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"Complex Logic" in Berlin: The Becoming of a Scientific School and Its Premature End

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Abstract: Building on ideas of Aleksander Zinoviev, Berlin logician Horst Wessel further developed a conception of so-called complex logic in his research group at the Humboldt University of Berlin in the 1970s. That new orientation within philosophical logic included a theory of logical consequences, a non-traditional theory of predication and a logical theory of terms. The logic group at Humboldt University disintegrated during the reorientation of higher education policy in the wake of German unification. By then, the school had produced some recognized logicians and it had educated a few highly talented young researchers among graduate students. In our paper we try to answer the question of whether the Berlin group would have had the potential to become a school of science under more favourable circumstances.

Key words: school of science, meme, menome, Berlin school of complex logic

1. Introduction

In this paper we describe the fate of a scientific community in Berlin in the 1970s and 1980s. Our research question is: would this community have turned into a school of science if it had not ceased to exist due to historical contingencies? In order to pursue this question, we need to clarify the basic notion. The novel idea is to describe, in section 2, a school of science as a living scientific organism with specific memes. That is, we individuate a school of science by its memetic struc-

* The first author was responsible for the general structure of the work, the theoretical background and the editing of the individual parts.

** The second author contributed historical data, in particular the group's genealogy and the historic bibliography, and conducted a survey among former group members.

ture. In the second part, the case of the community mentioned above is examined from this point of view.

2. School of Science

2.1. What Is a School of Science?

The term "scientific school" is widely used in the history and philosophy of science as a self-description as well as an external description, but it is hardly ever clearly explicated. Moreover, it is characterized by its Janus-facedness: on the one hand, schools serve the emergence and assertion of scientific aspirations, on the other hand, they serve their prevention and fragmentation. Different formulations try to capture the idea: an invisible college, a school of thought, a specific local intellectual tradition, Ludwik Fleck's thought collective. Sometimes a school of science is a school in the strict sense – take Abelard's school as an example. We will use the phrase "school of science" as a technical term to denote coherent social groups in the world of science across multiple generations. They are communities of scientists identified as a collective because they represent particular scientific ideas within academia or in social discourse and they influence debates in their field.[1] Perception as a group results from public advocacy of those ideas and sometimes (in addition to that) through shared behaviours and forms of scientific exchange. You may often witness charismatic teachers passing on their behavioural patterns to their students with amazing accuracy.[2] But of course it is not about personal style. In a communicative process of knowledge production, a particular scientific style emerges alongside the individually newly acquired knowledge. Scientific style is a way of doing science. Procedures, methodologies, values and norms become the, mostly implicit, basis of individual scientific ac-

[1] Concerning the inherent homonymy of the term *school of science*, i.e., the meaning of a formal educational institution, respectively of a semi-formal association of individuals who share a specific outlook on scientific matters, we will decidedly go for the second meaning.

[2] Consider the well-known episode during Ludwig Wittgenstein's visit to Ithaca. The Malcoms had invited him and he also attended a Norman Malcom seminar at Cornell University, which he commented on at length. After class, one of Malcom's students approached him, "Who was that poorly dressed little fellow who aped you so impudently in speech and gestures?" – I have often witnessed charismatic teachers passing on behavioural patterns to their students with amazing accuracy. But of course it takes more than personal style to create a school of science.

tion. In the individuation of schools and school histories this tacit knowledge plays a central role.

Ralf Klausnitzer points out the etymological connection between "school" and "sect." The term sect was understood in classical Latin alongside the Latinized *hearesis* (school, direction) in an initially completely neutral meaning. Only later was heresy used as a culpable arbitrary disturbance of the inner unity of the church.[3] Certain echoes of this very tradition seem still to be found in the term school of science. Following Klausnitzer in that respect, one should conclude that a school founder is by definition always a heretic.

Schools of science are vivid or they are inanimate. The Toruń school of discussive logic is alive and kicking, that of the Pythagoreans is as dead as a dodo (though not without influence). In the latter case, concerning extinct schools, however, they must have been alive at an earlier time. There are gradations between life and death, dialethic cases like the Lvov-Warsaw School. Schools have a lifespan. In order to develop into a scientific school, the research collective shall achieve continuance. The life of individual researchers is limited, so it needs followers who may replace the elderly. The followers, educated by their masters, perpetuate their knowledge, sometimes sublate it. Each generation alters the common knowledge – by extending it, or by revising it, even disruptively. Occasionally, such disruptions may happen to be fatal – researcher loose trust in the school's basic principles. Schools must honour their principles in order to remain schools. So they may fall out of time. Old schools, like all old organisms, lose their fertility and eventually die. But normally, people adopt to the new findings and incorporate them in the community's tenets.

A school of science is a living organism, a coherent social group which jointly strives for scientific insight. One fundamental presupposition of a fully developed school is a unified language. Practically, the elaboration of a common language will be part of the school's becoming, it serves as a regulative ideal. A strong authority, be it a charismatic leader or a code binding for all, will be of great help in this respect. Unique language does not mean uniform thinking, of course. Being composed out of individual researchers, a scientific school's output will be at times inconsistent.

[3] R. Klausnitzer, *Wissenschaftliche Schule. Systematische Überlegungen und historische Recherchen zu einem nicht unproblematischen Begriff*, in: *Stil, Schule, Disziplin. Analyse und Erprobung von Konzepten wissenschaftsgeschichtlicher Rekonstruktion (I)*, eds. L. Danneberg, I. Höppner, R. Klausnitzer, Peter Lang, Berlin 2005, pp. 31–64.

For instance, the École Polytechnique under Lagrange, Fourier, Laplace, etc., was characterized by common language and common scientific beliefs. But they differed in the question of continuity of nature (Fourier) or discreteness (Laplace). Such contradictions do not disturb in any way the wholeness of the collective consciousness of the school. On the contrary, the synthesis of such different ideas gave rise to new methods and procedures in the next generation. The inherent contradictoriness of the collective creative consciousness sometimes also shows itself in the individual. This can happen if one has recognized and internalized insights and thoughts of the close colleagues as reasonable and uses them in one's own thinking process at ease, that is, unaware of inherent inconsistencies.

Any school must be ready to cope with a dynamic environment. This means resilience in case of external interference, but also the ability to take advantage of favourable circumstances. When a niche opens, it is good to be prepared to fill it. Niches in science range from grant opportunities, meeting solvent sponsors, vacant chairs to be occupied, to important journals to be boarded. A precondition for all that is attentive observation of the surroundings. Specifically: taking part in scientific exchange by reading other researchers' papers is necessary for survival. This is where a charismatic leader can be disturbing. If he has become old and mentally immobile, and at the same time self-confident enough to declare his outdated preferences to be still binding, then he puts the collective in danger. It can therefore be better for the group to adore an identity-giving idol that is very old or has already died and therefore no longer interferes in everyday matters.

Recognition as a school of science is a task for the scientific community (although ambitious scholars often tend to insist on their personal role of a school founder). Also the attribution of researchers to a school is also made by the academia. Should the individual scientist have a right to object? Or, can a community perceived as a school reject the attribution – for example, for reasons of science policy? Can a scientist ascribe to a school himself?

The first author once was a member of a scientific school. This was in the late 1970s/early 1980s in Jerzy Kotas's logic group in Toruń. A wonderful time, full of joyous research in logic and of amicable social contacts. I enjoyed it a lot to be part of this community. But it would never have occurred to any of us to think of our circle of friends as of a school of science. So I had a strong sense of belonging, but was not aware of my school membership. Witness the 2006 book *The Lvov-*

Warsaw School: The New Generation,[4] I do also belong to that wonderful school. Thanks to Jacek Jadacki and Jacek Paśniczek, I know about my membership. But in this case, it was the opposite for quite some time: I did not feel it until I was told. So it seems to be a tricky thing with being a member of a school of science. Gut feelings and normative assignment do not always match.

The notion of a school of science has the inherent conceptual power of the term to provide structure and orientation in the scientific landscape. Where do I locate myself in science? Everybody tries to ennoble one's own scientific provenance: "I am a Harvard historian" or: "I am from the Vienna Circle." As an appreciated side effect, this impresses an order on the shimmering jumble of a period's research and teaching activities. What is more, schools of science nobilitated not only their members, but also their place. "I am from Cambridge" is intended to mean: "I come from the metropolis instead of the province." In this way, Constance, Glasgow and New Haven, CT, become metropolises. The possibility of retrospective classification is also beneficial.

So the concept looks vague, but useful. This should be sufficient reason to ask for further clarification of the term. All the more so, as the term is still controversially discussed in the (not particularly extensive) literature.[5] Certainly, self-ascription of a scientific collective is insufficient to be regarded as a school of science. As Klausnitzer points out, an educated use of the concept needs a scrupulous demonstration of specified conformity in terms of conception and methodology. This requires expert scientometric methods and a lot of meticulous, time-consuming work – something that cannot be fully delivered here. So for the case study included in this paper, we use the term in a performative way.

2.2. Memes

As mentioned earlier, a school must last longer than an individual scientist's professional activity, all the more than his or her personal commitment to a research topic. The transmission of the research tradition is thus indispensable. It seems that three capabilities are crucial:

[4] J. Jadacki, J. Paśniczek, *The Lvov-Warsaw School: The New Generation*, Rodopi, Leiden 2006.

[5] My basic sources of information were L. Danneberg, I. Höppner, R. Klausnitzer, eds., *Stil, Schule, Disziplin. Analyse und Erprobung von Konzepten wissenschaftsgeschichtlicher Rekonstruktion (I)*, Peter Lang, Berlin 2005, and – extremly rich in content – L. Danneberg, *Auswahlbibliographie zu "Disziplin", "Schule" und "Stil"* (an unpublished manuscript – thanks to Ralf Klausnitzer for making it available).

1) reproduction: evolutive systems, that is, (biological) organisms or (cultural) human creations, reproduce in cycles of successive generations;
2) variation: variation processes generate variants of these evolutive systems, which are co-reproduced;
3) selection: because population size is limited by scarce resource, certain variants (the "fitter" ones) reproduce faster and displace the others in the long run.

These three skills are the Darwinian modules of evolutionary processes.[6] Evolution is a cybernetical phenomenon. The modules thus are not limited to biological evolution. They also apply to self-reproducing automata[7] and in some respects to cultural evolution in human society. In the biological world, the code of evolution consists of genes and various auxiliary mechanisms. For cultural evolution, Richard Dawkins coined by analogy the term *meme*. Memes are, as genes and self-reproducing automata, replicators. According to Dawkins, the existence of replicators is essential for the evolution of viable complex structures by selection processes.

The concept of a meme was introduced as a neologism, decently based on old Greek and Latin phrases, in Dawkins's 1976 book *The Selfish Gene*. Originally, it means something that "conveys the idea of a unit of cultural transmission, or a unit of *imitation*." Memes in Dawkins's sense include tunes, ideas, catchphrases, clothes fashions, ways of making pots or of building arches,[8] and – some

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[6] In Darwin's original treatise we have:
1) variation, or the introduction of new change to existing elements;
2) heredity or replication, or the capacity to create copies of elements;
3) differential "fitness," or the opportunity for one element to be more or less suited to the environment than another.
These three characteristics are sometimes misunderstood as necessary characteristics of replicators, i.e., of objects that produce (in a suitable environment) copies of themselves, or as characteristics of the concept of a replicator. However, they are the abstract aspects by which replicators can be compared; they are standards of replicator fitness, so to speak; cf. C. von Bülow, *Article Meme*, in: *Enzyklopädie Philosophie und Wissenschaftstheorie*, ed. J. Mittelstraß, Vol. 5, J.B. Metzler, Stuttgart–Weimar 2013.

[7] See, e.g., ch. 8, *The Rise of Replicators*, from Ananyo Bhattacharya's superb book *The Man from the Future: The Visionary Life of John Von Neumann*. There were highly interesting ideas of cybernetical replicators around already at Dawkins's times, including John von Neumann's theory of self-reproducing automata, Warren McCulloch and Walter Pitt's artificial neural networks, John Horton Conway's cellular automaton, "Life."

[8] Cf. R. Dawkins, *The Selfish Gene*, Oxford University Press, Oxford 1976, p. 297.

would like to continue – political ideas and scientific theories.[9] In his 1998 book *Consilience: The Unity of Knowledge*, Edward O. Wilson praised the concept meme, understood as the basic unit of cultural inheritance, for its eminent role in unifying the natural and social sciences.[10] Together with Charles J. Lumsden he famously argued for a co-evolution of genes and memes.[11]

A disclaimer for young readers: at the turn of the millennium, the concept was hijacked by the internet community with very small modifications. First they called it internet meme, but now it is just meme.[12] Apparently, Dawkins shrugged his shoulders, claiming that those funny online images have a lot in common with his original idea.[13]

It is tempting to think about further analogies with Dawkins's ideas about the genome. But one should abstain from such "memetics." The meme–gene analogy freeloads on the unprecedented success story of genes in microbiology, evolutionary biology, system biology. In all these disciplines the relevant molecular causal mechanisms are scrupulously investigated and the complex interaction between genetic makeup, carrying organism and its environment are analyzed (though by far not fully understood). There can be no question of any of this in the case of memes.[14] The analogy is largely metaphoric. But hopefully, it is a metaphor that will further boost scientific imaginativeness.

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9 J. Gray, *The Atheist Delusion*, "The Guardian," 14.03.2008, URL: https://www.theguardian.com/books/2008/mar/15/society. Gray is a rude critic of memes.

10 E.O. Wilson, *Consilience: The Unity of Knowledge*, Random House, New York 1998, p. 352.

11 C. Lumsden, E.O. Wilson, *Genes, Mind, and Culture: The Coevolutionary Process*, Harvard University Press, Cambridge, MA, 1981.

12 In German, you have "Mem" for the original thing versus "Meme" for the internet phenomenon.

13 In an interview with Wired magazine on the occasion of his being involved in the New Directors Showcase, Dawkins was asked "How do you feel about your word meme being reappropriated by the internet?" His reply went: "The meaning is not that far away from the original. It's anything that goes viral. In the original introduction to the word meme in the last chapter of *The Selfish Gene*, I did actually use the metaphor of a virus. So when anybody talks about something going viral on the internet, that is exactly what a meme is and it looks as though the word has been appropriated for a subset of that" (R. Dawkins, O. Solon, *Richard Dawkins on the Internet's Hijacking of the Word "Meme"*, Wired, 20.06.2013, URL: http://www.wired.co.uk/news/archive/2013-06/20/richard-dawkins-memes).

14 Just to raise one point: the smallest contributors to the replication processes in genes known so far are microRNA. They consist of twenty-two base pairs only, about six Angström each. The whole microRNA is therefore ca. 12.6 nm long. Compare that to the complete genome, another actor in the replication process, which is mostly encoded in DNA double helix. If you unwind the string of a human DNA it would extend over about two metres. So, the range of size is nine orders of magnitude – that is far beyond imagination. Genetic mechanisms are well-researched

The notion of a meme has been under heavy criticism from the very beginning.[15] Dawkins does not remain unimpressed. In his 2006 jubilee session he seems to withdraw from the meme motif to some extent. Closing the session, he says:

> This is not something that I've ever wanted to push as a theory of human culture, but I originally proposed it as a kind of – almost an anti-gene point, to make the point that Darwinism requires accurate replicators with phenotypic power, but they don't necessarily have to be genes. What if they were computer viruses? They hadn't been invented when I wrote *The Selfish Gene* so I went straight for memes, units of cultural inheritance.[16]

Indeed, Dawkins's book is on genes. It is on biology almost entirely. Chapter 11 on replicators in human culture, although it became very famous afterwards, stands somewhat aside. And Dawkins could well have used alternative examples of replicators, such as self-reproducing automata. Alas, at the very end of his afterword at the same jubilee session in 2006, he reminds the auditory of the final sentences of his *Selfish Gene*:

> We can even discuss ways of deliberately cultivating and nurturing pure, disinterested altruism – something that has no place in nature, something that has never existed before in the whole history of the world. We are built as gene machines and cultured as meme machines, but we have the power to turn against our creators. We, alone on earth can rebel against the tyranny of the selfish replicators.[17]

This is undoubtedly thrilling, but it is not purposeful, perhaps. With the very last sentence he seems to clearly undermine the leitmotif of his 1976 book. And yet, Dawkins's memes seem to offer interesting perspectives on schools as collective organisms with certain goals and behavioural patterns. It may look like a bad idea

for seventy years now. For biological systems, genes are necessary, but not sufficient for replication. Messenger RNA is involved to switch genes on and off. It is not clear what mRNA-analogues – if any – are at work in the case of memes. For memes we have the name and some vague idea of an analogy. For the time being, all the presupposed mechanisms of meme expression, variation and transcription remain educated fiction, not supported by evidence.

15 For a fair and comprehensive overview of the main criticisms, see C. von Bülow, *Article Meme*, op. cit.

16 R. Dawkins, *Afterword*, Darwin @ LSE, 16.03.2006, URL: https://www.edge.org/event/darwin-lse.

17 Ibid.

to explicate one notoriously vague term, "school in science," by the not less misty concept of "meme." But on the other hand: if the former one is essentially vague, then how to expect a stringent definition in terms which are themselves precise?

Memes in Dawkins's sense shall include, as it was mentioned above, political ideas, manners, technologies, religious doctrines and scientific theories. Here I would object. At least the last exemplification of meme would be too broad for our purposes. Memes in science should not be identified with fully elaborated theories. That's too coarse-grained a view. A scientific meme is rather a sticky new idea in some disciplines – attractive, easy to explain, easy to remember: "Speed of light is constant," "Organisms are survival machines for genes." Memes in science are compact, recognizable, scientifically significant ideas.

Some scientific ideas become memes only in due time, under favourable conditions. They are made by human mind (namely, the author's), and they make human mind (e.g., the followers' minds). They are products of the intellect and they do not exist independently. But they may survive, as hibernated information, outside the mind in all sorts of storage media. Thus, a school of science does not necessarily have to have continuity over time. Memes, as genes, are types, not tokens. So, there is no problem with sharing them.

Our aim is to use memes for individuating schools of science. This requires further specific properties for the respective memes. Such school-building memes shall form the "hard core" of the school's scientific creed, its doctrine. To that aim they must be new, but neither revolutionarily new, nor should they be weird. By definition, these memes are not mainstream, nor will they be mainstream soon. Otherwise, they become generally accepted by the scientific community – and thus cannot create a specific school: the school as such would not appear at all or it would dissolve into the discipline's mainstream soon. In the second case it would not work out either. Whoever claims all-too bizarre hypotheses will be treated by other scientists with disrespect. As a result, the group would turn into a sect and would be expelled from academia. (Although, scientific moods may swing: what was silly yesterday may be reasonable today, and, perhaps, becomes junk tomorrow.)

Let the whole of memes in a scientific discipline be its *memepool*. What is the carrier of (parts of) a memepool? Expert scientists? Certainly. Can collectives of scientists be considered meme carriers? We do think so, as long as they share scientific memes. Let us call the part of the memepool which is common for a sci-

entific collective the *menome* of the group.[18] In order to develop into a school in science, the menome has to be original, recognizable, resilient, and, most of all, replicable. A school in science is always distinguished by a menome of that sort. Modifications of the menome directly affect the school. First the new meme appears in an individual mind as an idea concerning the school's doctrine. That's heresy. But next the heresy spreads among the orthodox – thereby changing the menome, or: modifying the doctrine – or, the deviator is expelled, or something intermediate happens: the school divides. By the way, this is why schools of science are not like slime moulds – since they are individuated by their specific menome, they cannot fuse with each other without losing their identity. The merger kills them. But of course, something new can come out of it.

Certainly, the scientific menome is not all that characterizes a school. A school's fitness does not exclusively depend on the scientific replicators. It needs a sense of tradition, devotedness to the school founder, perhaps common manners and peculiarities. All of that may be considered as the school's extended menome. The central trait, however, is its scientific menome: without proper memes there will be no school.

3. Berlin Group of Complex Logic

3.1. The Rise of the Complex Logic Group

As a case study, we will apply our findings to a specific research community, the so-called Berlin group of complex logic.

The Berlin group of complex logic was a group of logicians in the Philosophical Faculty of Berlin's Humboldt University and their project was "complex logic" in the mid-1970s. At that time, the university had already had a long-lasting tradition in mathematical logic. Not so, however, in philosophy. Here, Marxism-Leninism dominated in the second half of the 20th century. The relationship of this scientific doctrine to logic was not an intimate one.

In 1967, Horst Wessel returned from Moscow, were he had obtained a PhD in logic under the supervision of Aleksander Zinoviev. His thesis was about the problem of truth in dialectics and in formal logic. He established the Depart-

[18] "Memome" would be in better analogy to genome, but it sounds too bad, perhaps. The same holds, in my view, for the somewhat similar concept of a "memeplex."

ment of Logic in the Philosophical Institute of Humboldt University and started teaching formal logic to students from the institute and beyond. This was done in a modern way. Able students liked it a lot. Lecturers had the pleasant feeling of spreading seeds of good science and rational thinking in their students' minds. Today you would call it a mission.

Wessel, the unquestioned leader of the group, was a charismatic personality, full of humour, usually pretty sarcastic. This was difficult to bear for some people. There was a saying that the most likeable thing about Horst Wessel was his wife, Ingrid. Indeed, Ingrid Wessel, a professor of Asian studies, was usually able to smooth the waters quickly. Horst Wessel was extremely well networked and socially largely fearless. His working-class background and dignified kinship relations were also helpful. Moreover, he received his blessings from Moscow University itself. The Virgin of Mercy thus extended her protective shell over the young logic department in Berlin – whoever is under Mary's pall is safe. Then, however, history allowed itself a crude joke: Zinoviev fell into disgrace because of his literary work and had to leave the Soviet Union. The protective pall momentarily turned into a sanbenito – a heretic's cloak. Wessel and Zinoviev agreed to play down these scientific relations. Only after German unification the matter was put in proper order at the occasion of Zinoviev's 70th birthday. A scientific conference in honour of Aleksander Zinoviev was organized in 1992, accompanied by a huge party. Everybody was happy at the end.

Glittering parties at scientific events was a characteristic feature of the Berlin group. They liked to celebrate together and to entertain their guests. Even according to the period's standards, when working collectives were tied together much closer than today, social life in this group was exceptional. Birthdays, end-of-term barbecues, sport contests – there were many occasions to meet your colleagues and their family members. It goes without saying that there were regular and long scientific meetings with extensive debates on individual research projects or on new results from elsewhere. All that enhanced the group's sense of belonging and mutual loyalty. The strong feeling of togetherness did not remain without consequences for the public presentations of the Berlin logicians. It was sometimes almost amusing to see that they began their papers at conferences – regardless of the respective topic – with an outline of complex logic. This not only served to hammer the basics of complex logic into the audience, but it also caused a uniform appearance of the group members. It was clear from the very outset: they belong together.

Certainly, it needs more than just a good scientific institution, a demand for teaching students proper science, and a charismatic leader to get off the ground with a novel scientific agenda. The conception planted by the Berlin group embraced a holistic, universal understanding of logic. Complex logic consisted in three parts: a theory of terms, a theory of predication, and an approach to logical entailment. The package was attractive enough to allure talented young researchers, who Wessel trained in complex logic. The naming was not very fortunate, since it's relation to the basic idea of the system was not obvious. So it did not play an outstanding role for making the brand popular.

How to characterize the basic ideas of complex logic?[19] They should be precise, short and firm enough to be ready for replication. For NTP, the non-traditional predication theory, the task is not hard: Besides "predicate P is attributed to subject s" [symb.: s↑P] and "P is denied for s" [s↓P] we may form classical negations for both. The crucial observation is that *tertium non datur* does not hold: (s↓P) ≡ ~ (s↑P) is not true in NTP. Let this be the first meme of complex logic, characterizing NTP, its first ingredient. It is easy to understand, easy to remember. No wonder NTP became well-known soon.

Also the second component, consequence theory, can easily be memorized. Logical consequence is a binary predicate □ which can occur only once in theorems. The second meme is this: A □ B is a valid rule of strict logical consequence iff$_{df}$

1) A ⊃ B is a classical tautology;
2) B contains only variables that occur in A;
3) A is no contradiction, B no tautology.

Just to avoid misunderstandings: the above definition is not fit for winning a beauty contest. But it is, again, easy to comprehend and to memorize.

The third part of the logical equipment of complex logic, the theory of terms, is different. Here we assume a distinction between subject terms, which shall denote objects, and predicate terms, which shall denote properties and relations. Next, quite a few specific relations of this theory are introduced and investigated, such as the denotation or naming relation, the relation of meaning inclusion, relations between singular, general, categorical, empty and non-empty subject terms.

[19] The technical details have been reduced to a minimum to make the text as comprehensible as possible. For a more detailed presentation of the logical background of the conception, see, e.g., K. Wuttich, *Horst Wessel: Contributions to the Theory of Logical Consequence, Non-Traditional Theory of Predication and Logical Theory of Terms*, "History and Philosophy of Logic" 2020, Vol. 41, pp. 291–300.

This seems to be somewhat overcomplex. Term theory could not be boiled down successfully into a meme. A vast amount of idiosyncratic operators is used to formulate highly specific and not always self-evident norms for term-building. It is little wonder, therefore, that the theory of terms has found comparatively little resonance with other logicians. Also for the first author of this paper, being a close scientific confederate of the Berlin group, the theory of terms was not an issue. It was largely unknown to him.

Admittedly, the potential replicators that span complex logic do not look particularly good. And yet, in combination they characterize an original research project. It is safe to say that the Berlin logic group developed pretty well towards the end of the 1980s. It attracted increasing attention for its research at home and abroad, and its members were recognized and recognizable as representatives of the concept of complex logic. Group members actively participated in national and international symposiums and conferences in the USSR, Poland, Hungary, Czech Republic, Bulgaria, Germany, Sweden, Italy and the USA, including the World Conferences on Logic and Philosophy of Science (Moscow, Uppsala, Florence). This also applies to the founding of the Society for Analytical Philosophy and its conferences in the early 1990s.

3.2. The Berlin Group's Genealogy

According to Ralf Klausnitzer,[20] the initial stage of a scientific school lasts usually around fifteen years. After that time, we often observe its exponential growth. So, how has the research collective of complex logic presented itself after fifteen years, that is, in 1990?

3.2.1. Head of School

Horst Wessel (1936–2019), Professor of Logic, Humboldt University of Berlin:

- PhD 1967 (Lomonossow University, Aleksander Zinoviev), *Проблема истины в диалектике и в современной логике* [The Problem of Truth in Dialectics and in Modern Logic];
- habilitation 1976 (Humboldt University), *Philosophie und Logik* [Philosophy and Logic].

[20] R. Klausnitzer, *Wissenschaftliche Schule*, op. cit., p. 46.

3.2.2. Second Generation

Evelyn Dölling (born 1947), Reader in Logic, Humboldt University of Berlin:

- PhD 1975 (Humboldt University, Horst Wessel), *Zur Logik empirischer Zusammenhänge* [Logic of Empirical Context];
- habilitation 1985 (Humboldt University), *Logik und Sprache. Zum Gebrauch des Existenzprädikates* [Logic and Language: On the Use of the Existential Predicate].

Johannes Dölling (born 1948), Lecturer in Logic, Humboldt University of Berlin:

- PhD 1975 (Humboldt University, Horst Wessel), *Definitionen in der Philosophie* [Definitions in Philosophy].

Peter Keller (born 1948), Public Officer:

- PhD 1975 (Humboldt University, Horst Wessel), *Probleme der Zeitlogik* [Problems of the Logic of Time].

Klaus Wuttich (born 1948), Reader in Logic, Humboldt University of Berlin:

- PhD 1977 (Humboldt University, Horst Wessel), *Probleme der Epistemischen Logik* [Problems of Epistemic Logic];
- habilitation 1987 (Humboldt University), *Modale und Nichtmodale Epistemische Logik* [Modal and Non-Modal Epistemic Logic].

Karl-Heinz Krampitz (born 1951), Reader in Logic, Humboldt University of Berlin:

- PhD 1977 (Humboldt University, Horst Wessel), *Zum Begründungsproblem in der Logik* [The Problem of Justification in Logic];
- habilitation 1990 (Humboldt University), *Der Existenzbegriff in der Logik* [The Notion of Existence in Logic].

Uwe Scheffler (born 1957), Lecturer in Logic, Humboldt University of Berlin:

- PhD 1985 (Humboldt University, Horst Wessel), *Eine Theorie der Konditionalaussagen* [A Theory of Conditionals];
- habilitation 1999 (Humboldt University), *Ereignis und Zeit. Ontologische Grundlagen der Kausalrelationen* [Event and Time: Ontological Foundations of Causal Relations].

Without exception, all logicians of the second generation came to logic via Zinoviev or Wessel. Both were charismatic personalities who knew how to fascinate philosophy students not only with their conception of logic, but also with their conception of Marxist philosophy as a science. Characteristic of this is a remark Zinoviev made to the second author of this paper at the end of the first year of study (summer 1969): "Klaus, specialize in logic! Everything else makes

no sense. Perhaps, history of philosophy. Marx and Engels dreamed up all of Marxism over a glass of beer." Wessel, who at that time was still fighting for the establishment of logic at the philosophical institute, will of course have expressed himself less drastically. But by this time he had managed to enthuse a small group of gifted students with his and Zinoviev's conception of logic. Around 1970, Evelyn and Johannes Dölling and Peter Keller visited Moscow State University with a group of students and became personally acquainted with Zinoviev. All three made more or less reference to the work of Zinoviev and Wessel in their dissertations, but not to the work of one another. The topics were just too different for that. This also applies to Wuttich and Krampitz, who joined Wessel's group in 1973 and 1975 after studying at Moscow State University. The second author of this article wrote his diploma thesis under Zinoviev and continued to work in the direction advised by him. In doing so, he drew heavily on all three areas of complex logic and of course quoted many works by Zinoviev and Wessel. The quotations from Zinoviev almost caused him trouble in 1977, when he was completing his dissertation: Zinoviev had just fallen out of favour. With one exception, the name "Zinoviev" had to be replaced everywhere by "the author of the SE1 system." Krampitz had fewer problems with his dissertation on the problem of justification. He referred to the concept of complex logic by using the logical language rules in section *Approaches to a Systematic Setup of Logic*.[21] The same applies to the habilitations of Wuttich and Krampitz from 1987 and 1990 respectively. Uwe Scheffler, who had also studied in Moscow but no longer experienced Zinoviev as a teacher, in his work on causal logic and in his habilitation thesis, *Event and Time: Ontological Foundations of Causal Relations* (1999) explicitly points out that the basic idea of his work comes from Zinoviev and Wessel.[22] In the section *Termini and Statements: The Linguistic Foundations* he also relies on Wessel's work on term theory.[23] Since Scheffler was the only representative of the second generation who was able to continue working at Humboldt University until after Wessel's retirement in 2001, he was intensively involved in supervising the active group of philosophy students that had formed after the reunification, primarily through Wessel's lectures and which we refer to here as the third

[21] K.-H. Krampitz, *Zum Begründungsproblem in der Logik*, dissertation A, Humboldt-Universität zu Berlin, 1980, pp. 98ff.

[22] U. Scheffler, *Ereignis und Zeit. Ontologische Grundlagen der Kausalrelationen*, habilitation, Humboldt-Universität zu Berlin, 1999, Preface, p. ii.

[23] Ibid., pp. 18ff.

generation. For a time Krampitz (from 1993 to 1995) and Wuttich (1993–1996) were involved in the work of the logic group. They were employed by Wessel in a Deutsche Forschungsgemeinschaft project and took an active part in the meetings of the group.

3.2.3. Third Generation

The third generation includes: Fabian Neuhaus, PhD, Mireille Staschok, PhD, Sebastian Köhler, PhD, Bente Christiansen, Lars Mecklenburg, Henning Franzen, Marco Winkler, Ralf Dombrowski, PhD, Andreas Dahlke, Maik Zühlke and Sebastian Gerhard.

Marco Winkler, who later did research in linguistics, wrote to Wuttich: "At the time, I understood the Berlin group as a school and I was very happy to be part of it." Henning Franzen, who published a logic exercise book with Scheffler, replied: "I would see myself more as a member of a social group than as a member of a scientific school. I guess I came too late for that." Sebastian Köhler, who wrote his master's thesis under Wessel's supervision, also has fond memories of his time in this logic group. He later did his doctorate in another field. When asked if he felt like a member of a logic school, Fabian Neuhaus replied:

> Unfortunately I only experienced the offshoots of the Berlin logic group. I started studying in 1996 and at that point – I think – from the original Berlin logic group only Prof. Wessel and Uwe [Scheffler – M.U.] were still employed at the university. It was a great time and I was very happy to have belonged to this group in a social sense. But I was still a very young student and had corresponding worries (homework, exams, girlfriends). In this respect, of course, I wasn't ready to contribute anything scientifically. When I started to take a serious interest in science around 2000, Prof. Wessel's health was no longer as good and he was also less committed. In fact, I had more to do with Uwe. But because of the whole situation (Prof. Wessel facing retirement, Uwe's uncertain future), everything had to happen very quickly. I did my master's degree in 2001 and my doctorate in 2002. Shortly thereafter, the Berlin logic group was dissolved. In this respect, I was simply 5 years too young to become a scientific member of the Berlin logic group. My only publications on a topic in the field of complex logic were the article *Derivability and Consequence* (in "What Follows?") and my dissertation. And the latter only to a limited extent.

> Because even if I quote works from the Berlin logic group in my dissertation, so other authors played a much larger role in terms of content. After that I was out of philosophy/logic. In this respect, I did not take up the topics of complex logic again scientifically later.

The impression that everybody also felt part of a social group in the 1990s can be found in almost all reports of students who were enthusiastic about logic in those years. The commitment of Bente Christiansen in this cohesion was outstanding. Wessel's publications, especially his books, which were published by Logos Verlag[24] after the accession of the German Democratic Republic to the Federal Republic of Germany, would hardly have been possible without their cooperation. In the forewords to their dissertations, both Fabian Neuhaus and Mireille Staschok thanked Bente Christiansen for constant help and support.

Due to Wessel's retirement in 2001 and to the fact that the logic professorship was no longer active and Scheffler, as a lone fighter, no longer had the opportunity to continue leading the group, the young "logicians" had to find a different career path outside logic (as shown in detail below). In the end, only two doctorates were finished in this field. In his doctoral thesis, *Naive Predicate Logic: A Logical Theory of Predication*, Fabian Neuhaus wrote:

> Uwe Scheffler and Horst Wessel have always encouraged and challenged me – each according to his nature. In their school you were taught to use your own mind, to formulate and deal with pointed criticism. Anyone who knows philosophy institutes knows that this is anything but a matter of course. I couldn't have wished for better teachers.

In addition to Wessel, Zinoviev and Scheffler, Neuhaus also quotes some of Krampitz's works. The second doctoral thesis, written by representatives of the third (last) generation, comes from Mireille Staschok, *Existence and the Consequences: Logical Conceptions of Quantification and Predication*.[25] In the foreword, she explicitly thanks Wessel, who was the second reviewer, and Scheffler, her first reviewer. Zinoviev and Wessel's NPT occupies a large part of her work. The whole chapter 5 is dedicated to this theory. But she also refers to other authors from the

[24] Logos was the family publishing company, where not only many books of the group were issued, but also the book series "Logical Philosophy," edited by Scheffler, Shramko, Urchs, and Wess.

[25] M. Staschok, *Existenz und die Folgen. Logische Konzeptionen von Quantifikation und Prädikation*, dissertation, Humboldt-Universität zu Berlin, 2007.

Wessel school. Krampitz, Neuhaus and Scheffler are mentioned, as well as the book *daß-Termini. Intensionalität und Ersetzbarkeit* [*daß-Termini*: Intensionality and Substitutability] by Wessel and Wuttich.[26]

3.3. What Else Happened

The rigid system of academic appointments in the German Democratic Republic, which amounted to long-term planning of university chairs, made a "natural" spread of the conception through new professorships of its members at other universities almost impossible. There was no call for open chairs at universities, that is, for professorship vacancies. Thus, the group remained concentrated in Berlin.[27]

The end of the Cold War in East Germany, which manifested itself in 1990 with the accession of the German Democratic Republic to the Federal Republic of Germany, brought with it the largest wave of layoffs in German university history. In many cases, the dismissals became a de facto professional ban for those affected. It was above all a political decision to orient the humanities education at the universities of the unified Germany in the way that was customary in the West. But we do not think that was the only reason. A tenured professorship at a German university is the lifelong dream of countless poor devils who have to eke out a living in temporary positions after their habilitation. With a pinch of sarcasm, one could say that the newly gained chairs in the East were too precious to be left to the previous, outlandish chairholders.

A few years later, a handful of the colleagues listed above were still doing science, including only three who continued to do logic:

- Horst Wessel (1936–2019), Professor of Logic, Humboldt University of Berlin, retired 2001;
- Evelyn Dölling, Professor of Semiotics, Technical University of Berlin, retired 2015;
- Johannes Dölling, Lecturer, Institute of Linguistics, Leipzig University, retired 2014;
- Peter Keller, worked as a journalist until 2014;

[26] H. Wessel, K. Wuttich, *daß-Termini. Intensionalität und Ersetzbarkeit*, Logos Verlag, Berlin 2003.

[27] By the way: Humboldt University was the country's best university and Berlin was by far the most attractive city in East Germany. All university posts in the German Democratic Republic were open-ended anyway, so nobody was particularly interested in leaving Berlin for other appointments.

- Klaus Wuttich, management of German–US student exchange;
- Karl-Heinz Krampitz, owner of a cybercafe;
- Uwe Scheffler, Reader in Logic, Technical University of Dresden;
- Dr. Fabian Neuhaus, Lecturer at Theoretical Computer Science, University of Magdeburg;
- Dr. Mireille Staschok, hicking guide;
- Dr. Sebastian Köhler, Lecturer, HMKW, Berlin;
- Bente Christiansen, school teacher;
- Lars Mecklenburg, programmer;
- Henning Franzen, school teacher;
- Marco Winkler, projects at University of Magdeburg;
- Ralf Dombrowski, unknown;
- Andreas Dahlke, developer;
- Maik Zühlke, manager;
- Sebastian Gerhard, freelancer.

3.4. The End

Wessel himself reflects upon the situation with his peculiar sense of humour in one of his books:

> With the end of the GDR, the work of this department also ended. The strong united Germany that I had also striven for could not afford so many logicians. Nevertheless, I was justifiably proud of the fact that by leaving the professorship of the Institute of Philosophy I had made a real contribution to the inner unity of our fatherland and to the implementation of the leading culture. Now one could no longer distinguish between Ossis and Wessis among the professors of the Institute. The last relic of the defunct GDR had disappeared.[28]

Be that as it may, the Berlin research group on complex logic dissolved within a short period of time, as did many other groups in universities and research institutions in the period's disruptive environment. Change was too fast and too radical. Internal resilience was not enough to adapt to entirely new circumstances. The group had no future. And yet it had had many of the prerequisites to sustain under more favourable conditions. A charismatic leader, a strong sense

[28] H. Wessel, *Antiirrationalismus. Logisch-Philosophische Aufsätze*, Logos Verlag, Berlin 2003, p. v (own translation).

of togetherness resulting from a joint mission, a clear vision of complex logic advocated in a recognizable manner. They had a creed, a confession of logical faith: two and a half meme to spread, ready for replication. So we belief they would have had a chance to become a scientific school.

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