

**Between Science and Politics: Axolotl Research at Jena University, Germany
During the Lysenko Era (1950s -1960s)**
Uwe Hoßfeld & Lennart Olsson

Department of the History of Medicine, Science and Technology,
Ernst Haeckel House (U.H.) and
Department of Systematic Zoology and Evolutionary Biology (L.O.)
Friedrich Schiller University Jena, Germany
e-mail: b7houw@nds.rz.uni-jena.de & olsson@pan.zoo.uni-jena.de

One of us (Lennart Olsson) is a Swedish developmental biologist who works on cell migration, pattern formation and cell fate using, among other amphibians, the Mexican axolotl as an experimental animal. Uwe Hoßfeld is a historian of biology whose area of expertise is 20th century biology, in particular evolutionary biology. Together we have become fascinated by the history of axolotl research at the university where we now both work - the Friedrich Schiller University in Jena, in the eastern part of Germany, the former German Democratic Republic (GDR). As we describe below, axolotl research was drawn into the debate about how evolution works here in Jena in the 1950s and 1960s. The camps were on the one hand the neo-darwinists who were fascinated by the rapid developments that had recently taken place in evolutionary biology in several countries resulting in the “Synthetic Theory of Evolution” (STE). On the other hand, developments in the Soviet Union had promoted Trofim Lysenko’s ideas, with their Lamarckian view of evolution, to the status of official dogma, and many prominent geneticists and evolutionary biologists lost their jobs and in some cases even their lives under Stalin’s rule.

The beginning of axolotl research in Jena was when Julius Schaxel, a student of Ernst Haeckel (Zoology professor in Jena at this time), became interested in developmental biology. Schaxel started to work on problems such as limb regeneration and parabiosis using axolotls. Schaxel established a breeding group of axolotls in Jena during the 1920s in the era of the Weimar republic. Schaxel was a well respected scientist in his time, but his social democrat and later communist political views were going to get him into trouble after the National Socialist Party came to power in the state of Thuringia (where Jena is situated) in the early 1930s (Hopwood, 1997). Schaxel emigrated, first to Switzerland and later in 1933 to Moscow, where he was offered a position at the famous Severtsov Institute of Evolutionary Morphology at the Academy of Sciences of the Soviet Union. Schaxel continued his axolotl research in Moscow, but the axolotl colony in Jena disappeared and no axolotl research was performed under the National Socialist regime (1933-1945). However, one of Schaxel’s students, Georg Schneider, had joined Schaxel in

Moscow and worked with him on axolotl development. Schneider was also a communist, so after the end of World War II, he could return to Jena, which had become part of communist-ruled GDR.

A Lysenko protagonist

Schaxel had worked in the Ernst Haeckel House (EHH), the former villa of Haeckel which had been incorporated into the University. During the rule of the National Socialists, the zoomorphologist Victor Franz had been director of the EHH. Franz was an ardent Nazi, and was dismissed from his position after the war. A new director was sought, and after a short time under the leadership of the zoologist Jürgen W. Harms, Georg Schneider became first temporary (from January 1, 1947) and later permanent director of the EHH. Schneider (Fig. 1) belonged to the group of returning emigrants around Walter Ulbricht (who became a leading politician in the GDR) and held leading positions in the local Thuringian part of the German communist party from July 1945 until April 1946. Already in October 1945, six days before the official re-opening of the Friedrich Schiller University, Schneider got his Ph. D. with a thesis on “The role of the nervous system in the regeneration of the limbs in the axolotl”. The thesis is not to be found anymore. Later (in 1947) Schneider tried to get the “Habilitation”, a title normally required for being qualified to apply for professorships in Germany (also today). This involves producing a new thesis which is then evaluated by several reviewers. Schneider’s Habilitation thesis



Fig.1 Portrait of Professor. Georg Schneider. Archive of the Ernst Haeckel House. Jena

got mixed, partly very negative reviews, and he withdrew his proposal. Partly because of the lack of a Habilitation, it was not until 1951 that Schneider was made a tenured professor of “theoretical biology” in Jena.

Outside of the University setting Schneider often gave lectures about “Creative Darwinism” (schöpferischer Darwinismus), the term often used for their teachings by Lysenko’s followers, to members of organizations such as the Society for German-Soviet Friendship etc. Thereby he was very active in promoting Lysenko’s ideas and their use in agricultural practice (Fig. 2). When the Lysenko doctrine lost

its immediate power after Stalin's death, and the scientific debate had been won by the proponents of the synthetic theory of evolution also in the GDR, there was no interest anymore in Schneider's agricultural suggestions. In 1959 his career took a new turn when he got a position as a diplomat in charge of cultural affairs at the Embassy of the GDR in Moscow. Upon returning to Jena in 1962 Schneider taught theoretical biology again until his death in a car accident in 1970, but did no further axolotl research.

The synthetic theory of evolution, axolotl research and Lysenkoism Schneider took advantage of his position as

argumentation: "The essence of the teachings of Michurin and Lysenko is that their theories and methods are no dogmas, no stiff system, but quite the opposite. They promote further developments [...] They represent the most advanced in today's biology [...] Also the teachings of Michurin and Lysenko are the further development of the natural science aspect of Marxism [...] Therefore let us boldly apply the theories and methods of Michurin and Lysenko!" (Schneider 1951, pp. 113-4). As the heroes of his evolutionary biology he postulated Lysenko, Lamarck, Darwin, Haeckel, Timiriazev und Michurin.

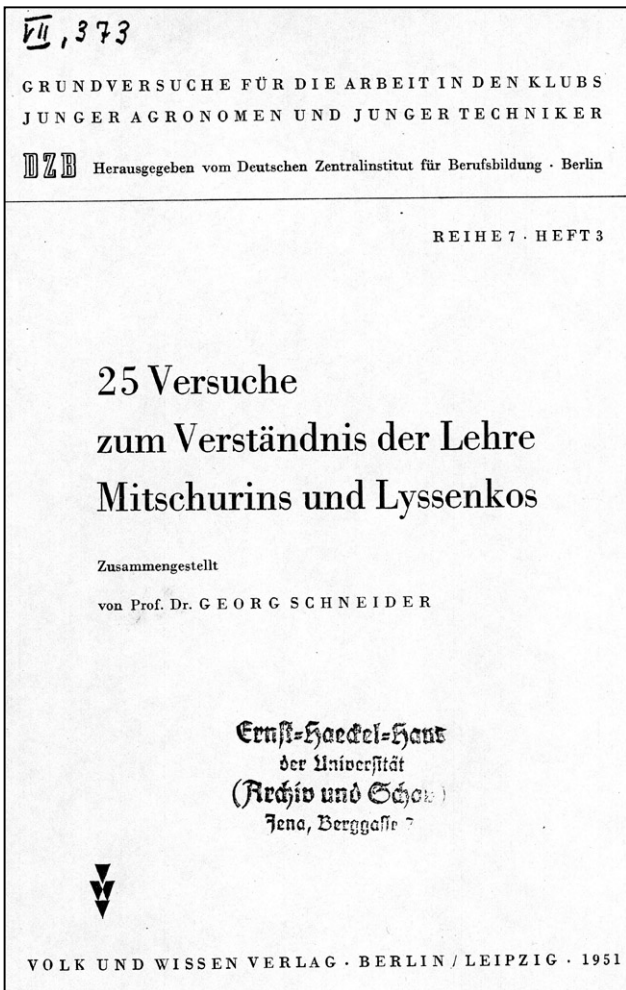


Fig. 2 Cover of one of Georg Schneider's publications. "A collection of 25 Experiments towards an understanding of the teachings of Michurin and Lysenko".

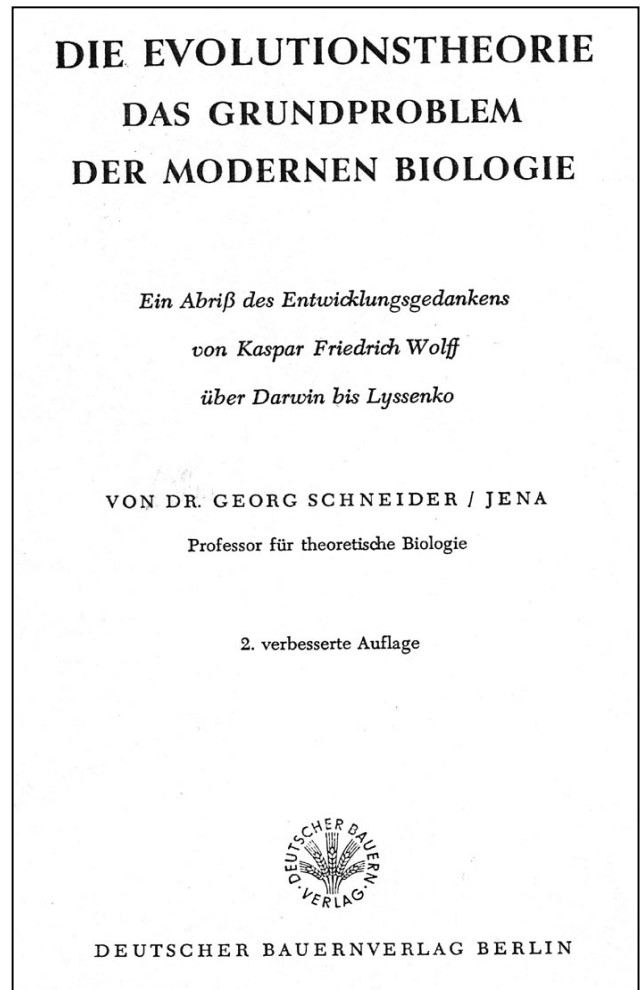


Fig. 3 Cover page of Schneider's book "The Theory of Evolution, the Fundamental Problem of Modern Biology. An outline of evolutionary thinking from Caspar Friedrich Wolff over Darwin to Lysenko".

Professor of theoretical biology and promoted Lysenko's teachings. He also gave a colloquium on "The history of evolutionary biology in Russia". During 1951-52 Schneider lectured on "Descendence Theory and Creative Darwinism" and "Modern Problems in Biology", and gave seminars in the agricultural school on "Agrobiologie". Schneider's book "The Theory of Evolution, the Fundamental Problem of Modern Biology" (Fig. 3), published in 1950 by the publishing house of the farmer's association (Bauernverlag), is an example of his dogmatic Lysenkoism as well as his level of

In his scientific work, Schneider tried to connect back to the developmental research of his teacher Schaxel by doing experiments on ontogenetic determination in axolotls (Schaxel & Schneider 1939; Schneider 1940). He first used two rooms in the EHH for these experiments, and could later build up a larger "Laboratory for Experimental Biology" in one of the buildings in the Physics department (Schneider 1947, 1948). The laboratory investigations in axolotls used the "Pfpfung" method (Figs. 4-5). Whole organs or organ parts were put into contact with an animal of the same or a

different species. Schneider used white and dark axolotls. Upon reading Schneiders papers, we are struck by the fact that it is very difficult for Schneider to connect his experimental results directly to Lysenko's ideas. It is only in his lectures that he tries to interpret results from his axolotl research as support for Lysenkoism. Apparently, he tried to transfer characteristics from one animal to the other in the parabiotic twins, and maybe he thought that the transferred characters would become inherited. This is very difficult to tell from the written sources. His pure Lysenkoism-arguments can only be found in his theoretical papers about evolutionary biology etc., not in his axolotl publications.

A book for burning?

An important milestone in establishing the STE in the Soviet Union was the book Faktery Evolucii (Factors of Evolution) published in 1946 by Ivan Ivanovitsch Schmalhausen (or Shmalgauzen). Interestingly, Schneider had made a translation into German of this book (in collaboration with the botanist Otto Schwarz) already in 1946, long before

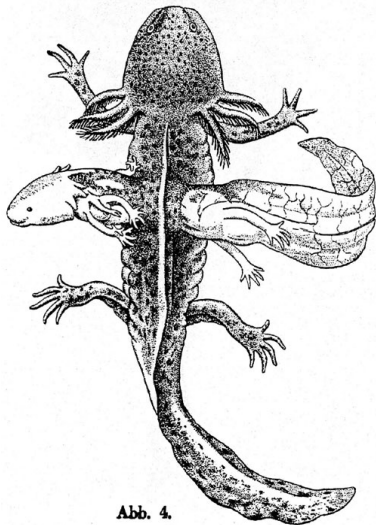


Abb. 4.

Fig. 4. Example of an experiment using the Propfung technique. A small white axolotl has been put under the dorsal fin of a black axolotl. In the original figure caption, Schneider writes „...shows clearly, that [...] the skin of the black axolotl has grown over, and been overgrown by, the skin of the white axolotl [...] In addition, it can be clearly seen that this animal developed rather normally on the back of the other animal. It did not eat anything itself, but received all its nutrients from the Hypobiont (the host animal). [...] This animal lived for more than 2.5 years.” (Schneider, 1947).

Theodosius Dobzhansky published an English translation in 1949. The title was Die Evolutionsfaktoren: Eine Theorie der stabilisierenden Auslese, and the manuscript had 547 pages. Interestingly, this manuscript was never printed. Instead Schneider performed a ritualistic burning of it in the courtyard of the EHH in the winter semester of 1949-50. The reason was that Schneider had come to realise that Schmalhausen was “an incorrigible enemy of the progressive teachings of Lysenko”, a “formal geneticist” whom he denounced (Wessel 2001). However, whatever was burnt was not the real manuscript,

which Schneider brought with him to Moscow in 1959 when starting his job at the Embassy of the DDR (Höxtermann, 2000). He later must have brought it back to the EHH, where one of us (Uwe Hoßfeld) recently found it in the library. Thus, Schneider was apparently influenced and impressed by ideas that became part of the STE during his stay in Moscow, but later changed sides and became a Lysenkoist.

Epilogue

Rudolf Hagemann, a geneticist at the University in Halle, pointed out in 1985 that it is a fortunate peculiarity of the historical development of the GDR that the ideas of Lysenko never got much hold and did not make much damage there. This is all the more remarkable as a lot of school textbooks in the 1950s were full of Lysenko's ideas, and it was almost impossible to give lectures on genetics at the universities. Schneider's book from 1950 served as a

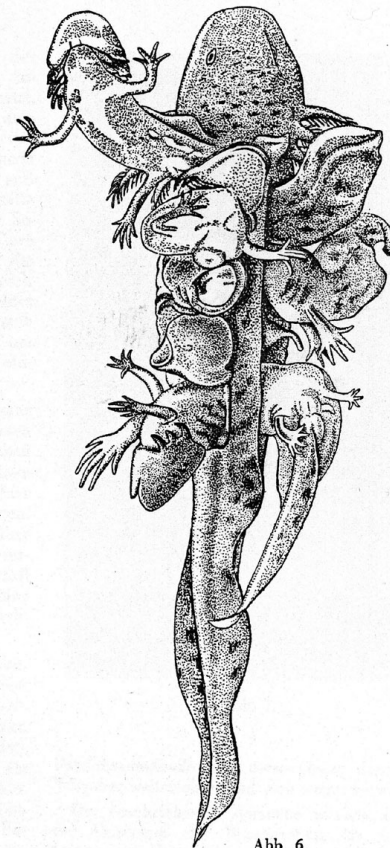


Abb. 6.

Fig. 5. Another Propfung experiment in which five animals were planted on the back and the Hypobiont, the host animal, has nevertheless given nutrition to all of them. Some animals are better, some worse developed, but every single animal has moved independently after its own nervous system. [...] The nervous system of each animal is independent of the others. (Schneider, 1947).

school textbook for many years, and Siemens (1997) has shown that an increasing number of articles about Michurin were published in the journal *Biologie in der Schule (Biology in School)* from 1952 and onwards. Teachers were also given a directive from the Ministry of Education to teach at least

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seven hours of "Michurin-biology" (Siemens, 1997). At the same time, genetics research was performed at the research institutes run by the Academies of Sciences (above all in Gartersleben) and Agriculture (above all in Quedlinburg) (Hagemann, 1985). Schneider's axolotl work apparently had no impact.

In Germany, the credit for falsifying the views of Lysenko goes largely to the geneticist Hans Stubbe and his co-workers. They could show that Lysenko and his followers often worked with contaminated material, used uncritical, lax and careless experimental procedures, and misused the terminology of dialectic-historical materialism. Conscious manipulation of experimental results to bring them into line

with expected results were also common as well as discrimination of scientific enemies etc. It is the privilege of current and future generations of scientists to throw light on this dark and disgraceful chapter in the history of science. The conditions are very good, now that the ideological and political aversions have disappeared. A chance which should be used well (Arosevskij 1994, Kolchinsky 1999, Höxtermann 2000, Hoßfeld & Brömer 2001)!

Axolotl research in Jena ended when Schneider became a diplomat in 1959, but is now returning again with the work of Lennart Olsson's research group on axolotl head development. We hope to soon establish a small axolotl colony in Jena once again.

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