

Schnelle, Thomas

Ludwik Fleck, a Classical Scholar of the Sociology of Science and of Epistemology

Kwartalnik Historii Nauki i Techniki 28/3-4, 524-544

1983

Artykuł umieszczony jest w kolekcji cyfrowej Bazhum, gromadzącej zawartość polskich czasopism humanistycznych i społecznych tworzonej przez Muzeum Historii Polski w ramach prac podejmowanych na rzecz zapewnienia otwartego, powszechnego i trwałego dostępu do polskiego dorobku naukowego i kulturalnego.

Artykuł został zdigitalizowany i opracowany do udostępnienia w internecie ze środków specjalnych MNiSW dzięki Wydziałowi Historycznemu Uniwersytetu Warszawskiego.

Tekst jest udostępniony do wykorzystania w ramach dozwolonego użytku.





PROFESOR LUDWIK FLACK

We are publishing in this number a set of articles on the theory and personality of Ludwik Fleck. The idea of this set was conceived in Berlin (GDR) in May of 1982 at a conference of editors-in-chief of journals of the history of science and technology. As a result of this undertaking an article has been sent by V. Porus of the Institute of the History of Natural Sciences and Technology, USSR Academy of Sciences. We are including also a contribution by T. Schnelle, author of the only monograph on Ludwik Fleck, and a review of this book (pages 666—671). The editor of this series of articles is Henryk Hollender.

The vignette on p. 525 has been designed by Janina Nowakowa. The photograph of Ludwik Fleck appears by courtesy of Thomas Schnelle.



LOOKING AGAIN
AT
LUDWIK FLECK

Thomas Schnelle
(Hamburg)

LUDWIK FLECK — A CLASSICAL SCHOLAR OF THE SOCIOLOGY
OF SCIENCE AND OF EPISTEMOLOGY

During the last decade one could witness a very rapid growth of the interest shown by scientific research for the thus far completely unknown Polish microbiologist Ludwik Fleck (1896—1961). As early as in the mid-thirties did he publish his papers, but, unlike his medical research, they remained virtually unnoticed for nearly 40 years. Now all of a sudden, he can be considered today quite justly a 'classical scholar' of the sociology of science and of the theory of cognition — whose position might be compared with that of Popper's *The Logic of Scientific Discovery* or with Merton's studies of the connection between economics, puritanism and natural sciences.

Fleck's studies pertaining to the theory of science can be subdivided into three phases:

- (1) In the preparatory phase he had published two brief essays¹.
- (2) In the main phase (about 1935) there appeared, in addition to a mo-

¹ L. Fleck: *O niektórych swoistych cechach myślenia lekarskiego*. 'Archiwum Historii i Filozofii Medycyny oraz Historii Nauk Przyrodniczych' Vol. 6: 1927, p. 55—56. (English as: *Some Specific Features of the Medical Way of Think-*

nograph in German², also two longer articles in the respected Polish periodical 'Przegląd Filozoficzny'³.

(3) In the post-war phase two further publications in Polish periodicals⁴ and a thus far unpublished manuscript in English⁵ complete his studies pertaining to the theory of science.

So far it is only the aforementioned monograph that has been taken into consideration in the discussion of his approach. It appeared originally under the title *Entstehung und Entwicklung einer wissenschaftlichen Tatsache. Einführung in die Lehre vom Denkstil und Denkkollektiv* in 1935 in a Swiss publishing firm. In 1980 the German text was published as a new edition, and the English translation a short time previously⁶.

The rediscovery of Fleck is closely connected with another author, who was to find a remarkable attention much more rapidly than Fleck: he was Thomas S. Kuhn⁷. The interest in the work of Fleck got into action in the first place due to the mentioning of Fleck's research in Kuhn's preface — and again only many years later⁸. However, in the

ing, in: *Cognition and Fact. Materials on Ludwik Fleck*, ed. by T. Schnelle and R. S. Cohen, Dordrecht 1984, forthcoming. German version in: L. Fleck: *Erfahrung und Tatsache. Gesammelte Aufsätze*, ed. by L. Schäfer and T. Schnelle, Frankfurt am Main 1983, p. 37—45); L. Fleck: *Zur Krise der 'Wirklichkeit'*. 'Die Naturwissenschaften' Vol. 17:1929, 23, p. 425—430, again in: *Erfahrung und Tatsache [...]*, p. 46—58. (English as: *On the Crisis of Reality*, in: *Cognition and Fact [...]*).

² L. Fleck: *Entstehung und Entwicklung einer wissenschaftlichen Tatsache. Einführung in die Lehre vom Denkstil und Denkkollektiv*. Basel 1935, Frankfurt am Main 1980. (English as: *Genesis and Development of a Scientific Fact*. Chicago — London 1979).

³ L. Fleck: *O obserwacji naukowej i postrzeganiu w ogóle*. 'Przegląd Filozoficzny' Vol. 38:1935, p. 57—76, English as: *Scientific Observation and Perception in General*, in: *Cognition and Fact [...]*. (German version in: *Erfahrung und Tatsache [...]*, p. 59—83); *Zagadnienie teorii poznawania*, 'Przegląd Filozoficzny' Vol. 39:1936, p. 3—37. (English as: *Problem of Epistemology*, in: *Cognition and Fact [...]*, German version in: *Erfahrung und Tatsache [...]*, p. 84—127).

⁴ L. Fleck: *Problemy naukoznawstwa*, 'Życie Nauki' Vol. 1:1946, p. 322—336. (English as: *Problems of the Science of Science*, in: *Cognition and Fact [...]*, German version in: *Erfahrung und Tatsache [...]*, p. 128—146); *Patrzeć, widzieć, wiedzieć*, 'Problemy' Vol. 2:1947, p. 74—84. (English as: *To Look — To See — To Know*, in: *Cognition and Fact [...]*, German version in: *Erfahrung und Tatsache [...]*, p. 147—174).

⁵ L. Fleck: *Crisis and Science. Towards a Free and More Human Science*, in: *Cognition and Fact [...]*. (German version in: *Erfahrung und Tatsache [...]* p. 175—181).

⁶ Cf. note 2.

⁷ T. S. Kuhn: *The Structure of Scientific Revolutions*. Chicago 1962.

⁸ A review for Fleck's reception, which began with: W. Baldamus: *The Role of Discoveries in Social Science*. University of Birmingham discussion paper 1966 (again in: *The Rules of the Game*, ed. T. Shanin. London 1972, p. 276—302), can be found in the introduction to the new (1980) edition of Fleck monograph, *Entstehung und Entwicklung [...]*, p. XLVIII—XLIX.

meantime it became clear that, if one examines Fleck's essay merely for the purpose of explaining Kuhn by this method, one misses the true original conceptual achievements of Fleck. This seems also to be Kuhn's own opinion viz.: 'Very probably [...] acquaintance with Fleck's text helped me to realize that the problem which concerned me had a fundamentally sociological dimension. [...] But I am not sure that I took anything much more concrete from Fleck's work, though I obviously may and undoubtedly should have'⁹.

Now wherein did consist these Fleck's conceptual achievements? This will be outlined briefly below.

1. PRELIMINARY PHASE: REALITY CALLED IN QUESTION

The first publication by Fleck¹⁰, which deals with the theory of science, is traced back to a lecture he had read in 1926 at the 'Association of the Friends of the History of Medicine in Lwów'. Its title was *Some Specific Features of the Medical Way of Thinking*. This article demonstrates what importance is attributed to the circumstance that Fleck's considerations relating to the theory of science have their origin in the analysis of the medical discipline. The theory of science usually finds its bearings by way of developments in physics and chemistry. The problem of the authorship of the research, hence the problem of who produces the new cognition and how this is done, stood hardly in the forefront of their interest. This was concentrated altogether upon the justification relationship of scientific cognition. Wherever the relationship of origin was at stake, one referred to the 'genius' of the innovator. On the contrary, the connexion between the theoretical-experimental and therapeutic-practical aim-fixing, so typical for medicine, can much more vividly direct the attention towards the co-operative, collective character of scientific research than this is possible in the scientific activity of physics and chemistry.

In the first publication Fleck brings into prominence two peculiarities of medicine, which make themselves, as far as the types of their scientific concepts are concerned, in opposition to those of other scientific disciplines: In the first place the interest in cognition in medicine is directed not towards the regular, 'standard' phenomena, but exactly towards the morbid states of organisms, which deviate from the standard: 'The subject of medical cognition differs in principle from that of scientific cognition. The scientist looks for typical normal phenomena, while a medical man studies precisely the atypical, abnormal, morbid

⁹ T. S. Kuhn: *Foreword*, in: L. Fleck: *Genesis and Development [...]*, p. VIII.

¹⁰ Cf. note 1.

phenomena. And it is outright that he finds on this road a great wealth and individuality of these phenomena which form a great number, without distinctly delimited units, and abounding in transitional, boundary states. There exists no strict boundary between what is healthy and what is diseased, and one never finds again exactly the same clinical picture. This extremely rich wealth of ever and ever differing variants is to be subdued mentally, for such is the cognitive task of medicine'¹¹. Hence the formulation of regularities among morbid phenomena, and the definition of morbid units are therefore possible only in the case of a high abstraction of individual observations. For this reason the conceptualizations in medicine take place statistically.

However, in the second place, the medical aim of cognition is, predominantly, not the widening of knowledge in itself, but very pragmatically: the control of precisely such morbid states. Concentrations, models and approaches, briefly everything that pertains to the theoretical elucidation of morbid observations is therefore exposed to a constant, highly direct success pressure. Consequently, the abstracting statements are often found to be insufficient in medicine.

These peculiarities in medicine imply definite characteristics of medical thinking. Thus 'we know, from the calculus of probability, that even an accidental case, even events which lack mutual relations, can be embraced within certain laws, and so one should not wonder that even these abnormal morbid phenomena are grouped round certain types. [...] These types, these ideal, fictitious pictures, known as morbid units, round which both the individual and the variable morbid phenomena are grouped, without, however, ever corresponding completely to them — are produced by the medical way of thinking, on the one hand by the specific, far-reaching abstraction, i.e. by rejection of some observed data, and on the other hand, by the specific construction of hypotheses, i.e. by the guessing of nonobserved relations'. Thus the formulated morbid units are highly fictitious — a wide gap yawns between the learned book knowledge and the real observations. Between the desire to reach theoretical unification, which can be attained only by way of abstraction, and the necessity to render concrete the utterances, which enforces a plurality of competing approaches, the medical thinking comes into a constant tension. The immense number of peculiarities in the real morbid states compels to a constant changing of medical conceptions. True, the further development of medical knowledge is orientated, to begin with, according to the hitherto existing explanatory patterns, viz. this development tries to formulate 'sub-types' to the so far fixed definitions of diseases. Fleck adduces here as a

¹¹ L. Fleck: *O niektórych [...]*, p. 55.

characteristic the plurality of 'Para-' and 'Pseudo-' names in medicine. Yet frequently novel problems cannot, because of the success pressure for their solution, describe sufficiently in this way the individual disease pictures. Thus they compel to carry out the formulation of new definitions of diseases. However, the direction in which this development progresses depends not only on observations and new problems. On the contrary, factors come into play which ought to be called 'imponderabilia' from a logical standpoint: the intuitive pre-feelings of the succession of new problems and ideas. However, this 'intuition' can have its roots only in the hitherto existing development of medicine — and so the new definitions of diseases grow historically out of their precursors.

Fleck demonstrates under still another aspect why is medicine subjected to a particularly high variation pressure. Just as other disciplines, so also does it look for causal relationships in order to explain its phenomena. However, in this case it leads to difficulties which are more considerable than in other branch sciences such as biology: a disease depends on the concrete moment in two respects. It develops with time, and alters at the same time the vital functions of the organism, which display themselves their proper specific temporal course. Therefore one cannot observe, at least in medicine, the assumption that it is possible to conceive satisfactorily the relationships between the observations of morbid states as unidimensional developments. Consequently, a morbid state ought to be observed from different angles of view. While in other disciplines — such as perhaps in the case of atomism in chemistry, or energetics in physics — it is possible to formulate an approach which embraces the totality of the discipline, such a unitary possibility of observation does not exist in medicine. The necessity of different concepts leads in this case to the 'incommensurability'¹² of its theoretical ideas.

In spite of this impossibility of arriving at comprehensive ideas in medicine, there arise time and again 'dominating standpoints', 'definite methodical ideas', 'certain leading thoughts'¹³. However, they always remain as transient ideas, which are replaced with the new ones. Thus the medical knowledge resembles a constant flow: in it, time and again, the definite methodical ideas and leading thoughts do develop into a dominating standpoint. However, these are always merely the specific temporary ideas which change dynamically into new orientations: 'The object of medical thinking — the disease — is not an enduring state, but a process which changes continually, and which has its temporal genesis, its course and end [...]. Never a *status praesens*, but always

¹² *ibidem*, p. 56.

¹³ *ibidem*, p. 61.

only the *historia morbi* does create the clinical unit. [...] This historic, temporal nature of the notion of the disease is unique'¹⁴.

In his second work dealing with the theory of science Fleck generalizes some of his statements beyond the boundaries of medicine collectively to natural sciences. The publication in question was a brief article in German, which appeared in 'Die Naturwissenschaften'¹⁵ under the title *On the Crisis of 'Reality'*. The main problem discussed here is that of the ontological status of reality: Fleck points vigorously to the impossibility of an absolute reality, independent of experience.

This article was meant to be a reply to the work of Kurt Riezler, *The Crisis of Reality*, which had been published likewise in 'Die Naturwissenschaften' eight months before¹⁶. Riezler is busy here with the effects of the results of research in natural sciences and, especially, in physics upon the thus far dominating philosophical grasp of reality. According to that, natural science proceeded so far a three-membered structure of the idea of reality: The first reality was represented by subjective perceptions, starting with which 'our cognition forms another, the second reality'¹⁷. A claim is laid on this reality, viz. to produce an objective likeness of the third reality, which is valid for everybody. Now this third reality is to be the 'absolute reality', which, independently of any experience is ordered in itself and to which we draw steadily nearer and nearer by improving our likeness in the second reality. This understanding was shaken by four different realizations:

- (1) The scientific laws known hitherto originated partly from statistical regularities only.
- (2) The concept systems of individual sciences did diverge instead of converging as one would expect.
- (3) Physics did depart more and more from the real perspicuity as the use of 'mathematical ordering framework' increased.
- (4) The usefulness of the principle of causality became doubtful, at least in the quantum theory.

The main question was therefore, whether it can be really admitted that the third, 'absolute', reality does exist on the whole as independent from our reason which accepts it, or, if it is at all possible, as a really closed order. For 'perhaps the world is not a ready order whatever, but order mixed with disorder. [...] Or else can this order have such characteristics that, with the aid of the means given to us, it cannot be either grasped at all or merely incompletely'¹⁸. Riezler attempted to

¹⁴ *ibidem*, p. 62.

¹⁵ Cf. note 1.

¹⁶ K. Riezler: *Die Krise der Wirklichkeit*. 'Die Naturwissenschaften', Vol. 16:1928, 37/38, p. 705—712.

¹⁷ *ibidem*, p. 705.

¹⁸ *ibidem*, p. 709.

specify this 'crisis of "reality"' from the point of view of epistemology: It would be our duty to draw therefrom the conclusion that the 'mathematical symbolism of modern physics [...] is by no means the absolute reality'¹⁹ or else is able to supply it. In addition to this symbolism one has to admit still other 'ordering frameworks'. Nevertheless one has to stick to the existence of the 'absolute' reality: one should see in it the 'basis' of the first reality of subjective perceptions, just as that of the recognized ordering framework of the second one, just as finally of the reason proper. One should look for the signification content of the absolute reality no longer in the 'static', 'ready' physical arrangements — but in the metaphysical sense-giving, which is to be recognized from the continually developing dynamic world pictures of the second reality. Riezler concludes: 'A new view of the world becomes possible. This new view of the world is dynamic, not static. The world is not ready-made, it is incomplete. Its order is not an existing, but a becoming one. Its image is not the supposed harmony of the starry sky and of its eternal laws, but the history of mankind, the restless one, wherein nothing remains unchanged — even the meaning, the toil and the fate'²⁰.

This article by Riezler seems to have been for Fleck a welcome occasion for producing his philosophical views which were meanwhile further developed. To be sure, he rejects an 'absolute' reality, which is independent of experience. However he concurs at the same time with Riezler inasmuch as he publicizes also a 'dynamic view of the world' of changing 'order frameworks'.

At the same time he develops his considerations, as compared with the first work of 1927, in two directions: In the first place there appear some first thoughts regarding the question of what is really the epoch-making standpoint: The notion of the thinking that is 'full of style', of the 'thought-' and 'thinking style' appears for the first time. This notion replaces that of the 'order framework' of Riezler. Secondly, and this is the essential subject of that article, Fleck analyzes now more systematically the relation between object, cognition activity and the social framework of natural sciences: Fleck 'sociologizes' his scientific analysis. Every cognition activity is exposed to the action of factors of three kinds:

- (1) 'the weight of education': knowledge consists predominantly of what one had learned, and not of what had been newly recognized. However, each reproduction of knowledge in the process of learning is accompanied by a simultaneous imperceptible shift of the knowledge contents.

¹⁹ *ibidem*, p. 711.

²⁰ *ibidem*, p. 712.

- (2) 'the load of tradition': New knowledge is always already imprinted with what has been known before.
- (3) 'the effect of the order of succession of cognition': What has been once conceptually formulated, will always retrench the free play of concepts which are being built upon it.

Consequently a number of social factors do influence that which is perceived by an individual — these factors are even indispensable if the perception by an individual is to take place. The ordering structures, if they depend on the individual perceptions, are also indispensable for the perceptions themselves: 'If one would like to solve the problem of the genesis of cognition in the traditional manner as an individual matter of a symbolic "person", one would have to accept not only the sentence: *nihil est in intellectu, quod non fuerit in sensu*, but also its inversion: *nihil est in sensu, quod non fuerit in intellectu*. And one does not make any headway here' ²¹.

Thus, as far as Fleck is concerned, the distinction between the 'first reality' of sensuous perception impressions and the 'second reality' of various order frameworks, which render the former reality objective, becomes senseless. Perception is always an ordered cognition. It is only when social and cultural conditions are taken into account that one can explain why do we meet, beside the scientific 'reality', so many other, competing 'realities'. Just as every individual, so also every social group has at its disposal its own specific social reality. Cognition as a social activity is therefore combined with the social postulates of the individuals who carry it out. Consequently every 'knowledge' generates its own 'thought-style', by means of which it conceives the problems and adjusts them for its purposes.

However cognition is not only tied up with its cultural and social postulates but, conversely, it also acts on social reality: if it is a product of an activity tied up with long-living groups, it follows just as the social organization its own regularities, and thus it sets limits of their further cognition activity to persons who take part in it: 'The point is that cognition is neither a passive contemplation nor an acquisition of an only possible insight into what is given directly. It is an active, living entering into relationship, a recasting and being recast, in short a creation. An independent reality can be attributed neither to the "subject" or the "object"; each existence is based on interaction, and is relative' ²².

With the relativization of reality with respect to the cognition condensed to the thought-style of the moment it is the relativization of truth that proceeds. In addition to the problems which pass for being

²¹ L. Fleck: *Zur Krise [...]*, p. 426.

²² *ibidem*, p. 426.

worthy of being investigated, the thought-style determines also the observation method of the object. Consequently the 'truth' so perceived is independent of the thought-style and from the purpose of knowledge, determined by that style. However this renders ultimately senseless the mental image of the 'third, absolute reality'. The latter is, at all events, the official, ideal picture (of natural sciences): that is naive and beautiful. Here belongs the absolute, the third reality of Riezler. That is the life and work of the researcher, this is his religion. It is a beautiful thing when, during the work of an artist, his opus hovers in front of him as a vision of unattainable perfection. However, it is naive not to realize that this vision is not something absolute, but rather something which mostly depends on the subject and on the moment. One ought not to forget that there exists after all no science which has already become, but always a science which is only in the state of becoming²³.

Wherever every cognition remodels reality in order to provoke a new cognition it is impossible to speak about a constant approximation, 'not even an asymptotic one': 'The endeavour to attain the understanding of the Absolute is based upon a peculiar misunderstanding: this is as if one desired to make a virgin jungle accessible without altering its virgin state'²⁴.

2. THE OPUS MAGNUM: THE PROBLEM OF A THEORY OF COGNITION

Both essays described at the beginning and dating from the second half of the twenties contain already, at least in a rudimentary form, the entire width of Fleck's theoretical concepts. Later he elaborated them in detail at the beginning of the thirties, and finally published them in 1935/36 in a monograph and two articles. As can be seen from the subtitle of the monograph, Fleck develops in it his approach from the perspective of the determination of the idea of a fact, viz. both theoretically and empirically, by means of a detailed case study for the development of the scientific idea of syphilis. Both articles were published in the leading Polish philosophical periodical of that period of time, 'Przegląd Filozoficzny' (Philosophical Review). The first-published article deals, under the title *Scientific Observation and Perception in General*²⁵ in the first place with Fleck's concept of gestalt-seeing as 'perception conformable to style', and with its epistemological significance. The other article, which was published one year later (1936),

²³ *ibidem*, p. 429.

²⁴ *ibidem*, p. 429.

²⁵ Cf. note 3.

has the title *Problem of Epistemology*²⁶. It develops the 'Theory of the thought-style and of the thought-collective', in particular from the points of view of the 'communication of thought' and of its meaning for cognition, its historicity and the internal structure of the thinking collective.

The above three publications should be considered as presenting a unity. One can in particular single out three characteristics for the characterization of his approach:

Fleck radically sociologizes the theory of science. According to this perspective the collective character of scientific activity is decisive not only in the elaboration of new ideas but also in their *genesis*. Fleck's point of view is an extremely anti-individualistic one: the origin of a new thought cannot be located in any individual. It stems from the co-operation of the collective. Its medium is *cognitive communication*. Fleck distinguishes between *intracollecive* and *intercollective* communication. The function of the former is a stabilizing one, as it repeatedly confirms the actual thought-style of the collective. Intercollective communication, however, provides influences from outside of the collective which result in change. Individuals belong simultaneously to several and distinct thought-collectives so that the corresponding thought-styles will exist side by side in each individual. Thus every member of a collective interprets a thought differently: understanding involves necessarily some kind of *misunderstanding*. In a way, Fleck reverses the traditional view of scientific language: 'meaning invariance' was considered to be one of the conditions of scientific knowledge, now the uneliminable misunderstanding becomes a crucial condition of change and development in science. Fleck emphasizes the role of language as the most important instrument of cognitive communication among scientists. (He is the first to use comparative contents-analysis of textbooks as an instrument of research.) However, verbal communication is not sufficient for a style-adequate co-operation of the collective. Also in science it must be complemented through *practical experience* which cannot be formulated explicitly.

Fleck radically historicizes the theory of science. He substitutes for the received view of scientific development as a cumulative and progressive process a view of it as *continuous change of thought-styles*. These are historically developed, sociologically conditioned and mutually interacting. The dynamics of this structure generate the developmental forces of science → developmental, however, not understood as progressive or evolutionary. In this way science is able to turn its attention to new problems. Others at the same time lose their style-relative character — they become irrelevant and are no longer 'visible'. Thus

²⁶ Cf. note 3.

while new knowledge emerges, old is lost. Unlike Kuhn, Fleck does not speak of abrupt revolutions in science: the preconditions of thought and knowledge change steadily, usually without the scientists' awareness. However, even over long periods of time certain pre- or proto-ideas survive. They function as heuristic guide-lines for the research of several generations of thought-collectives. They endure, because they are received and re-used by the collective of each newly emerging school of thought. They are re-interpreted within the framework and according to the changed presuppositions of the new thought-style. The old and the new merge together. There is thus a continuity running through successive thought-styles.

Fleck re-interprets in this framework the constitution of a scientific fact. It is no longer something given independently of scientific activity, for the sociologically conditioned and historically developed thought-style imposes itself on scientists' cognition. The presuppositions of a thought-style are actively set by the collective. But what the scientists seek are the passive linkages which result from those active 'settings'. Once certain pre-conditions have been chosen and accepted, the passive linkages implied within them are no longer open to the decision of the collective, but on the contrary are experienced as 'laws of nature'. The scientist may feel himself in relation to such an experience to be in a 'passive', merely reacting role. Fleck describes the process of knowledge of a fact as the development of these checks on the scientists' arbitrariness, which arises from a resistance in the thought-collective. If the thought-collective attempts to incorporate the resistance within its so far developed system of thought, this resistance develops into an ever more definite 'force of thought' and, finally, becomes a perceived gestalt. Although regarded as something 'objectively given', a fact is thus determined through the actual thought-style.

Who was this scholar who made such an original and unique contribution to the emergence of the sociology of science and knowledge? Ludwik Fleck was born in 1896 in the Polish Lwów (Lemberg), at that time a part of Galicia belonging to the Austrian Empire, the son of a Polish-Jewish family. His training was in medicine and although he only held academic posts after the second world war, his research — mainly in microbiology — was already published in the twenties and thirties in leading European medical journals. He showed courage and heroism in surviving the German concentration camp (cf. below)²⁷.

Although Fleck's work must without doubt be called a classic of the sociology of knowledge, his intellectual background is primarily philo-

²⁷ Detailed information to Fleck's biography in: T. Schnelle: *Ludwik Fleck — Leben und Denken. Zur Entstehung und Entwicklung des soziologischen Denkstils in der Wissenschaftsphilosophie.* Freiburg 1982.

sophical. The literature he read in sociology and Gestalt theory was chosen on a somewhat random basis. An explanation for the obvious gaps in the literature quoted by Fleck is that studies in the sociology of knowledge and science were only little known among Polish intellectuals. The ideas he borrowed from them served primarily as an instrument enabling him to give a systematic answer to fundamental difficulties confronting philosophers around him. This seems at first to be paradoxical: Polish philosophy of the interwar period is best known for its contribution to the development of neo-positivism (Ajdukiewicz) and its logicians (Łukasiewicz, Tarski, Chwistek). Fleck sharply polemicalized against both of these schools.

Nevertheless it was this background, which influenced Fleck's theoretical developments decisively²⁸. In Lwów, the leading and highly influential philosopher was K. Twardowski, pupil of Franz Brentano, and teacher of the most prominent figures in the following generation of Polish philosophers. His pupil K. Ajdukiewicz remained in Lwów. Logic was represented there by Leon Chwistek.

Of special importance was the ontological ambiguity latent in Brentano's thought and also characteristic of Twardowski's 'psychological philosophy': whether an object of a presentation is something objectively 'given', or rather a product of the act of presentation itself, was a problem that continually occupied members of that school. Again and again different answers were proposed, all resulting in various ways in the postulation of the 'constructedness' of the presented object.

Within the Vienna Circle it was Ajdukiewicz who in his early works advocated most distinctly a nominalistic point of view: his 'radical conventionalism' claims that 'the scientific world view is even in its last details of conventional character and [...] may be altered through corresponding changes of its conceptual apparatus [...]'²⁹. Ajdukiewicz tried to define *Sinn* (meaning) in terms of language-structure and without the help of a semantic dimension. The result was a relativist view of the validity of different world-views which can be build up through the choice of different language-structures.

In a similar way — constructivistic rather than nominalistic — Fleck was influenced by Lwów's third distinguished philosopher: Leon Chwistek, best known for his contribution to formal logic. Central to his philosophy was however the concept of a 'multitude of realities' existing side by side and understood as constructions on the basis of incompatible axiomatic systems.

²⁸ A. detailed analysis in: T. Schnelle: *Ludwik Fleck* [...].

²⁹ K. Ajdukiewicz: *Logistyczny antyirracjonalizm w Polsce (Logistic Antiirrationalism in Poland)*, 'Przegląd Filozoficzny' 1934. (In German version: *Der Logistische Antiirrationalismus in Polen*, 'Erkenntnis' Vol. 5:1935, p. 151—161.)

Thus it seems justified to describe Fleck's theory of science as an original combination of philosophical and sociological theories of knowledge. His philosophical theory claims that all empirical discoveries of 'scientific facts' contain, and depend on, non-empirical ingredients — and these are products of the mind, subjective fictions, thought-styles. Fleck may therefore be called a radical nominalist or constructivist. He links his epistemological point of view with a sociological argument, which secures it against the following criticism: if this is epistemologically the case, why are scientists not aware of the fictitious character of their conceptual apparatus? Thought-styles, he argues, are collective phenomena, products of socialization processes of closed communities and hence invisible to their members.

The genesis of Fleck's thought is hence determined by his adoption of nominalist and constructivist elements in the thought of the philosophers around him. From a sociological standpoint he gave a coherent explanation of the ontological ambiguity ascribed to the objects of knowledge by Twardowski; a foundation for the unfounded conventional 'world views' of Ajdukiewicz; and an explanation for the phenomenon of the 'multitude of realities' of Chwistek.

3. THE POST-WAR YEARS: EXPERIENCES FROM THE CONCENTRATION CAMP

Fleck's publications dating from the mid-thirties have not been his last ones. After World War II there appeared two more epistemological articles of equal importance. The first one had the title *Problems of the Science of Science* and was published in the Polish journal devoted to the theory of science 'Życie Nauki' (The Life of Science)³⁰. The second one was published in the popular-science journal 'Problemy' (Problems), under the title *To Look — to See — to Know*³¹. Fleck develops the approach to his theory once more from the point of view of the gestalt-visualization. Finally there exists a manuscript of a contribution in English language, which Fleck gave first the title *Crisis and Science*, and later the title *Towards a Free and More Human Science*³² and in which he had expressed his opinion with respect to a discussion about *Science and Human Welfare* (in 'Science' of July, 1960). This paper had not been published: our well-known periodicals rejected it as 'of no importance at that time'.

Above all, the first-mentioned of the above essays requires biographical background information regarding Fleck's vicissitudes during

³⁰ Cf. note 4.

³¹ Cf. note 4.

³² Cf. note 5.

World War II³³. The point is that it processes Flack's observations on the theory of science in the case of a lay (collective which did work under the terrible conditions of a research laboratory on methods of producing typhus vaccine at the Buchenwald concentration camp.

Uu to the outbreak of World War II Fleck lived in Lwów. When Nazi Germany attacked Soviet Union and the city of Lwów was occupied late in June 1941, Fleck was deported with his wife and son into the Jewish ghetto. The conditions and the fate of this ghetto are described by Fleck in an easily accessible report: Eugen Kogon quotes this report in his *Der SS-Staat*³⁴. It is in the hospital of that ghetto that Fleck did continue, under the most primitive conditions, his research work. Since, in spite of the typhus epidemics which was rampant in the ghetto, no vaccine was available, Fleck developed a new method by which the vaccine was obtained from the urine of typhus cases. After the war he published the relevant papers³⁵. This activity of Fleck became known to the occupation authorities. They realized that Fleck belonged to the leading typhus specialists in Europe. It is for that reason that, in December 1942, Fleck and his family were imprisoned and deported to the pharmaceutical factory Laokoon.

Fleck did not stay a long time at that factory. Late in January, 1943, he and his family were again imprisoned and, following a brief internment in the Lwów prison, deported to the Auschwitz concentration camp. Here Fleck was, at first, busy as a so-called 'male nurse' at the block 20 which belonged to the building for diseased people. He succeeded in concealing a typhus case; he attributed this to the effect of the vaccine he produced in Lwów, which he had used for the vaccination of himself, his family and many other persons. Later on he was transferred to block 10 (an isolation block). It is here that the notorious sterilization experiments were conducted by Clauberg and Schumann (Fleck's relevant statements are found in Kogon³⁶). Fleck work here consisted in diagnosing the syphilis, typhus and other cases in a serological laboratory. The deported French woman-doctor, Dr. Hautval, who also worked in block 10 during two

³³ Detailed information to Fleck's biography in: T. Schnelle: *Ludwik Fleck [...]*.

³⁴ E. Kogon: *Der SS-Staat. Das System der deutschen Konzentrationslager*. München 1977 (first published 1946).

³⁵ L. Fleck: *Swoiste substancje antygenowe w moczu chorych na dur plamisty*. 'Polski Tygodnik Lekarski' Vol. 1:1946, p. 663—666. (English version as: *Specific Antigenic Substances in the Urine of Typhus Patients*, 'Texas Reports on Biology and Medicine' 1947, p. 168—172.)

³⁶ E. Kogon: *Der SS-Staat [...]*, p. 264.

months in 1943, writes in this connection: 'Incidentally, I should like to mention to what extent the staff of that laboratory did help us. They were always ready to do all necessary examinations for my patients, and they managed to dexterously conceal the result as being harmless, since the true result was fatal for the patients' (letter dated April 2, 1980).

In August 1943 the Institute of Hygiene of the SS in the Buchenwald concentration camp organized a laboratory for the purpose of producing, and conducting research on, more productive methods of making typhus vaccine. On the order of the SS Management HQ in Berlin Fleck was deported to that place in December 1943.

In his report *Der SS-Staat* Eugen Kogon³⁷, who himself as a prisoner had been, right from the establishment of the Institute, a secretary of the SS-Leader, Dr. Ding-Schuler, reports about this block. Dr. Ding-Schuler was at the same time the head of the 'Clinical Station of the Department for Research on Typhus and Viruses, Institute of Hygiene of the Waffen-SS', which had been established as early as late in autumn 1941 and transferred to block 46 in 1942. It is here that tests with humans were carried out in order to evaluate the effect of typhus vaccines of various origin. For this purpose many prisoners were artificially infected with the highly active blood of typhus cases. At the same time block 46 served for the isolation of all typhus cases in the camp.

To be sure, block 50 had herewith only the head in common. Kogon writes:

'In the block 50 the typhus vaccine was produced from mouse and rabbit lungs using the method of Professor Giroud (Paris) [...] There have been chosen for this task the best available specialists in the camp, among them medical men, bacteriologists, serologists, chemists, in the first place the Lwówier docent Dr. Ludwik Fleck, whom Ding-Schuler brought expressly from Auschwitz to Buchenwald through the SS-WVHA [SS Management Head Office — TS]. A clever policy of the prisoners had decided as a matter of course, to bring the endangered colleagues of all nations into this squad which was respected by the SS to the same extent as block 46. [This referred to the awe which the SS camp command and the section leaders experienced as regards the possibility of infection with typhus: they did believe that infection could be propagated also by contact, through air or by being in front of the coughing person. For that reason they never entered this block — TS]. Both the SS Battalion Leader Dr. Ding-Schuler, and the prisoners themselves did encourage this taboo fear, though for different reasons (for instance by means of danger notices

³⁷ *ibidem*, p. 176.

on the separate fence wire round the block). The doomed men (death candidates) such as the Dutch professor of physics, van Lingen, the Dutch Reich consultant for physical exercise Harry Pieck and other Dutchmen, the Polish physician Dr. Marian Ciepielowski, who became the production manager, Professor Dr. Balachowsky from the Pasteur-Institute in Paris, the author of this report as an Austrian journalist, and seven Jewish colleagues, had found there, with the knowledge and approval of Dr. Ding-Schuler, a refuge there and, on the basis of suitable suggestions sent to the Reich Security Head Office, which were, at any given time, suggested, drawn up and submitted for signature by myself, protection against immediate actions and death transports. "*Ultimum refugium Iudaeorum*" — "The ultimate place of refuge for Jews", this was the name Dr. Ding-Schuler gave once jokingly, though not without reason, to block 50. The squad consisted of 65 men, including 12 Russians. The valuable instruments, apparatus, microscopes and the like were mostly of French origin, either as looted material or else as things "bought" of French companies without subsequent payment.

The breeding of the typhus germ strains (*Rickettsia provazeki*) was carried out using 2 ml of blood from typhus cases in block 46, and guinea pigs. Officially, two kinds of vaccine were produced: the normal one for the fighting units of Waffen SS, and another, which was rather turbid and therefore isolated for the prisoners. In fact, and unbeknownst to Dr. Ding-Schuler there existed a production of the first quality, available in very small amounts, which was used for the endangered prisoner-colleagues working in appropriately exposed positions, as well as a production of a second quality which, although not harmful was ineffective, and was produced in considerable quantities for the SS³⁸.

One also finds elsewhere a good documentation of the sabotage activity of prisoners in that laboratory, which has been reported by Kogon. Thus Lutowski³⁹ reports the statements of Fleck, according to which the group in question was obliged to send to other institutes also the test specimens of the serum produced. It became however possible to forward high-grade vaccines through Kogon who used to carry out all written work for Ding-Schuler. It is likewise unquestionable that the activity, which remained completely unknown to the Germans right until the end of the war, was only possible under the guidance of the serological scientists of the block, viz. of Fleck., of

³⁸ *ibidem*, p. 175—176.

³⁹ J. Lutowski: *Co to jest leukergia. Rozmawiamy z prof. Fleckiem* (What is Leukergy. We are Talking with prof. Fleck), 'Po prostu' Vol. 4:1950, 18, p. 6.

the Pole Dr. Ciepielowski and of the Frenchman Professor Waitz. Barbarski states that the amount of the produced ineffective vaccines was about 600 litres, and this vaccine was destined to be used for the vaccination of about 30,000 SS members at the front⁴⁰. The production figure of the effective serum amounted, according to the same source, to 6 litres (this figure is given also by Fleck in the unpublished manuscript of 1958)⁴¹.

Fleck's observations in the laboratory of the block 50 form the background against which Fleck wrote his post-war article *Problems of the Science of Science*. This might startle one greatly, but it is certainly an index pointing to Fleck's attempts to survive mentally: He stuck firmly to his research interests — not only the serological ones, as mentioned before, but also the epistemological ones.

The basis of Fleck's portrayals is apparently the error which according to Kogon, had been the reason that resulted originally in the production of ineffectual vaccines. Kogon did say (on January 7, 1947, according to Bayle⁴² during the Nuremberg trial, that the prisoners did only learn from Fleck that their vaccine was ineffectual. However, after a discussion with Flack, it was agreed that the production should be continued as an act of sabotage:

"The first stage of vaccine production was purely experimental. We had at our disposal a method which was more or less stolen from the Pasteur Institute in Paris [what is meant here is the method of Giroud — TS], and we had to test its efficacy in block 50. Experiments with animals lasted approximately four months: we had been always urged by Ding who wished to get tangible results as fast as possible. We decided then, together with the bacteriologists and the production manager, Marian Ciepielowski, to produce a light harmless vaccine. The cause of the disease, the *Rickettsia provazeki*, is as yet not quite certain. It is difficult to know the form which constitutes for certain the cause of the illness, i.e. the typhus germ. It was this fact enabled us to pick the way we wanted to pick.

When Dr. Ludwik Fleck arrived at block 50 in Buchenwald, he told us, after having had a look at the typhus germs we had produced from the rabbits' lungs, that these were not *Rickettsias* but germs of another kind. We asked him not to let Ding know anything of this

⁴⁰ K. Barbarski: *Sabotaż w ampułce (Sabotage in the Ampoule)*, 'Prze-krój' 1947, 99.

⁴¹ L. Fleck: *W sprawie buchenwaldzkiej. Komentarz do książki F. Bayla 'Croix Gammée Contre Caducée' (On the Buchenwald Matter. Comment on the Book of F. Bayle)*. Unpublished manuscript in the possession of the archives of Prof. Stanisław Konopka, Główna Biblioteka Lekarska, Warszawa.

⁴² F. Bayle: *Croix Gammée Contre Caducée. Les expériences humaines en Allemagne pendant la deuxième guerre mondiale*. Paris 1950, p. 1178.

discovery, but rather to experiment with us so as to try to find a suitable way out of this difficulty. Dr. Fleck kept this secret during the period of two years when he was working with us. It was only when the Cracow Institute did supply us with the mouse lungs and with the inefected material from mouse intestines that we could become sure that our animal material did really contain *Rickettsia provazeki*; following this, we produced a vaccine which was doubtless highly effective, but which we could only produce in small quantities.

As Ding wanted us to give him large amounts of vaccine, we started producing two kinds; one without any value and completely harmless, which we did produce in large quantities; this vaccine was sent to the front; and another kind, in very small quantities, which was highly effective and which was used in special cases, for instance for ourselves and for our colleagues who worked in the camp under dangerous conditions. Ding-Schuler did never learn about these arrangements. As he lacked true bacteriological knowledge, he did not discover the secret of production. He fully relied on reports given to him by the block 50 experts. Besides, it was owing to his daring that he obtained a visible external success; when he saw that thirty or forty litres of vaccine were sent to Berlin, he was happy. However, he was highly preoccupied with the vaccination of SS forces, and with the possibility that these men could fall ill, and die, in Russia. The inefficacy of our vaccine could be disclosed, and the external experts, whom SS did have at their disposal, could hold an inquiry and become sure that the true vaccine had been hardly produced. Nothing of this kind did occur, and this adventure lasted until March 1945'.

Fleck treats this happening as the point of departure of his demonstration that the 'thought-collective' in block 50, just as any other scientific collective, reaches a self-consistent knowledge edifice on the basis of social factors acting within it. Of course, when compared with the 'proper' serological knowledge, it is based on an error but, since this error has flown systematically into the ideas of the collective, it does not result in an internal conflict of these ideas. At the same time Fleck makes the 'sociological conditions' of the collective of laymen responsible for not having noticed its error: The group was isolated from the thought-collective proper of microbiology. Thus there existed no contacts that would be able to counteract the mutual self-confirmation of the group members as regards the correctness of their discovery. Thus there arose, under the pressure of conditions, a specific mood in the collective, which made it possible for the group to erect an independent, closed system of ideas.

The group had, first, to accept the shaking of its edifice of knowledge, when it had to apply this edifice to the 'real' stimulus material, supplied from outside the camp. However, the result was by no means a rapid collapse of the system — for this to happen, the social forces within the group had been by far too strong. Instead, under the pressure of the 'recognized authority' of the institute of origin, there began a slow process of the adaptation of the group concepts to those of the microbiological thought-collective proper. In the last analysis, the knowledge edifice of the isolated laymen's collective turned out to be untenable: it rested on a systematic error — an error, to be sure, from one standpoint only, which is settled outside this laymen's collective. The system of ideas was, in itself, consistent. It was on the basis of its active couplings that it had reached the corresponding discoveries.

Fleck concluded therefrom:

'Most important in our history is the fact that — as it became evident — the social mechanism of the genesis of an error is the same as that of the genesis of true knowledge [...] Both in the false and in the true science it is the same joint forces that play the role of a motor, while the individual is the representative of certain social functions rather than a conscious source of action. In both the false and the true knowledge, a view does not arise by a logical calculation of some elements, but by way of a complex process of stylization. There exists no observation that would not be forestalled by a directing and limiting readiness of thought'⁴³ — a statement which, considering the background against which it had been made, is highly perplexing⁴⁴.

Translation from the German delivered by the author

Reviewer: Henryk Hollender

⁴³ L. Fleck: *Problemy naukoznawstwa [...]*, p. 332.

⁴⁴ In the last days preceding the liberation of the Buchenwald concentration camp by American Forces on April 11, 1945 — as indicated in: *W sprawie buchenwaldzkiej [...]* — he was hidden by the communist underground, in order to be saved from being evacuated, just as many other Jews and (political prisoners had been saved. Fleck's wife was sent from Auschwitz for 2 months to Birkenau, later to Ravensbrück, and was liberated on April 30, 1945. His son Ryszard, on the other hand, was deported from Auschwitz and Birkenau, first to Gross-Rosen, and later to Buchenwald. All other relatives of Fleck perished during the war.

It was only after several months spent in hospital, first in Buchenwald and later in Bolesławiec, that Fleck could return to Poland in July 1945. In 1948 he went to Nuremberg as an expert witness in the IG-Farbenindustrie trial. Here he gave evidence about the test experiments with various typhus vaccines produced by IG Farben, which were carried out on artificially infected prisoners in block 46 of the Buchenwald concentration camp.

