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**Address:** Institute of the History of Science and Technology, Universitetskaya naberezhnaya 5,  
St. Petersburg, 199034 Russia

Phone: (+7-812) 328-47-12; Fax: (+7-812) 328-46-67

**E-mail:** histbiol@mail.ru

**Website:** <http://shb.nw.ru>

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## Soviet Biologists and Evolutionary Theory — Who Made it into the Textbooks in Former East Germany and Why?

*KARL PORGES*<sup>1</sup>, *ELIZABETH WATTS*<sup>1,2</sup>

<sup>1</sup> Biology Education Research Group, Institute of Zoology and Evolutionary Research,  
Faculty of Biological Sciences, Friedrich Schiller University Jena, Jena, Germany

<sup>2</sup>corresponding author: elizabeth.watts@uni-jena.de

The Soviet Union had a tremendous social and scientific influence on life in the German Democratic Republic (GDR) between 1945 and 1990. The school system and curriculum were affected by these influences, even though the GDR school system was not identical to the Soviet education system. Marxist-Leninism, as a self-identified scientific ideology, acted as a unifying political element. Charles Darwin's theory, which was understood as projecting a materialistic worldview, became the cornerstone of Marxist philosophy (Kolchinsky, 2001a, p. 157) and a constant in biology education in the GDR (Porges, 2018). A historical examination of the educational relationship to evolutionary biology thus provides insight into the complex interplay between science and society (inter alia, Junker & Hoßfeld, 2009). The respective zeitgeist is also reflected within the school itself, which in turn shapes future generations through its educational mission. The present contribution clarifies the question of which Soviet biologists found their way into the biology class of the GDR as part of the lessons on evolutionary biology and which technical and ideological statements were associated with those teachings. The analysis showed that during the time of Lysenkoism only a subset of biologists was included in the teaching and learning materials of the GDR and its own claim to respect all major Soviet biologists could not be fulfilled.

**Keywords:** soviet evolutionary biologists, evolutionary biology, biology education, biology in the GDR, textbooks, Lysenkoism.

Schools are the cornerstone of our modern society as they provide “not only qualification but also socialization services with regard to the preservation and security of society” (Fees, 2006, p. 82). Yet schools are also “a product of our history and thus it remains doubtful that they truly provide the solution to a student's right to education” (ibid.). The need for schools to face “the current needs of students, combined with their historical development”, means that schools face “a continuous pressure to reform” (ibid., p. 86). This also effects school materials and their content such as textbooks and other educational materials. Consequently, our understanding of knowledge “is socially pre-structured and mediated” (Lässig, 2010, p. 199). This means that textbooks “always act as a mirror of their time” (Jürgens, 2006, p. 406) and every change made to them is a reflection on society. A retrospective “analysis of curricula and other teaching materials [...] can be used to draw the most direct conclusions regarding the pursued goals of dissemination of ideas, values and established theories” (Neuner, 1989, p. 15). Taking a look at evolutionary biology is particularly interesting because despite its contribution to science education (or perhaps because of this), evolutionary theory continues to be at the center of scientific, social and school policy discourses (see, inter alia, Hoßfeld & Brömer, 2001; Engels, 2009; Watts, 2018).

Following the Second World War, the German Democratic Republic (GDR) emerged as a new socialist state within the Soviet Occupation Zone (SBZ). The Soviet Union had a continuous influence on the social and scientific life in the GDR after its founding on October 7, 1949. In geopolitical structures, such as the *Council for Mutual Economic Assistance* and the *Warsaw Treaty*, the GDR and the Soviet Union acted as allies and contractors. A unifying ideological element between both states was the Marxist-Leninism ideology. Although the school system of the GDR cannot be equated with the Soviet Union's school system, developments in the school system and curriculum contents were not without Soviet influence.

The discipline of evolutionary biology played a key role in biology lessons in the GDR (Porges, 2018), as school officials believed that it supported the states' materialistic view of the world. It is therefore not surprising that the life and work of Alexander Ivanovich Oparin (1894–1980) was a favorite in biology textbooks when it came to the discussion of the origin of life. The ideological influence of the Soviet Union was seen clearly in the increasing amount of information on the life and work of Ivan Vladimirovich Michurin (1855–1935) as well as Trofim Denisovich Lysenko (1898–1976) that was included in the GDR biology curricula and textbooks into the 1960s. Influenced by the popularity of Lysenkoism, essential findings from the field of genetics and evolutionary biology, as well as outstanding (Soviet) scientists, were left unmentioned, which ultimately led to severe educational gaps among the students. Nevertheless, the “recent years have seen a ‘re-thinking’ of this doctrine in Russia” (Kolchinsky et al., 2017).

The present contribution will clarify the question of which Soviet biologists found their way into the GDR biology classroom with regard to evolutionary biology and which technical and ideological statements were associated with their contribution. This is also intended to draw attention to the dangers associated with pseudo-scientific representations in the school for the future generations.

### Lysenkoism — a popular export?

The efforts to establish Lysenkoism in the GDR were comparatively limited and never reached the same level as they did in Stalinist Soviet Union. The president of the Academy of Agricultural Sciences Hans Stubbe (1902–1989) has been credited with limiting the negative effects of Lysenkoism in the GDR. Together with other scientists Stubbe refuted Lysenko's theories and convinced the leaders of the Socialist Unity Party of Germany (SED) that the application of Lysenkoism would lead to economic losses (Nikonow & Schulze, 2004; Laitko, 2010). Despite these efforts, Lysenkoism found its way into the textbooks of the GDR and remained there until the early 1960s (Hoßfeld & Brömer, 2001; Porges, 2018). The introduction of Lysenkoism into the textbooks was accomplished in part through the efforts of Jena zoologist Georg Schneider (1909–1970), who used his position as director of the Ernst Haeckel House and professor of theoretical biology in Jena to propagate Lysenkoism (Hoßfeld & Olsson, 2002; Hoßfeld & Breidbach, 2007) and to influence the content and design of the GDR school textbooks. The botanist and textbook author Werner Rothmaler (1908–1962) also occasionally supported the propagation of Lysenkoism (Laitko, 2010).

The presence of Lysenkoism in the GDR prevented the integration of classical genetics into the teaching and learning materials (Porges et al., 2016; Porges et al., 2017), although the term “Lysenkoism” was almost never used directly in the GDR. Instead Lysenko's ideas were often referred to as “schöpferische Biologie” or “schöpfersiche Weiterentwicklung” (creative biology

or creative further development) or presented as Mitschurin biology. While Mitschurin and Lysenko were included in the curricula and textbooks, teaching Mendelian genetics in biology class was considered official grounds for dismissal (Löther, 2010). Remarkable is that historians and contemporary witnesses continue to have very different views on the extent of Lysenko in the GDR (Laitko, 2010), while the analysis of the textbooks shows that the influence was in fact quite widespread. Therefore, a “simple totalitarian model” is overly simplified and not suited to “adequately reflect the relationship between politics and science in the GDR” (ibid., p. 129).

The Lysenko Era in August 1965 with the Gregor Mendel Memorial Symposium (Brno) and the Symposium on the Mutational Process (Prague). While the authors of the school textbooks only integrated a small amount of genetic content in lessons on breeding biology and / or in evolutionary biology lessons during the Lysenko Era, they created a clear separation of the disciplines and introduced a larger coverage of the field of genetics in the textbooks, starting in the mid-1960s. Likewise, the textbooks had changed from a historical-scientific to a logical-scientific structure. These changes to the textbooks also came about due to the 1965 Educational Reform, which made evolutionary theory the focus of all biological instruction. Education was understood as a major societal task and knowledge of evolutionary biology appeared to be indispensable in reaching the GDR educational goal, i. e. a socialist mind-set, combined with a high level of education. Thus, it can be said that even “ideology-free” textbook still contained politically motivated content. The next section will offer a brief look at the history of schools in the GDR and will be followed by an analysis of textbooks dealing with Soviet researchers in evolutionary biology chapters.

## **A historical look at education in former East Germany (GDR)**

According to the Order No. 40 by the Soviet Military Administration in Germany, classroom instruction was to begin again in the Soviet Occupation Zone (SOZ) on 1 October 1945, and on 18 October 1945, the central committee of the German Communist Party and the central committee of the Social Democratic Party of Germany published a joint call for a democratic school reform that would provide educational chances for all citizens (Geißler, 2000). But these new schools should not just be an extension of the educational system found previously in the eastern states of Germany, but should reflect the new political orientation of the SOZ.

The new developments in the school system that occurred in the SOZ were referred to as the “anti-fascist-democratic school reform”. The central leading legal document that guided this reform was the “Gesetz zur Demokratisierung der Deutschen Schule” (Law for the Democratization of German Schools), which went into effect on 1 September 1946. The central task of the school reform was “to raise the educational level of the primary school to the level of the middle school” (Geißler, 2000, p. 92) and also to support a comprehensive denazification of the Nation (German).

In order to ensure that the newly established GDR to meet these educational goals, there was a rush to create new textbooks and to train new personnel. This meant that the first textbooks to be used in GDR classrooms were created through a rushed editing of older textbooks that had originated during the Weimar Republic, but by 1948, new textbooks gradually replaced these edited textbooks (Günther & Uhlig, 1969). Teacher training was also rushed and these quickly trained teachers represented “the key symbol of the GDR society in the anti-fascist-democratic school reform phases from 1945 to 1949” (Kirchhöfer, 2009, p. 140). The entire school format was also changed.

The previous three-tier school system was replaced by an eight-year primary school education, followed by either a three-year professional school or four-year high school (Geißler et al., 1996).

The GDR was officially founded on 7 October 1949 and the constitution of the GDR secured the basic principles of the “Gesetz zur Demokratisierung der Deutschen Schulen” (Günther & Uhlig, 1969). The Ministry for National Education (Ministerium für Volksbildung) (MfV) was created from the existing structural institutions and a school policy was quickly implemented, following the 4<sup>th</sup> Pedagogical Congress in 1949, which was designed to support economic objectives through the increase of scholarly performance in the classroom (Geißler, 2000, p. 280). Compared to the curricula of 1946, the new curricula provided compulsory material that was to be taught universally (ibid., p. 287). By the school year 1951/52, new textbooks were available that supported the teaching of certain subjects according to the provided syllabuses (ibid., p. 288). Due to the high academic burden upon the students, a “relaxation of the formal and compulsory nature” of the curricula was introduced (ibid., p. 442).

By the spring of 1950, a comprehensive “reorganization” of the school system was planned (ibid., p. 263). New schools comprising 10 grades were opened as structural innovations in 1951 (Köhler, 2008); these would later become known as “Mittelschulen” (secondary schools or middle schools) (Günther & Uhlig, 1969, p. 84). During the school year 1958/59, the Ministry for National Education initiated a new stage in the restructuring of the “Mittelschule” (ibid.). The “Gesetz über die sozialistische Entwicklung des Schulwesens” (Socialistic Development of the School System Statute) was adopted on 2 December 1959 and according to this new law, the required level of completion was gradually increased to ten years, and the ten-year general “Polytechnische Oberschule” (Polytechnical High School) (POS) became the general foundation of the GDR school system. The term “Oberschule” was used with the intention of distinguishing the “newly unified type of school” (Geissler, 2000, p. 512), which exemplified a qualitatively higher educational concept in comparison to the former German school system. The implementation of this new school-type was accompanied by a new compulsory curriculum that was introduced on 1 September 1959 (Günther & Uhlig, 1969). Although this new education act caused significant educational changes in the GDR, some of the provisions were only temporarily important due to continued developments (Geißler, 2000).

Following a long public discussion on this topic, the “Volkskammer” (People’s Parliament) passed a law that unified the socialistic educational system (“Gesetz über das einheitliche sozialistische Bildungssystem”) on 25 February 1965. The compulsory Polytechnical High School became the center of the new educational landscape. The new law resulted in significant changes to the extended secondary school, which should enable students to pass their university entrance exam (Günther & Uhlig, 1969). In order to create a smooth transition to the new “Erweiterte Oberschule” (extended secondary school) (EOS) from the ten-year polytechnical school (POS), the academic level of the 9<sup>th</sup> and 10<sup>th</sup> grade had to be raised. Between the school years 1967/68 and 1980/81 preparation for the extended secondary school thus took place in preparatory classes (ibid.).

As a result of the act, new curricula were gradually introduced. Although the 1959 guidelines had been “tried and tested in school practice”, they were specified on the basis of the state and developmental tendencies of the entire social development, and new guidelines were introduced in the academic year 1965/66 (ibid., p. 172f). More than in the previous curriculum, the structure of the courses led to a “high degree of coordination” (Drefenstedt, 1969, p. 84). The publishing house *Volk und Wissen* developed teaching materials “in which the content of the specified syllabus was prepared in terms of content and didactics for each subject and class” (Günther & Uhlig, 1969, p. 176). In 1982, the final phase of curriculum development began. This was followed by a pressure to modernize that lasted until the reunification of Germany.

## Evolution education in former East German (GDR) textbooks

Lessons in evolutionary biology played a key role in the implementation of the “three major goals of biology teaching” in the German Democratic Republic. The goals were: “To form a scientific world view [...]; To develop knowledge about the scientific foundation of biology and [...] educate students according to a new, socialist morality” (Dietrich & Kummer, 1979, p. 413). Evolution was taught in the 8<sup>th</sup> and 12<sup>th</sup> grades (graduating classes) as early as 1946 and was introduced into the 10<sup>th</sup> grade (graduating class) curriculum a decade later with the foundation of the “Polytechnischen Oberschule”.

The goal of GDR biology curriculum was to create a basis for the understanding of the theory of evolution from the 5<sup>th</sup> to the 9<sup>th</sup> grade and to offer a comprehensive understanding of evolution by the conclusion of the 10<sup>th</sup> grade (Neuner, 1969). Ultimately, “every proper biology lesson should contribute to the students’ understanding of evolution” (Lengert, 1959, p. 92) and “in all grades [...] there should be a provision of systematic knowledge for the later comprehension treatment of the theory of descent in the sense [...] of a line of guidance” (Dietrich, 1972, p. 18). Yet the presentation of evolution in teaching and classroom materials used divergent approaches in terms of design, structure, and content (Porges & Hofffeld, 2017). However, there were variations in coverage with time delays as the result of political, societal, didactic and scientific discourses and developments. There was a reduction of ideological statements and didactic reductions of subject content in the curricula and school textbooks, which were created by school, subject and science experts. It is apparent, though, that there was a fundamental attempt made at the reconciliation of the didactic materials. The orientation towards Lysenkoism in the 1950s meant that elements of synthetic theory that were developed in the 1930s and 1940s (Reif et al., 2000) find their way into school materials more than 20 years later. Despite the differences in the details, which was typical for the time, a continuity did exist between 1946 and 1989, such as in the materials from Charles Robert Darwin (1809–1882). Since, while the authors of the various textbook chapters did name up to 141 individuals in connection with evolutionary biology, the life and work of Darwin remained a central component (tab. 1). Ernst Haeckel (1834–1919) and Jean-Baptiste de Lamarck (1744–1829) also stood out. The history of science thus represented a constant that allowed teachers to present the historical perspective in the classroom as well as the current materials.

Ultimately, the educational materials reflected not only the development of the evolutionary theories themselves, but also highlighted their interdisciplinary nature. In addition to theories of evolution, the authors also incorporated paleontological and neontological evidence as well as information regarding hominization, biogenesis and natural systematics into the teaching and classroom materials.

*Table 1: Frequency of soviet biologist within evolutionary biology chapters in the GDR biology textbooks: including names embraced within terms such as “Darwinism”*

Grade	8			10					12			Σ
	1951	1953	1957	1960	1965	1968	1971	1988	1952	1957	1965	
Darwin	30	23	71	69	68	47	46	61	113	106	68	702
Haeckel	10	8	6	11	10	7	10	17	69	52	30	230
Lamarck	9	8	8	15	16	13	8	11	48	33	27	196
Mitschurin	24	21	0	4	0	0	0	0	53	0	0	102

Lysenko, T. D.	14	13	0	0	0	0	0	0	33	0	0	60
Timiryazev	4	4	2	2	2	0	0	1	22	12	2	51
Oparin	1	1	0	4	8	7	6	1	4	6	11	49
Wiljams	0	0	0	0	0	0	0	0	27	0	0	27
Kovalevski, A.	0	0	2	1	2	0	0	0	0	16	1	22
Kovalevski, V.	0	0	1	1	1	0	0	0	0	15	1	19
Grell	0	0	0	0	0	0	0	0	2	0	0	2
Lysenko, D. N.	0	0	0	0	0	0	0	0	1	0	0	1
Mendeleyev	0	0	0	0	0	0	0	0	1	0	0	1
Kovalevskaya, S.	0	0	0	0	0	0	0	0	0	1	0	1
Mechnikov	0	0	0	0	0	0	0	0	0	1	0	1
Karpechenko	0	0	0	0	0	0	0	0	0	0	1	1

## Soviet biologist in evolutionary biology chapters in the GDR biology textbooks

### Grade 8

Shaped by the 4<sup>th</sup> Pedagogical Congress in 1949, the school system was focused on establishing its own, Soviet-scientific tradition. At a classroom level, this meant that lessons were focused on Lysenko's Lamarckian ideas as a Soviet-Stalin alternative to Mendelian. As a result, creative Darwinism increased in presence and popularity in the early 1950s and also became more widely used in teaching and learning materials (Porges et al., 2016; Porges et al., 2017).

It was expected that by grade 6 "the pupils should have recognized the importance of Michurin and Lysenko as new creators of the breeding sciences" (MfV, 1951a, p. 11). A particular objective for students in the 8<sup>th</sup> grade was that these students should clearly recognize the further development of Darwinism into creative Darwinism through the work of Michurin and Lysenko. In doing so, the students should expand upon their previous knowledge in order to understand the difference between hereditary and non-hereditary changes and thereby also recognize and reject "the reactionary 'Neo-Darwinism' as a falsification of Darwinism" (ibid., p. 16).

These ideas were promoted in the textbooks for grade 8. Specifically, the textbook editions from 1951 and 1953 provided detailed information on Michurin and Lysenko breeding concepts (Lemke, 1951; 1953). The textbook authors emphasized that the work of these Soviet scientists made it possible "to obtain new properties in plants and animals which the parent did not possess" (Lemke, 1951, p. 77), thus highlighting man's new role as "the creator of new species". (ibid., p. 83). Under the title 'Great Biologists', the textbook authors presented illustrations and brief biographical information about Kliment Arkadyevich Timiryazev (1843–1929), Michurin and Lysenko. Here the authors described Timiryazev as "the forerunner of Michurin's biology", since he tirelessly declared "that hereditary changes in organisms are caused by environmental influences" (ibid., p. 125).

While the 1957 textbook no longer dealt with Michurin and Lysenko within the chapters on evolutionary biology, Timiryazev and the brothers Alexander Onufryevich Kovalevsky (1840–1901) and Vladimir Onufryevich Kovalevsky (1842–1883) were presented as Russian

scholars who contributed to the dissemination of Darwinism in Russia through their research activities. All three scientists were depicted with a photograph taken from the archive of the Ernst Haeckel House in Jena, Germany (Arnold et al., 1957).

## Grade 10

The topic of evolution was not discussed in 10<sup>th</sup> grade textbooks until 1951. In the unit entitled *Die schöpferische Weiterentwicklung der Organismen durch den Menschen* (Creative Further Development of Organism through Human Action) it was stated quite clearly that the scientific findings of Michurin and Lysenko act as the basis of the treatment (MfV, 1951b). After the curriculum changes in 1956, the textbooks no longer dealt with evolutionary biology. Yet, in the chapter on "Inheritance Theory" it was clearly stated, that the students were to build upon their knowledge the theory of evolution and their application in plant and animal breeding in order to become familiarized with the basic principles of modern hereditary teachings, while still taking into account the problems that exist in this special field of biological science (MfV, 1956). The teaching content was centered on Michurin's biology, chromosome theory and the inheritance of acquired properties. While the inclusion of the chromosome theory showed "an astonishingly tolerant attitude" on the part of the authors during "in the initial phase of 'de-Stalinization'" (Tille, 1992, p. 429), neo-Darwinism was still presented as a pseudo-scientific basis for misanthropic racial discrimination.

Michurin's life and work was also included in the 1959 curriculum. Teachers were to convey a short biography of Michurin during the unit *Geschichte der Entwicklungslehre* (History of developmental theory) and discuss his doctrine of the interconnection between organisms and their environment. Similarly, the curriculum called for teachers to discuss Timiryazev's important role in spreading of Darwinism (MfV, 1959a). Timiryazev was also mentioned in the syllabus of 1966 in the unit entitled *Kampf um die Durchsetzung des Entwicklungsgedankens* (*The struggle for the Implementation of the Developmental Concepts*) (MfV, 1966). Initially there was a lack of adequate textbooks for the newly created grade 10 (POS graduating class) and thus the 1956 curriculum still referred to textbooks designed for the Oberschule or secondary literature (MfV, 1956). A textbook devoted entirely to evolution was published in 1960. Here, Michurin Biology was propagated without offering any type of theoretical foundation. Although the authors acknowledged that Michurin's biology was not yet able to offer any well-rounded theories, they emphasized that "the comprehensive solution of heredity, change, and development can only be found through it" (Ambrosius et al., 1964, p. 37). At another point they pointed out that breeding sciences also investigate directed change, i. e. inheritance of acquired traits (ibid., 1964), but Lysenko's name was no longer mentioned in connection with this idea.

The revised textbook of 1965 contained for the first time a short chapter on the foundations of heredity. Here, the authors were more critical, as they explicitly acknowledged that the inheritance of acquired traits "is one of the most controversial ideas in biology" and that "this question has not yet been clearly addressed" (Bach et al., 1967a, p. 104). In this textbook, Michurin and Lysenko were mentioned for the last time as representatives of the "guided plant development procedures" (ibid.). Timiryazev and the Kovalevsky brothers were also included in the 1960 and 1965 with the same text block from the 1957 edition (Fig. 1).

The following textbook editions from 1968 and 1971 no longer contained any such information. It was only in the last textbook of the GDR that was published in 1988 that the authors again noted: "Among the scientists who made a special contribution to the promotion of Darwin's teachings were Thomas Henry Huxley in England, Kliment Arkadyevich Timiryazev in Russia and Ernst Haeckel in Germany" (Kummer et al., 1988, p. 79).

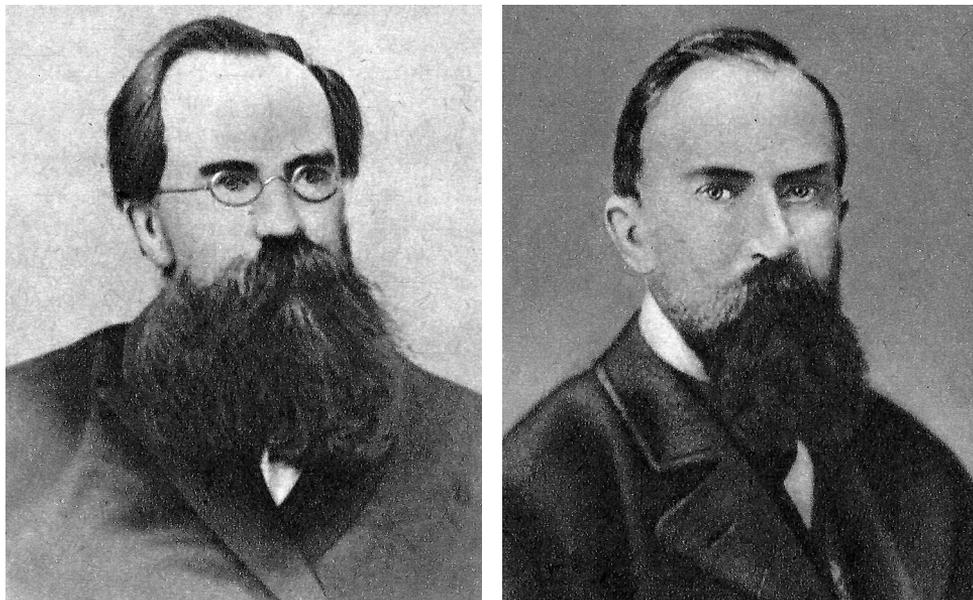


Fig. 1: A.O. Kovalevsky and V.O. Kovalevsky in 10<sup>th</sup> grade textbook (1960)

## Grade 12

The curriculum of 1953 was largely focussed on the unit *Die Weiterentwicklung des Darwinismus zur schöpferischen Mitschurinschen Biologie* (The Further Development of Darwinism to Creative Mitschurin Biology), which contained a total of 18 lessons. In addition to life and work of Timiryazev, Michurin and Lysenko, Wassili Robertovich Williams (1863–1939) was also included in this curriculum and named “as the founder of modern soil science”. The syllabus explicitly provided bibliographic references for communicating the basic insights of Michurin’s biology, in particular for lessons on the vitality of organisms. Two of the suggested reference books were from Lysenko<sup>1</sup>. In blatant disregard of scientific data, the authors called for students to question “the unscientific theories of formal genetics”, claiming that progress in the biological science was being inhibited by the theories of rigid inheritance, germ lines, and genes (MfV, 1953b).

The 1958 curriculum contained not only evolutionary biology but also a unit *Entwicklung der Vererbungslehre* (Development of Hereditary Studies). The focus of the unit was on Michurin biology and the chromosome theory of inheritance. It also discussed the Mendelian rules of inheritance, the mutation theory of de Vries and Johannsen’s gene concept. Just like in the 1956 curriculum for grade 10, it was stated that neo-Darwinism should be discredited as the pseudo-scientific basis of misanthropic racial discrimination (MfV, 1958). In the unit entitled *Geschichte der Abstammungslehre* (History of Evolutionary Theory) the curriculum required the discussion

<sup>1</sup> Lysenko T.D. (1951) *Über Erbanlagen und ihre Veränderlichkeit*. „Agrobiologie“, Berlin: Verlag Kultur und Fortschritt, p. 384–439; Pliustsch L. (1952) “Die Mitschurinsche Biologie über die Vitalität der Organismen”, *Biologie in der Schule*, Issue 7, p. 295ff; Lysenko T.D. (1952) “Die Vitalität der pflanzlichen und tierischen Organismen”, in: *Biologie in der Schule*, Issue 8, p. 346ff.

of the life and work of the Kovalevsky brothers and Timiryazev, with a particular emphasis on Timiryazev's works *Sonne, Leben und Chlorophyll* (Sun, Life and Chlorophyll), *Die Veränderlichkeit* (Variability) und *Die Vererbung* (Heredity). With regard to the Kovalevsky brothers, the students were to understand the importance of their work in the field of paleontology and comparative embryology and for the the establishment and recognition of Darwinism (ibid.).

The curriculum designed for the academic year 1959/60 continued to promote a critical examination of the chromosome theory and a rejection of neo-Darwinism. The life and work of Michurin and Lysenko were still present, but this content was now found in the unit on *Geschichte der Pflanzen- und Tierzüchtung* (History of Plant and Animal Breeding). Timiryazev and the Kovalevsky brothers continued to be included in the unit dealing with the formation and development of the theory of evolution (MfV, 1959b).

Even in the foreword of the 1961 syllabus we could find evidence of ideological promotion, as it stated that one of the purposes of the curriculum was "to duly acknowledge the research results of progressive biologists and their fight against unscientific theories" (MfV, 1961). Among these "progressive biologists" were Mechnikov, Timiryazev and Michurin. Timiryazev was discussed in detail in the chapter *Kapitel zur Geschichte der Entwicklungslehre* (History of Developmental Theory), and more information on Michurin was provided in the chapter *Weiterentwicklung der Organismen durch den Menschen* (Further Development of Organism through Human Action).

Yet, there was a major shift in the 1967 curriculum. Lysenko was completely absent and it was explicitly stated that developments in the biological sciences in recent years had necessitated a correction of the syllabus (MfV, 1967). The only "progressive biologist" still present was Timiryazev, who was included in the unit entitled *Der Kampf um die Durchsetzung des Entwicklungsgedankens* (The struggle for the Implementation of the Developmental Concepts).

The strong emphasis on Lamarckist ideas in the curricula was also reflected in the accompanying textbooks. Both textbooks (1952 and 1957) were produced in collaboration with Lysenkoist Schneider. In the 1952 textbook Timiryazev, Williams, Michurin and Lysenko were discussed in the chapter *Die Weiterentwicklung des Darwinismus zur schöpferischen Biologie* (The Further Development of Darwinism to Creative Biology). There were 22 pages of text and four illustrations available (fig. 1, 2, 3). Their life and work were extensively reported (Gruner et al., 1953). For example, the textbook authors explained how Timiryazev "exercised great influence on Wiliam" (ibid, p. 95), they emphasized that in Chicago Williams spoke with the Russian chemist Dmitry Ivanovich Mendeleev (1834–1907), "who agreed with his theories" (ibid.). With regard to Michurin and Lysenko, the authors wrote that when Michurin first began his work he actuated Dr. Grell's methods of acclimitization (ibid, p. 103) and, furthermore, that Lysenko's father Denis Nikanorovich Lysenko was able to prove in practice "that the results of his son's investigation are correct" (ibid, p. 111).



Fig. 2: Timiryazev in 12<sup>th</sup> grade textbook (1952)

In the heavily rewritten 1957 textbook, this chapter was dropped as a result of a curriculum amendment. Yet this chapter was dropped in the heavily rewritten 1957 textbook as a result of a curriculum amendment. Seven pages on V.O. Kovalevsky, A.O. Kovalevsky and Timiryazev were instead included in the chapter *Die Kämpfe um den Darwinismus* (The struggles over Darwinism). The authors also mentioned Sofia Vasilyevna Kovalevskaya (1850–1891). With reference to V.O. Kovalevsky's work, the authors emphasized that "he tried to imagine the extinct ungulates

as living beings in order to understand them in relation to their environment" (Rothmaler et al., 1957). One illustration showed three of Kovalevsky's drawings from the anthracotherium monograph, which illustrated the gradual regression of the toe among ungulates (ibid). With regard to his brother A.O. Kovalevsky, the authors stated that he had "the largest impact on the clarification of the relationship between invertebrates and vertebrates" (ibid, p. 97). The school pupils were also informed that Kovalevsky's work was greatly influenced by his oceanic-zoological studies in Naples and Messina, where he worked together with Ilya Ilyich Mechnikov (1845 bis 1916) for a period of time (ibid.). The summary of Timiryazev's work stated that he "enriched Darwinism through by providing a new view of the relationship of man to nature" (ibid, p. 99).

Evolutionary biology received a designated chapter for grade 12 for the last time in the 1965 textbook. According to the curriculum, the brothers Kovalevsky and Timiryazev were briefly introduced in the chapter *Die Verbreitung und Weiterentwicklung des Darwinismus* (The Dissemination and Development of Darwinism). The authors emphasized that Timiryazev was exposed to fierce attacks, just like Haeckel (Bach et al., 1967b). The authors also mentioned the geneticist Georgii Dmitrievich Karpechenko (1899–1941), who conceived diploid cabbage and radish hybrids by crossbreeding radishes (*Raphanus sativus*) and cabbages (*Brassica oleracea*) (ibid.). Although evolution was no longer discussed in the 1969 textbooks for grades 11 and 12, the endpaper of the book included a drawing by the plant geneticist Nikolaj Ivanovich Vavilov (1887–1943) with an accompanying text for the first time (fig. 5). Yet, nothing was stated about Vavilov's tragic end (see Kolchinsky, 2001b).

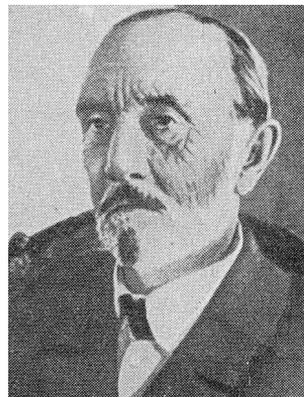


Fig. 3.: Michurin in 12<sup>th</sup> grade textbook (1952)



Fig. 4: Lysenko in 12<sup>th</sup> grade textbook (1925)

*Nikolai Iwanowitsch Wawilow (1887 bis 1943)*

Genetiker; befaßte sich mit der Erforschung von Entwicklungszentren der Kulturpflanzen, der Theorie der homologen Reihen und mit Problemen der Modifikation und Mutation. Große internationale Anerkennung fanden seine Arbeiten über Immunitätsprobleme und über die theoretischen Grundlagen der Selektion.



Fig. 5: Vavilov in 12<sup>th</sup> grade textbook (1965)

## Summary

The analysis of the curricula and school textbooks of the GDR showed that some but not all of Soviet scientists were discussed in the classroom. It was found that while Lysenkoism did not play as large of a role in the GDR as it did in the USSR, this impact of this ideology did, in fact, shape the GDR teaching and learning materials for biology classes well into the 1960s. The degree of influence in the GDR can be seen in the fact that educational leaders promptly responded to Lysenko's 1948 speech "On the state of biological science" and the demands made by the 4<sup>th</sup> Pedagogical Congress in the GDR. With the introduction of new curricula in the early 1950s, Mitschurin and Lysenko's life and teachings became central learning objectives for the units on evolution and breeding in grades 8, 10 and 12. In addition, the East German Lysenkoist Georg Schneider was the opportunity to help shape the GDR school textbooks.

Although the central curriculum required that class time should be devoted to the discussion of *all* great Soviet biologists, this requirement was not fulfilled. The extraordinary contributions made to synthetic Darwinism<sup>2</sup>, by great Soviet biologists such as Sergei Sergeyeovich Chetverikov (1880–1959), Ivan Ivanovich Schmalhausen (1884–1963), Nikolay Ivanovich Vavilov, Theodosius Dobzhansky (1900–1975) and Nikolai Vladimirovich Timoféeff-Ressovsky (1900–1981), were left entirely out of the teaching and learning materials. These scientists had also been active in multiple countries and had formed meaningful networks with other research institutions (Levit & Hoßfeld 2017).

Moreover, it was found that British, American and even German evolutionary biologists, who had also made important contributions to synthetic Darwinism were either not mentioned or discredited within GDR textbooks. Instead, Lysenkoism, as a counter-concept to neo-Darwinism, was the defining element of this era. The claimed motivation behind this movement was to counter racial discrimination not only at an ideological level but also biologically.

Interestingly, scientists, such as Oparin, who did not present direct competition to Lysenko's theory, were untouched by this movement and their work did find its way into the GDR textbooks. Works of biologists like Timiryazev and the Kovalevsky brothers, who lived before Lysenko, found their way into the school materials during this time and beyond. The end of the Lysenko Era in 1965 was quickly reflected in the GDR curricula and textbooks. Lysenko and Michurin were simply no longer discussed after this point in time, while formerly neglected scientists like Vavilov and Karpechenko, for example, were subsequently included in the class 12 textbook. In summary, the history of biology education in the GDR, using evolutionary biology lessons as an example, illustrates that static biology lessons did not exist in this Soviet state. Rather, lessons on evolution in the GDR were subject to a progressive development, which was embedded in an overall social conditional structure.

Overall, a look into GDR biology textbooks shows that scientific discourses cannot be artificially detached from social conditions and political trends, and instead the mixing of these realms is often reflected in school materials. This type of study ultimately also emphasizes that political and scientific actors such as Georg Schneider have a pronounced influence on the design and content of school materials. Moreover, an individual's ability and success in persuasion within the political realm, such as Lysenko enjoyed in Russia and Stubbe in the GDR, can play a decisive role in the political orientation of a school and have long lasting repercussions for the educational system. Our education systems, whether in the former GDR or the current USA, are guided by political actors, either in the form of curriculum decisions or administrative guidelines.

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<sup>2</sup>See. Beurton, 2001; Golubowsky, 2001; Satzinger & Vogt, 2001; Levit et al., 2006; Levit & Hoßfeld, 2009; Hoßfeld et al. 2010.

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