MENDEL AND THE UNIVERSITY OF JENA. EVOLUTION WITH/WITHOUT GENETICS[1]

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SOME PERSONAL WORDS INSTEAD OF AN INTRODUCTION

My first contact with Mendel and his research was when I was a schoolboy at the Polytechnical Highschool and later at the advanced highschool during the lessons in biology education.

Later as a student, I bought my first three Mendel-books (SAJNER 1973, FROLOW & PASTUŠNY 1981, LÖTHER 1989) in a book shop in Jena. I have been doing research for more than a decade as student and PhD student at the Ernst Haeckel House, where for many years a catalog from a previous Mendel Exhibition was available for visitors to buy.

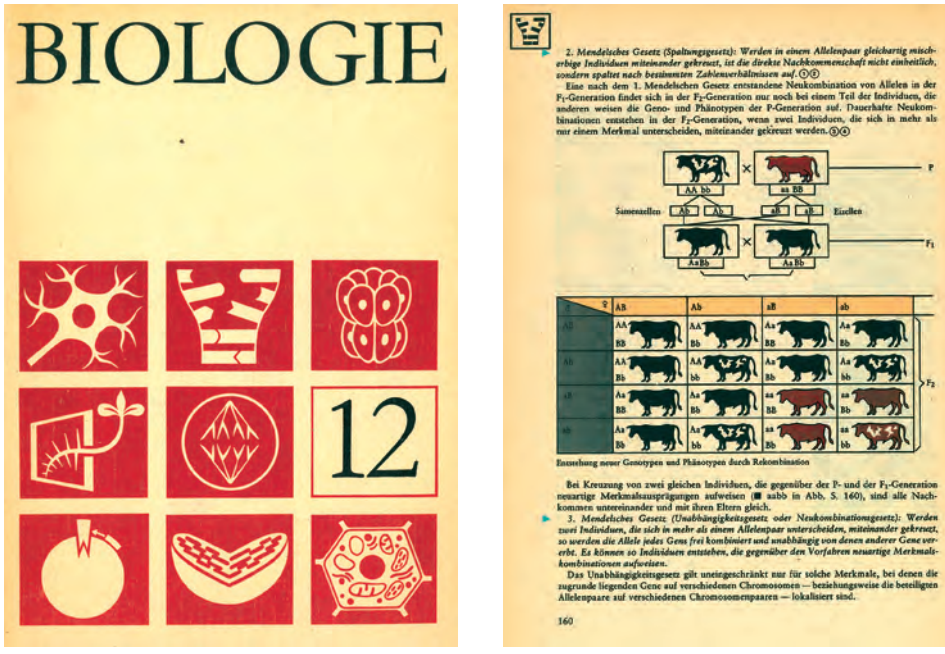

Fig. 1: Title page and p. 160, 1983.

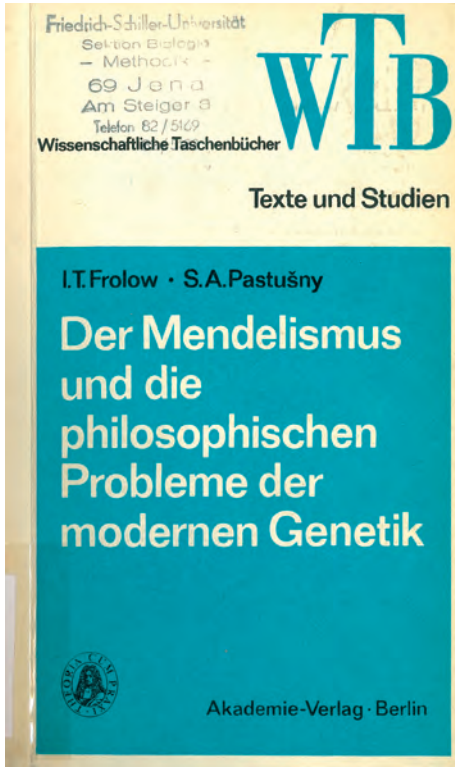

Fig. 2: Title Page, 1981.

Fig. 3: Catalogue to the Exhibition „G. Mendel's Discovery and the Development of Agricultural and Natural Scienes in Moravia"; edited by Dr. R. Musil, Moravian Museum.

Fig. 4: 25 years German-Czech Friendship

I also like to remember having discussed several times Georg Uschmann's (a former director of the Haeckel-house) important article on Mendel and Haeckel in my student seminars at Jena university (Uschmann 1971).

I have been cooperating with the Czech Academy of Sciences, the Charles University in Prague and the Mendelianum in Brno for three decades now. This collaboration resulted in many notable publications such as edited volumes, articles, and monographs.

A crucial contribution to the international Mendel research will be our upcoming volume on Mendels biography and experiments, published together with Michael Mielewczik, Ettenhausen (Switzerland) and Michal Simunek, Prague (Czech Republic). In addition, we are also constantly publishing in the traditional journal of the Moravian Museum "Folia Mendeliana".

This paper, based on my lecture, 21 July 2022, is divided into four small sections. First, after a short introduction on Jena University, the paper gives some information on Haeckel's biology without Mendel. Second, there will be some remarks on Ludwig Plates (Haeckel's follower) influence on Mendelism, and third, some reflections on Lysenkoism and Education in relation to Jena university.

KEYNOTE ON JENA UNIVERSITY

Among the older German universities established before 1800, the University of Jena belongs to the middle generation between the late middle ages and those founded under the banner of the Enlightenment of the 17th/18th centuries. It came from the early modern period of Humanism, the Reformation, the split into denominations. Territorial states now depended on the system of state churches, with their rapidly growing demand for academically trained civil servants, theologians, and lawyers. There was a close connection between theological and legal thought, as well as a general explosion in education through printed books and publishing. After Marburg (1527) and Königsberg (1544), the University of Jena, which originated in 1548 as the High School of the small state Saxony-Weimar and received the Imperial University privilege in 1558, is considered a classical Reformation university.

Seen structurally, the University of Jena originated and developed as a university molded and supported by a small city in Sachsen-Weimar and its four subsequent successor states (last in 1918). This small and multiple-state affiliation had advantages and disadvantages for the University of Jena: on one hand a permanent financial need, on the other hand considerable academic freedom, a policy of appointing controversial scholars taboo at other places like Schiller, Fichte, or Hegel etc.

A new phase in the structural development of the University of Jena began in conjunction with the development of Big Business in Jena in the 1870s and continued until the 1890s. The Carl-Zeiss Foundation, created by the Zeiss and Schott-Works and the industrial physicist Ernst Abbe in 1889/96, brought considerable resources to the financially-strapped university. In this climate of modernization, a connective nexus developed between industry and the university, which was able to foster a specific work culture, to attract new important publishers (Gustav Fischer, Eugen Diederichs), and justifiable gave Jena the reputation of an avant-garde cultural and artistic city in the provinces. The structural transformation quickly increased the number of inhabitants and students. At the university, this transformation yielded a considerable expansion of subjects and process of differentiation, especially in the medical and mathematical-scientific fields; the first courses were offered in new economic and social studies disciplines. Jena was thereby belatedly following the general trend in academia, but also set off down new paths. Thus, for example, an associate professorship (Extraordinariat) for Ear Medicine (Eugen Weber-Liel) was established in 1884, an Institute for Psychiatry (1891 Otto Binswanger), and an Institute for Pediatric Medicine (1917 Jussuf Ibrahim) in the Medical Faculty; Institutes of Technical Physics and Applied Mathematics (1902 Rudolf Ran), for Mathematics (1879 Johannes Thomar, 1898 August Gutzmer) as well as the associate professorships for Scientific Microscopy (1899 Hermann Ambrom) and

Fig. 5: Main Building (Press Office, Universität Jena).

Theoretical Physics (1889 Felix Auerbach) in the steadily expanding Physics Faculty. In 1865 Zoology received a full professorship (Ordinariat) through Ernst Haeckel, astronomy an associate professorship (Otto Knopf) in 1897, etc. All of these processes still took place within the structural bounds of the University of Jena, supported by a small state with the Weimar Grand Duke as nominal rector. The structural consequences first became clear after the "fundamental catastrophe" of the century, the first world war, the revolution which ended the Monarchy, the creation of the Weimar Republic, and the establishment of the new state government in 1920.

After dark periods during the nazi and the socialist regime (GDR), now with around 18,5000 students presently at the Friedrich Schiller University Jena belongs to the midsized universities in the Federal German Republic. As an educational institution it embodies the traditional Thuringia State University. The small federal state of Thuringia today also finances the Bauhaus-University Weimar, the Technical University Ilmenau, and the University of Erfurt currently under (re)construction. Between 1945 and 1990 this region belonged to the eastern part of the four zones of Germany or to the German Democratic Republic (GDR). Like the other GDR universities, after the collapse of this small German state in the course of 1990 the University of Jena was a part of the painful process of transformation into the Federal German University system. Since then, the University has been the centerpiece of the still barely 100,000 inhabitant-strong regional capital Jena. Jena belonged to the older and best known German universities and enjoyed an international reputation as a center for classical German philosophy with a close connection to Weimar. Here stood the cradle of the student fraternities with their initial ambitions for freedom and democracy. The University of Jena carried the name of Friedrich Schiller, who functioned here as a history professor, and owed its classical heyday not least of all to the official efforts of Goethe. Thus, its history was bound up with precisely these names which in 1945 stood for the other better Germany of poets and thinkers. Thus, the "Myth of Jena" inclined Soviet occupation officers to open precisely

this university within its occupation zone as quickly as possible (Hoßfeld et al. 2003a, 2003b, 2007; Senatskommission 2009).

ERNST HAECKEL – EVOLUTION AND NON-MENDELISM

The German biologist, philosopher and artist Ernst Haeckel was Charles Darwin's younger contemporary and a key figure of the "First Darwinian revolution". In his time more people learned evolutionary theory from his publications than from any other sources, including Darwin's very own writings. He defended and developed the Darwinian theory with the passion and energy like no one else did. Contemporary biology and related sciences is unthinkable without concepts coined by Haeckel such as "phylogeny", "monophyletic", "polyphyletic", "ontogeny", "biogenetic law", "ecology" or "phylogenetic trees". His experimental work on the systematics of Radiolaria resulted in his Habilitation in 1861. Since that time and through his whole life Haeckel became known as one of the most influential champions of evolutionism worldwide, also with his *General Morphology* (1866). He visited Darwin three times and we have now also some letters of both in the archive (Hoßfeld 2010; Hoßfeld et al. 2019, Hoßfeld & Levit 2020).

In 1865 Haeckel earned his second doctorate in zoology (Dr. phil.) and was appointed to the (first) Chair of Zoology at the University of Jena. This position he held until becoming an emeritus on April 1st, 1909. In the course of almost 50 years in office at his Alma Mater, Haeckel made Jena to a stronghold of Darwinism. As well as his British counterparts Darwin and Alfred Russel Wallace, Haeckel gained much field experience in various geographical regions. He travelled a lot (over 90 journeys), also to tropical regions (in 1881 Ceylon; 1900 Java and Sumatra), where he not only explored nature, but also

Fig. 6: Students life in the GDR (University Archive Jena, Picture collection).

Fig. 7: Ernst Haeckel, 1918 (photo collection U. H.).

demonstrated his outranging artistic skills. Haeckel discovered over 4000 new marine species, hold four Dr. h.c. degrees and was member of over 70 societies and academies (Leopoldina, Royal Society of Edinburgh etc.). In 1900 the Royal Society awarded him the Darwin-Medal, and 1908 the biologist received the Linnean Society of London's prestigious "Darwin-Wallace Medal". He published approximately 700 journal and newspaper articles, and 18 major books. The specificity of Haeckel's approach to Darwinism was in his aspiration to make it into a universal worldview opposing major religious doctrines. He tried to harmonically combine science, philosophy (monism) and art as mutually strengthening instruments (Hoßfeld et al. 2019, Levit & Hoßfeld 2019).

I contrast Mendel's work was completely unknown to Haeckel and ignored by him. His own scientific work on marine invertebrates was mainly concerned with morphological and taxonomic questions, with experiments playing a little role. Haeckel's theoretical opinions – published parallel to Mendel's work in 1866 – regarding the theory of evolution are largely based on findings from extant organisms and are often speculative in character. Here he resembles Lamarck. The botanist Wilhelm Olbers Focke later pointed out to Haeckel the need to introduce new research methods. Haeckel was first referred to Mendel

Fig. 8: Hugo Iltis to Ernst Haeckel, 13.08.1919, front and back side (Haeckel correspondence, EHH Jena).

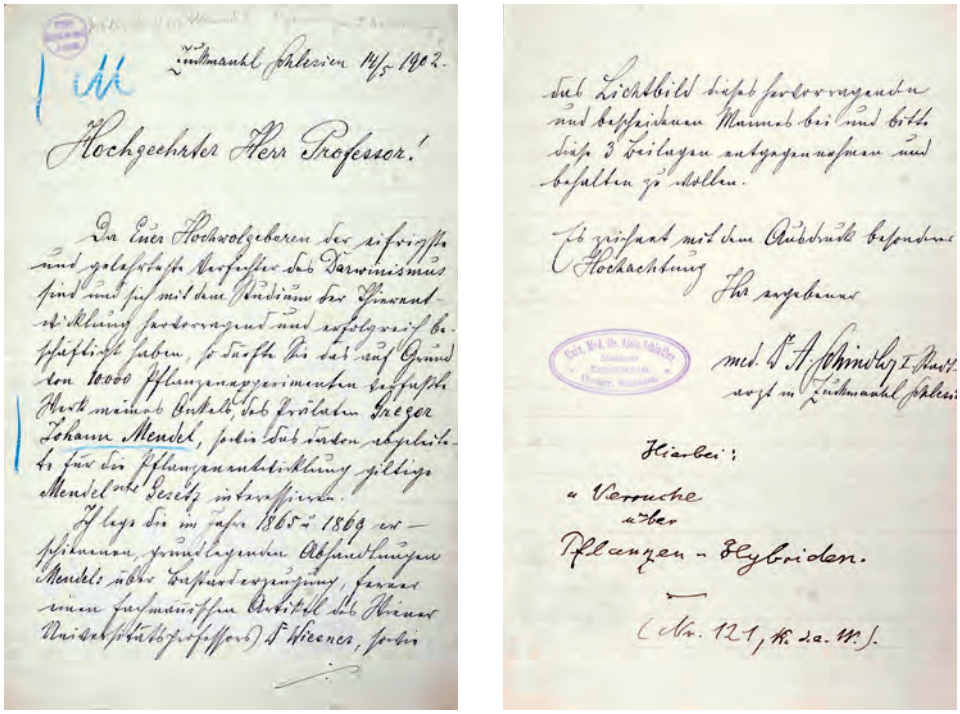

Fig. 9: Dr. Alois Schindler, Mendels nephew to Ernst Haeckel, 14.05.1902 (Haeckel correspondence, EHH Jena).

by Alois Schindler, Mendel's nephew, in a letter dated May 14, 1902. Schindler enclosed some of Mendel's works with his letter and hoped that Haeckel would be interested. Unfortunately, Haeckel did not grasp the importance of Mendel's work. At Tschermak's instigation, Haeckel signed the "Appeal for the erection of a monument to Gregor Mendel in Brünn in Moravia" in 1905, for which Iltis thanked him. After the inauguration of the memorial, Haeckel received from Iltis the report on the celebration (1911) with a small poem he had written himself, "To Ernst Haeckel": "... Your monument stands in millions of hearts, it come, you will one day have died, the monuments themselves will also be made of stone..." (Uschmann 1971, Sohn 1996).[2]

Finally it can be said that Haeckel did not recognize Mendel's real importance. With regard to genetics, even after 1900, he basically did not go beyond the ideas in the *General Morphology* of 1866. There are also numerous letters from Hugo de Vries, one of the rediscoverer in the whole Haeckel correspondence.

LUDWIG PLATE – EVOLUTION AD MENDELISM

The zoologist and geneticist Ludwig Hermann Plate, pupil and successor of Ernst Haeckel at Jena University, is one of the most important figures in the 'pre-synthetic' period (first third of the 20th century) of continental European evolutionary biology. Plate campaigned for a revival of the "original Darwinism" combining selectionism with neo-Lamarckian ideas, and was seen by many contemporaries worldwide as a proper advocate of Darwinism. Thus, a prominent Russian biologist, geographer and anti-Darwinist Leo

Fig. 10: Ludwig Plate (photo collection, U. H.).

S. Berg saw Plate as his main scientific opponent (Berg 1926). The American paleontologist Henry F. Osborn, who sought a compromise between selectionist and neo-Lamarckian methodologies, likewise honoured Plate with the title "prominent selectionist (Osborn 1926). Another contemporary of Plate, the Swedish anti-Darwinian historian of science Erik Nordenskiöld claimed that Plate's *Selektionsprinzip* (1913) contains "all that can be adduced in modern times in defence of the old Darwinism. And as its champion Plate has done a great service, thanks to his wealth of knowledge, his strong convictions, and his honesty" (Nordenskiöld 1928, p. 572). Nordenskiöld classified him as a middle-way Darwinian, who opposed the imperious dispositions of his master Haeckel and choose a course pursued by Darwin himself. Both, Plate's empirical as well as his theoretical works had an enormous impact during his life-time and are still cited in the morphological literature (Levit & Hoßfeld 2006).

Plate was seriously involved in genetic studies soon after the rediscovery of Mendel's laws. These studies resulted in Plate's own theory of heredity, the final version of which he expressed in some of his latest papers and finally summarized in the three volumes of his *Vererbungslehre* (Genetics), comprising more than 3000 pages (Plate 1932–38).

His "Classification of Genetics" was divided into two parts (Plate 1932: 9–10):

A. General Genetics (Allgemeine Genetik)

1. Progenetics (Progenetik)
2. Cytogenetics (Zytogenetik)
3. Mendelism or crossing analyses (Mendelismus oder Kreuzungsanalyse)
4. Theoretical Genetics (Theoretische Genetik)
5. Phenogenetics (Phänogenetik)

Fig. 11: Pisum type of Mendelian inheritance (PLATE 1932, p. 201).

Pisumtypus (vollkommene Dominanz) der Mendelschen Vererbung.

A. Farben.

Art	dominant	rezessiv	Art	dominant	rezessiv
I. Tiere.					
Hausmaus, Haarfarbe	orangegelb	wildfarbig	*Anas boschas*	Wildfarbe	weiß
	wildfarbig	graugelb			
	»	silberbraun	*Helix nemoralis*,	rotbraun	gelb
	»	zimtgelb	Schale. Die 5	ungebändert	gebändert
	»	schwarz	Bänder = 1, 2,	Pigment in Bän-	Fehlen des Pig-
	zimtgelb	gelb	3, 4, 5. Fehlen	dern u. Schalenmündung	ments
	schwarz	blau	eines Bandes		
	»	silbern	= 0.	geringe Bänderzahl	hohe Bänderzahl
	»	braun			
	braun	weißgelb		z. B. 0 0 3 4 5	z. B. 1 2 3 4 5
	jede Farbe	weiß von bestimmter Zusammensetzung		0 0 3 0 0	0 0 3 4 5
				0 0 0 0 0	0 0 3 4 5
	einfarbig	gescheckt	*Bombyx mori*,	gestreift	ungestreift
Augenfarbe	schwarz	rot	Raupen	schwarz	weiß
Hund, Haarfarbe	schwarz	braun		gelber Kokon | europ. Rasse	weißer Kokon | jap. Rasse
	einfarbig	gescheckt	» weiß	weißer Kokon | europ. Rasse	gelber Kokon | jap. Rasse
Pferd	Schimmel (grey)	braun			
	»	fuchsfarben			
	bay = braun, Mähne schwarz | brown = dunkelbraun	fuchsfarben (chestnut)	II. Pflanzen.		
			Antirrhinum majus, Löwenmaul	Blüte rot	weiß
Meerschweinchen *Cavia cobaya*	Wildfarbe	jede andere Färbung, Scheckung, Albino	Viele andere Pflanzen	Blüte gefärbt	weiß
	schwarz	rot			
Columba livia,	blau	silbern (-weiß-blau)	Tomate, Frucht	rot	gelb
Gefiederfarbe	gescheckt	einfarbig	Erdbeere, »	rot	weiß
	gestrichelt	gescheckt			

B. Special and applied Genetics (Spezielle und angewandte Genetik)

6. Genetics of the main and best examined animals (Genetik der wichtigsten oder bestuntersuchten Tiere)
7. Genetics of the main and best examined plants (Genetik der wichtigsten oder bestuntersuchten Pflanzen)
8. Anthropogenetics (Anthropogenetik)
9. Eu-genetics (Eugenetik) not Eugenics
10. History and Literature of Genetics (Geschichte und Literatur der Genetik)

Plate distinguishes three kinds of inheritance rules (PLATE 1932: 178–184): 1. General and special inheritance (Generelle und spezielle Vererbung), 2. Plasmogenic and karyogenic inheritance (Plasmogene und karyogene Vererbung), and 3. Heredity with or without Mendelian analysis (Erblichkeit ohne oder mit mendelistischer Analyse) and in his argumentation were two kinds of genes: a. "Mendeling" genes on chromosomes (= genotype; = Mendelstock); b. Erbstock (hereditary stick), a package of genes determining body plans. It is situated in the cell nucleus but outside of chromosomes. He was also a Mendel biographer. In his *Vererbungslehre* he wrote four pages, § 18: Historical notes on Mendel and Mendelism (1932, p. 189–192) and added important literature to the history of genetics part.

In sum, Plate was one of the most influential evolutionary biologists of the first third of the 20th century. His evolutionary theory, which looks eclectic for the current reader, reveals a relatively transparent logical structure in the internalist perspective. *He was a Mendel and Mendelism Fan!* Plate thought he had proposed a concept combining all

valuable theoretical movements and new disciplines of the biology of his time. He developed a research program which he called "old-Darwinism" during more than thirty years of experimental and theoretical investigations. In Plate's view was the only evolutionary theory able to unite all fruitful theoretical approaches (Lamarckism, selectionism, orthogenesis) with the most important fields of experimental biology, such as genetics.

SOCIALISM, LYSENKOISM AND EDUCATION

After the end of the Second World War in 1945, German scientists hoped for a strict subdivision between science and ideology. They hoped for a new beginning without misanthropic political doctrines, but this hope was thwarted in the German Democratic Republic (GDR). Soon it became clear that the communists wanted to decide in which direction scientific research should go, just like the national socialists that had ruled before them. This was true especially for biology and philosophy. In the 1950s and 1960s, the attitude to the mode of thought encapsulated by Lysenkoism and to "the socialist achievements of the Soviet Union" was used as a measure of a scientist's political stance. In this period, some scientists from Jena University (like the zoologists Georg Schneider, Georg Uschmann, Jürgen W. Harms, and Manfred Gersch or the botanist Hans Wartenberg) played important roles – pro and contra – in the debate about the non-Darwinian theories of Lysenko and his circle (for example the philosopher Isaj Prezent and the medical doctor Olga B. Lepesinskaja).

The Ukrainian agronomist Trofim D. Lysenko became well known in the 1930s through his research on Jarowisation (the cold treatment of seed to stimulate germination), which made it possible to sow grain in the spring instead of the previous fall. This made it theoretically possible to use the cold northern parts of the Soviet Union for agriculture. Building upon this early success, Lysenko developed his anti-Mendelian theories over the next decades (Hagemann 2002, Kolchinsky et al. 2017).

THESES OF LYSENKOISM

1. Inheritance is an attribute of the whole organism, not of discrete hereditary factors. Genes do not exist.
2. There is no difference in principle between sexual and graft hybridization.
3. Changing the environment gives rise to new characters that are inherited ("inheritance of aquired characters"). The type of the hereditary changes induced depends on the environmental influence.
4. Winter varieties of wheat, which normally require a period of cold treatment, can be changed into spring forms without any cold treatment as a consequence of the changed environment.
5. Classical genetics – dismissively called "Mendelism-Morganism-Weismannism" by Lysenkoists – is inconsistent with the philosophy of dialectical materialism (a cornerstone of Marxist theory).

His ideas were totally at odds with what was known about genetics at this time because of his proposal that acquired characters could be inherited. This notion first became known as "Michurin-biology" and later as "Creative Darwinism" (schöpferischer Darwinismus).

The influence of Lysenkoism at the universities was not uniform, and depended on the local situation. Of course, the Ministry of Higher Education of the GDR tried to provide supporters of Lysenko with greater influence. However, in general these efforts

Fig. 12: Title page, Schneider 1956/57.

WISSENSCHAFTLICHE ZEITSCHRIFT DER FRIEDRICH-SCHILLER-UNIVERSITÄT JENA · JAHRGANG 6 · 1956/57
MATHEMATISCH-NATURWISSENSCHAFTLICHE REIHE · HEFT 5/6
HERAUSGEBER: DER REKTOR

Aus dem Ernst-Haeckel-Haus, Institut für Geschichte der Zoologie, insbesondere der Entwicklungslehre, Direktor: Prof. Dr. Georg Schneider

Bemerkungen zur Mitschurin'schen Biologie

Von

GEORG SCHNEIDER

Zum Gedenken an den 40. Jahrestag der Großen Sozialistischen Oktoberrevolution

Im Verlaufe der 40 Jahre des Bestehens der großen Sowjetunion haben auch die sowjetischen Biologen an der theoretischen Entwicklung der Biologie lebhaft teilgenommen. Da die sowjetischen Biologen zum großen Teil auf dem Boden des Darwinismus standen und dessen schöpferische Seite besonders hervorgehoben werden sollte, war mit dem Ausdruck „schöpferischer Darwinismus" die sowjetische Biologie treffend gekennzeichnet.

Seit den dreißiger Jahren wurde durch die intensive Tätigkeit Lyssenkos die Arbeit und die Arbeitsweise Mitschurins in weitesten Kreisen bekannt.

Von den Vertretern des schöpferischen Darwinismus, insbesondere jedoch von Lyssenko und seiner Schule, wurden eine große Anzahl von Fehlern zugelassen. Es bestand dadurch die Gefahr, daß auch die positiven Elemente davon in Mitleidenschaft gezogen wurden.

Es ist daher notwendig, auf einige Fragen der Mitschurinschen Biologie einzugehen.

Mitschurin war einer der bedeutendsten sowjetischen Biologen. Seine Ansichten haben wesentlich zur Klärung vieler Probleme beigetragen. Es ist daher nicht verwunderlich, daß heute die moderne sowjetische Biologie seinen Namen trägt.

Die Mitschurinsche Biologie betrachtet ganz bewußt den dialektischen Materialismus als ihre philosophische Grundlage. Ich sage „bewußt", denn viele Naturwissenschaftler meinen von sich, und darauf wies Engels (5) im Jahre 1874 hin, sie kämen ohne jede Philosophie aus. Dabei werden sie stets, wenn auch unbewußt, von einer Philosophie, meist jedoch nicht der besten, beherrscht. Das konnte Engels schon im vorigen Jahrhundert auf Grund seiner Erfahrungen in Verbindung mit den Ergebnissen der damaligen Spezialwissenschaftler behaupten. Grundsätzlich gilt diese Aussage Engels leider auch noch für die heutige Zeit.

Der dialektische Materialismus, die Philosophie der Arbeiterklasse, zeichnet sich durch einen besonderen Zug aus, durch den er sich von allen anderen Philosophien grundsätzlich unterscheidet. Während fast alle bürgerlichen Philosophien die Welt nur zu erklären suchen, wies Marx (1845) darauf hin, daß es darauf ankommt, die Welt darüber hinaus zu verändern (21).

Die Vertreter der Mitschurinschen Biologie versuchten mit dem dialektischen Materialismus als philosophische Grundlage die Vorgänge der organischen Welt nicht nur zu erklären, sondern in sie einzugreifen. Entsprechend diesem Charakterzug ist die Mitschurinsche Biologie auf eine Veränderung der organischen Welt bedacht. Einem Biologen muß es daher stets darauf ankommen, seine Objekte, besonders wenn es sich um Formen handelt, die dem Menschen nützlich sein können, bewußt in einer Richtung zu verändern, die dem Menschen Nutzen bringt.

So ist die Mitschurinsche Biologie von vornherein auf die Praxis ausgerichtet und mit ihr mehr oder weniger verbunden. Die moderne Züchtung kommt heute ohne Anwendung der Mitschurinschen Prinzipien kaum noch aus. Die aktive Handlung, das bewußte Eingreifen, um Veränderungen hervorzurufen, ist der charakteristische Hauptzug der Mitschurinschen Biologie. Darin unterscheidet sie sich hauptsächlich von allen idealistischen biologischen Lehren. Hierin liegt die große politische Bedeutung der dialektisch materialistischen Biologie, eben der Mitschurinschen Biologie, besonders für die Erziehung unserer Jugend.

Junge Menschen, die durch die Mitschurinsche Biologie erzogen werden, lernen mit der Kenntnis der Tatsache und Gesetzmäßigkeit der organischen Welt gleichzeitig aktiv zu handeln; sie werden ermuntert, die Welt nicht als gegeben hinzunehmen, sondern in sie einzugreifen, sie zu verändern. Die Menschen erhalten die Gewißheit der Variabilität und die Kenntnis der Möglichkeit, Veränderungen herbeizuführen. Gerade diese Seite der Mitschurinschen Biologie ist für unsere Zeit von besonderer Bedeutung. Für den Aufbau des Sozialismus benötigen wir Menschen, die es verstehen, bewußt zu handeln, die den Willen haben, Altes zu verändern, die ständig ihre Welt umbauen. Der Sozialismus braucht aktive, bewußte Menschen.

Eine Naturbetrachtung jedoch, die versucht, die Welt idealistisch zu erklären, erzieht die Menschen schließlich zur Passivität. Das Bestehende könne ja doch nicht verändert werden. Die Dinge seien nun einmal so gegeben, es sei letztlich Schicksal, man müsse sich darein finden.

Es ist ein Ziel der Imperialisten, Menschen zu entwickeln, die sich mit dem Gegebenen abfinden, es als unabänderlich ansehen, sich selbst als machtlos betrachten. So steht besonders heute jeder Wissenschaftler und Lehrer vor der Entscheidung, ob er sich der Welt gegenüber aktiv oder passiv verhalten will, und wie er junge Menschen zu erziehen gedenkt.

were met with limited success. The German Lysenkoists – when they were party members – often got directions from the party to support Lysenkoism ("Parteiauftrag"). Some did this by conviction, because they believed in the old Lamarckian-Darwinian idea of inheritance of acquired characters. Others had been in opposition to the Nazi racist ideology and expected Lysenkoism to provide new ideas in genetics. And others were just opportunists who wanted to further their careers. At many universities, lectures on genetics were discontinued for several years and replaced by lectures on "Creative Darwinism". In the GDR, we had four important centres for Lysenkoism: (the animal physiologist Jacob Segal, the zoologist Rudolph Gottschalk), and later (with the botanist Werner Rothmaler), (with the zoologist Clemens Fritz Werner) and (with the zoologist and teacher Georg Schneider and the botanist Otto Schwarz).

However, Lysenkoism became influential at Jena University, because there the Marxist and Lysenkoist Georg Schneider became director of the Ernst Haeckel House (EHH) and professor of theoretical biology in 1947, back from exile in the Soviet Union. Schneider was

a member of the group of returning emigrants that included Walter Ulbricht (who became a leading politician in the GDR). He used his position as director of the EHH and Professor of theoretical biology to promote Lysenko's teachings, as "Creative Darwinism". He acted as a propagandist for a progressive antifascist Soviet biology, which was important to defend against a supposedly reactionary bourgeoise genetics with its racist tendencies. Schneider therefore gave lecture series on "Michurin" and on "Creative Darwinism" from 1950 onwards and held colloquia on related topics. "The Theory of Evolution, the Fundamental Problem of Modern Biology" published in 1950 is an example of his dogmatic Lysenkoism, as well as his level of 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!" (Hoßfeld 2007).

Fig. 13: *Example of an experiment using the „Pfropfung" 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 axolot 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 Hypoboint (the host animal). [...] This animal lived for more than 2.5 years" (Schneider 1947, p. 43).

In his scientific work, Schneider tried to continue the developmental research of his teacher Schaxel on ontogenetic determination in Mexican axolotls. For his experiments, which were aimed at changing hereditary characters through environmental influences, he first used two rooms in the EHH, and later built up a larger "Laboratory for Experimental Biology" in one of the buildings in the Physics department. The laboratory investigations in axolotls used the "Pfropfung" method. Whole organs or organ parts were put into contact with an animal of the same or a different species.

On G. Schneider we can summarize that he gained no scientific recognition. His work in evolutionary biology had no influence on the further development of biology in the GDR (Hoßfeld & Olsson 2002).

At the same time there was also a controversy between 1955 to 1957 in the "Wissenschaftliche Zeitschrift der Friedrich-Schiller-Universität". First the botanist and

Fig. 14: Textbook for biology lessons in the 12th grade, 1957, GDR.

Fig. 15: Title page – *Mirabilis jalapa*, 1988, GDR.

Lyssenko opponent Hans Wartenberg opened the discussion with his article (1955/56), then the Lysenkoist Georg Schneider followed with his support for the Lysenko ideas (1956/57). Finally, the solid essay by Ilse Jahn, the historian of biology on the rediscovery of Mendel's rules was published (1957/58). Jahn became known worldwide in particular for her immense history of biology, also through her numerous early works on Mendel.

Also in the German Democratic Republic (GDR), classical genetics found its way into biology classes in the mid-1960s by overcoming the "creative Darwinism" of Lysenko. Since that time, Mendelian genetics have been constantly present in the school curricula, in textbooks, slides etc. (Porges et al. 2016, 2021).

CONCLUSION

Finally, on the topic "Mendel and the University of Jena. Evolution with/without Genetics" five theses can be summarized:

1. The "German Darwin" Ernst Haeckel largely negated Mendel and was not open to genetics.
2. Jena University has had various points of contact with Mendel and Mendelism over the past 150 years.
3. Haeckel's successor Ludwig Plate was one of the greatest Mendelism experts of his time.
4. During the periods of National Socialism and Socialism the reception of Mendel went up and down again, often under political guidelines.
5. Mendel has been an integral part of school curricula in Germany for more than 80 years.

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REFERENCES

1 In December 2021 I was informed that the Mendelianum Committee has recommended my person for the Gregor Mendel Memorial Medal 2022. This nomination was a great honor for me and I am very happy to accept this piece of advice. The following article is the written form of my lecture on the occasion of the presentation of the Gregor Mendel Memorial Medal on July 21, 2022 in Palais Dietrichstein in Brno during the international Mendel Genetics Conference from 20 to 23 July 2022 in honor of Mendel's 200th birthday.

2 „... Dein Denkmal steht in Millionen Herzen, es kommen, wirst Du einst gestorben sein, von selbst die Monumente auch aus Stein ..." (Uschmann 1971).