwig Boltzmann and Richard von Mises), Zilsel's main concern still was the applicability of probability theory to empirical reality[10], an issue that was also related to his epistemological concerns. Contrary to Boltzmann's "ergodic hypothesis" assuming an equal possibility of all constellations in a closed system of observation, he proposed an additional claim assuming that all processes in nature essentially underlie a constant process of diversification. This so called *allagodic hypothesis* has two methodological consequences: (1) It points out that any scientifically examined system needs to be considered as a constructive entity and is based on defining an observational period as well as observation criteria. (2) Every investigation has to define the starting conditions of the investigated substances by means of empirical research (gas molecules, stars, etc. – in Zilsel's later historical writings this applies also to human beings and socio-economic data). This implies that the behavior of mass phenomena cannot only be described by means of the theoretical definition of their behavior (laws) but needs to be related to the initial empirical constellation of a process and its irreversible direction in the

[8] Ibid., p. 99

[9] See the chapter on the collective foundation of cognition below.

[10] Edgar Zilsel, Versuch einer Grundlegung der statistischen Mechanik, in *Monatshefte für Mathematik und Physik*, 1921, vol. 31, p. 120

succession of time.[11] Whereas the natural laws (in form of functional relations) only give formal descriptions of physical processes, they need to be connected to the empirically determinable constellation data. To research objects as mutable processes of mass phenomena thus necessarily aims at laws of regularities based on the constructive assumption that nature is manifold, and that stability or regular behavior of processes can only be found through an empirical definition of specific constellations. At the same time, the *allagodic hypothesis* emphasizes the constructive and normative aspect of the production of knowledge about reality as a process. We can understand the methodological part of defining the period and the according empirical criteria of research as the need to indicate the specific question and standpoint of an investigation. Thus we must consider the interrelation of the two methodological parts of the *allagodic hypothesis* regarding Zilsel's emphasis on the applicability of theories to the infinite empirical of real processes. The activity of application is the very crucial point where the empirical informs the constructive practice and vice versa the constructive activity informs the choice, criteria, and conception of the specific empirical data. In this circularity of the theoretical and the empirical practice, we have to consider the concept of the empirical in the cognitive process as not merely "given" but as constructively defined. This circular interaction transforms both the constructive as well as the empirical share of the production of knowledge into an infinite enterprise.

Induction, probabilistic reality, pragmatism

In Zilsel's epistemology, induction and probability theory are essentially related. The production of "reality," and the production of scientific objects are related to the methodological problem of collecting and processing mass data. This is the fundamental form of the production of knowledge leading to a procedural and infinite character of Zilsel's epistemology.

Zilsel explicitly extended his epistemological theory and the problem of induction from the natural sciences to a general theory of knowledge.[12] He pointed out the normative dimension of

[11] Already in this article, Zilsel's main concern was the problem of how to explain the irreversibility of all complex physical and natural processes theoretically. I will get back to the relevance of the issue of irreversibility and the problem of the definition of starting conditions for every observation of an isolated historical or social process in Zilsel's epistemological considerations below.

[12] Zilsel's emphasis on the role of induction for the cognitive process in relation to a statistical empiricism needs to be understood as a contrary position to the emphasis of the method of deduction in the logical empiricism of the Vienna Circle. Cf. for example Otto Neurath, "Zur Induktionsfrage", in id., Gesammelte philosophische und methodologische Schriften, ed. R. Haller, H. Rutte, vol. 2, Wien 1981. Cf. also the article of J. Lenhard and W. Krohn on Zilsel's foundation of physical and socio-historical laws (2006) in which they analyse the concept of induction in Zilsel's early works in comparison to Reichenbach's scientific methodology. Reichenbach's concept of induction emphasized the method of a constructive modelling, followed by inductive testing only as a second step.

an epistemology that proposes an understanding of knowledge as an infinite process: He understood natural laws or scientific proposition as well as any statement of everyday experience as regulative instructions in order to make further propositions about reality. According to Zilsel, every proposition about "real" processes, in nature or in history, contains the following instructive suppositions: "I had certain experiences, other people wrote or gave the according statements and all further historical sources, reference etc. will fit in accordingly."[13] Having experiences at the present moment can only result in subjective phenomenological propositions, the construction of „reality", however – in science as well as in everyday experience – is always connected to the expectation that all future experiences or testimony will be consistent with the previous experiences or testimony. For Zilsel, the construction of a „reality that is independent of conscious cognitive acts" thus does not imply testing theoretical assumptions in relation to an external reality. "Reality", however, is to be understood as an inductive extrapolation from present experiences to the future. Zilsel thus suggested a statistical and inductive understanding of all cognitive acts concerned with "reality". This is the perspective from which Zilsel suggested the concept of probability in order to give a rule how to judge which propositions about reality are more reliable and which are less so. In terms of statistics, a proposition about future developments is more reliable the more cases are observed and the larger the inductive series is constructed. This holds true – according to Zilsel – for scientific propositions as well as for everyday experience and represents the problem of induction.

Searching for laws: The natural scientific laws and developments in society and history

In his book "The Emergence of the Concept of Genius" Zilsel starts out with the premise that the term genius does not describe the quality of a single human being but is a concept formed by public opinion, and should therefore be examined as a structure involving social mass phenomena. This required a historico-statistical research method aiming at explaining the causal relations of social processes and the inherent image of excellent intellectual or creative work in order to formulate a list of general sociological laws of the emergence of the concept of genius[14].

[13] University of Konstanz Archives, Schlick papers, letter from Zilsel to Schlick, undated (about 1931), p. 2: „ich [hatte] gewisse Erlebnisse, andere Leute schreiben oder sagen Entsprechendes und alle weiteren Geschichtsquellen, Zeugnisse usf. werden sich entsprechend einfügen."

[14] Edgar Zilsel, Die Entstehung des Geniebegriffs. Ein Beitrag zur Ideengeschichte der Antike und des Frühkapitalismus, Hildesheim/New York 1972 (reprint of the issue Tübingen 1926), pp. 323-326

Zilsel's contemporaries harshly criticized the search for historical laws. The most common critique emphasized that whereas in nature processes could be observed which are always repeated identically, in history and in social developments occurrences never recur in exactly the same way.[15] With a view to the application of statistical mechanics in the theory of gases[16] and to statistical astronomy[17], Zilsel pointed to the structural similarity of the methodological problems in all disciplines researching the regularities of mass phenomena. Whereas he thus parallelized the methodology of the natural sciences and the humanities and aimed at introducing natural scientific methods to the humanistic disciplines, he conversely destabilized the traditionally rigid image of natural scientific concepts and objects. He emphasized that not only historical and biological processes but all physical macrostructures were irreversible. Even natural scientific laws would not unveil processes that were exactly identically repeatable. Zilsel tried to show that the general criticism of the search for historical laws had an erroneous idea of the function of laws in the natural sciences. Thus insisting on the irreversibility of historical developments was not to be considered an argument against the feasibility of historical laws. On the contrary, in statistical physics, irreversibility was the decisive epistemological condition for the research of the lawful characteristics of substances which were understood as a mass phenomenon of a large number of elements. Zilsel's statistical epistemology aimed at pointing to the procedural and varied constitution of every scientific object. He tried to show that although – or more precisely: because – all processes (physical, biological, and historical) are essentially irreversible, unstable, and mutable, every discipline has to determine the specific laws and regularities of its object of research.

Comparing Zilsel's mathematical text about statistical mechanics in gas theory, we can find the same methodological foundation in his historical studies related to his project of the sociological roots of modern science, namely the necessity (1) to isolate phenomena of mass elements in processes of fluctuation in order to examine their lawful behavior[18] and, (2) to define the initial

[15] Cf. for example Leo Jordan, review of Zilsel's „Die Entstehung des Geniebegriffs", in *Zeitschrift für romanische Philologie*, vol. 50, 1930, pp. 363-369.

[16] Cf. for example Ludwig Boltzmann, Lectures on Gas Theory (1896-1898), University of California Press, Berkeley and Los Angeles, 1964.

[17] Cf. for example Arthur S. Eddington, Stellar Movements and the Structure of the Universe, London 1914.

[18] Edgar Zilsel, "Problems of Empiricism", in Zilsel (2000), p. 195: "Social groups are seldom isolated and usually interact with one another; the number of their members is always comparatively small; the members are very different, and some of them exert disproportionate influence. These conditions do not favor group laws. With a gas enclosed in a vessel with permeable walls and consisting of only a million molecules, a few of them being extremely large, rather inexact gas laws could be ascertained. It is possible that in sociology, also, only very inexact regularities

constellations of the isolated systems empirically in order to predict their possible developments.[19] Relating history and the natural sciences, empirical and theoretical research, Zilsel thus tried to establish a *scientific* history based on natural scientific methods. Conversely, he *historicized* natural scientific objects and laws and emphasized that they were to investigate historically.

Political relevance of the search for laws

Zilsel's epistemological considerations need to be understood against the background of his interest in the natural sciences[20] as well as his position in the tradition of Marxist thinking.[21]

The issue of population, the question of how to explain social developments in order to understand and organize them, and the interest in the relation of different population strata arose more and more in the contemporary discourse. Since the First World War and throughout the 1920s, demography did not yet exist as an individual institutional scientific discipline. In Germany and Austria, however, the issue of population was discussed lively in politics, in different scientific disciplines (from national economics to biology) as well as in the intellectual scene.[22] Zilsel pursued two interrelated paths in his intellectual work both influenced by his natural scientific as well as his social interests: the analysis of historical as well as contemporary intellectual developments on the basis of demographic changes on the one hand, and the theoretical foundation of knowledge based on mass phenomena and the feasibility of laws of their regularities on the other hand.[23] The former can be read as a contribution to the formation of the

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can be discovered. Yet, no physicist or astronomer would entirely disregard a regularity on the ground that it did not always hold."

[19] Zilsel, „Physics and the Problem of Historico-Sociological Laws", in Zilsel (2000), p. 200: "Astronomers can not predict from Newton's law what the position of the planet Mars will be on the next New Year's Eve. In addition to the law they need the knowledge of the positions, velocities, and masses of a few celestial bodies at some given time: they need knowledge of 'initial conditions' as the physicist puts it. Knowledge of a law, therefore, is not a sufficient but only a necessary condition of prediction. Evidently the same holds for history. Even if laws according to which wars between industrialized countries proceed were known, it might still be impossible to predict the outcome of the present war. Among other more intricate things we do not know is e.g. the number of airplanes on both sides."

[20] Besides philosophy, Zilsel also studied mathematics and physics, and he later also got interested in biology, evolutionary theory and psychophysics.

[21] Zilsel was a member of the Austrian Social Democrat Party, taught courses in the left wing oriented Viennese adult education and published articles in the Social Democrat journal *Der Kampf*.

[22] Cf. Rainer Mackensen (ed.), Bevölkerungslehre und Bevölkerungspolitik vor 1933, Opladen 2002; Articles on demographic increase and population politics in *Der Kampf. Sozialdemokratische Monatsschrift,* vol. 13 (1920, vol. 14 (1921), vol. 19 (1926), vol. 21 (1928)

[23] Cf. Zilsel (2000), in which Wolfgang Krohn and Diederick Raven – referring to a letter from Zilsel to Leo Löwenthal of the International Institute of Social Research of April 21, 1939 – assume a relation of Zilsel's projects on the social origins of modern science and on the laws of nature and of history starting about 1930. I would like to suggest that in the broader sense of his two concerns – the historical and social analysis and the epistemological

history of science[24] or as early attempts at the formation of the sociology of science[25], whereas the latter must be examined as a contribution to the theory of knowledge.

Searching for historical laws represents the methodological consequence of the structural turn in the view of scientific objects as mutable mass phenomena. Zilsel considered the epistemological foundation of a scientific method for the search for laws as the most urgent scientific problem of his period: For him, it was the key to a unification of the scientific disciplines since it would establish knowledge about "reality" as propositions about regularities of an interrelational system of variable and irreversible processes.[26] The research of historical and social regularities was to be based on empirical facts solely. In this respect, Zilsel repeatedly pointed out the coaction of the natural sciences, mathematics, philosophy, economy and philology in the materialist historiography.[27] For Zilsel, materialist theory and Marxist socialism not only served as a political theory but must be understood as a comprehensive scientific-political program, which furthered the amalgamation of natural scientific and historico-sociological thinking.[28]

The collective foundation of the production of knowledge

Zilsel's epistemological position can be summarized as follows: The cognitive subject is not confronted with a single object but with an accumulation of an infinite and mutable mass of elements. This infinite and indefinite material needs to be rationalized, i.e. defined. The

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theory – Zilsel started his work in both directions around 1920 with his cultural theory "Die Geniereligion" ("The Religion of Genius") in 1918, the historical project on the formation of the concept of genius, and his theoretical article "Versuch einer neuen Grundlegung der statistischen Mechanik" ("Attempt at a New Foundation of Statistical Mechanics") in 1921. Even in his doctoral thesis in the field of the theory of cognition, we can find a relation to population issues and the practical application of this theoretical position in the working methods of insurance companies.

[24] Cf. Kurt Rudolf Fischer, "Das historische Bewußtsein bei Carnap, Reichenbach und Zilsel", in: Wien-Berlin-Prag. Der Aufstieg der wissenschaftlichen Philosophie. Zentenarien Rudolf Carnap – Hans Reichenbach – Edgar Zilsel, ed. Rudolf Haller und Friedrich Stadler, Wien 1993, p. 559

[25] Cf. Wolfgang Krohn, „Zur soziologischen Interpretation der neuzeitlichen Wissenschaft", in Edgar Zilsel, Die sozialen Ursprünge der neuzeitlichen Wissenschaft, ed. W. Krohn, Frankfurt/Main 1976, pp. 7-43

[26] Edgar Zilsel, „Soziologische Bemerkungen zur Philosophie der Gegenwart", in *Der Kampf*, 1930, vol. 23, p. 411: „Wenn es heute ein Problem gibt, das ungelöst und wissenschaftsverbindend, das also wahrhaft philosophisch ist, so ist es doch wohl das Problem der historischen Gesetze."

[27] Ibid., pp . 86-87: „Hast du bei Marx nicht gelernt, was Wissenschaft bedeutet? Vertief dich in die Naturwissenschaft und die Mathematik, studiere die klassische Philosophie, benütze immer wieder den Gelehrtenfleiß und die Gründlichkeit der Historiker, der Wirtschaftsforscher, der Philologen und lerne von ihnen!"

[28] Edgar Zilsel, „Philosophische Bemerkungen", in *Der Kampf*, 1929, vol. 22, p. 186: „Jenes wirkliche Leben zum Beispiel, das sich heute in der Philosophie zu regen beginnt, wurzelt doch nur in der Mathematik und Naturwissenschaft unserer Zeit, vor allem in der mathematischen Physik; es fehlt dieser Philosophie, so jung und kühn sie ist, sehr zu ihrem Schaden das Verständnis und das Interesse für Geschichte und Gesellschaft. An dem marxistischen Sozialismus aber kann man historisch denken und die gewaltigen Probleme der Gesellschaft sehen lernen, kann man lernen, daß die Geschichte unter allen gesetzmäßigen Naturvorgängen der verwickeltste und auch Naturwissenschaft gesellschaftlich bedingt ist."

production of knowledge thus comprised of the application of theories to empirical constellations, the collection of empirical data, its processing by means of statistical methods, the observation and documentation of periodical regularities in closed systems, as well as inductive conclusions creating knowledge as a system of instructions for making statements about "reality". The quantification of scientific objects or of cognitive objects in general and the application of quantitative and statistical methods to these objects are related to an anti-individualistic foundation of knowledge. The aim of this epistemological position is to found knowledge as a procedure that is both accurate and revisable. It incorporates collective cognitive activity in two ways: in the collection and processing of data as well as in the construction and revision of theories. Knowledge is therefore a jointly defined operation of achieving scientifically sound propositions about "reality". There is no entity in the singular cognitive subject which could guarantee a "scientific" view of reality. "Scientific" propositions can only be formulated by researching objects as mass phenomena and by subjecting them to a process of a collective revision. Scientific work thus consists of the organization of empirical data (scientific objects) as well as of the organization of the constructive part of cognitive processes in collaboration and co-operation (cognitive subjects). Since, in the investigation of mass phenomena, one is confronted with an infinite number of elements, the individual researcher can – due to limited time and ability – only pick out isolated elements at random.[29] Only the co-operative collection of a mass of data would be able to balance out statistically the haphazardness of investigation.

The attempt to "define the yet undefined" mass of empirical data transforms knowledge into an infinite process. Its aim is not truth knowledge but the creation of new rationalized realms. Zilsel provides a procedural and operational foundation for the production of knowledge from yet unsystematized mass phenomena. Zilsel's search for historical laws therefore is to be understood as an attempt to save rational thinking in the tradition of modern science. His anti-individualistic epistemological theory must also be read as an alternative account to contemporary philosophical tendencies that emphasized understanding based on individual empathy. As we learn from the conceptual structure of his book "The Religion of Genius" (1918), Zilsel criticized the admiration and the empathetic *understanding* of a person as "genius" for it only functions in opposition to and disrespecting an ignorant mass of people that *does not understand*. His epistemological position methodologically discarded a concept of knowledge and understanding as special

[29] Zilsel (1926), p. 323: "der Einzelne wird immer nur auf Einzelgebieten einzelne und höchst zufällige Materialien zusammentragen können, was alle seine Schlüsse fast entwertet."

personal abilities. The problem of cognition was not how to establish a correct perspective on a single object starting from the condition of a previous ignorance. Instead, his epistemological theory emphasized that all scientific disciplines (and also the formation of everyday experience) were confronted with the same constructive problem of how to organize the large number of interrelated data forming the phenomenon of a cognitive object. In its relational understanding of the inner mass structure of cognitive objects, Zilsel's epistemology simultaneously connects the constructive as well as the empirical aspects of mass data collection. It is in this intersection that the collaborative and organized work on the collection and constructive processing of data needs to be related to a specific standpoint of investigation in order to research the external reality as an "irrational" mass formation. Based on this epistemological perspective on the interrelation of empirical and theoretical practices, Zilsel started to spell out the involved agencies in the constructive part of scientific work by specific sociological and historical research and by rereading them against the background of a Marxist perspective on society and social processes.