**Popular Sciences for Jewish Children and Youth in the 18th and 19th Centuries in Europe**

# Table of Contents

Chapter 1: Sciences for Jewish Children and Youth in the Modern Era

Chapter 2: The Place of the Sciences in Jewish Culture: From Ancient Traditions to Modern Science Education and Popular Science Literature in Hebrew

Chapter 3: Scientific Knowledge “Dressed” as Judaism

Chapter 4: From Zoology to Animal Stories: Exoticism, Morality, and Human-Animal Relations in Texts for Jewish Children

Chapter 5: Science and Technology in Texts for Jewish Children in the Second Half of the 19th Century

Chapter 6: Chaim Zelig Slonimsky: A Prototype for Promoting Science and Technology Among Jewish Youth

Epilogue

Bibliography

**Chapter 1**

**Sciences for Jewish Children and Youth in the Modern Era**

In the middle of the 20th century, Dr. Emil Feuerstein (1912­–1993) wrote a book entitled *Jewish Discoverers and Inventors* (published in Hebrew by Sherbarak Publishing of Tel Aviv). Feuerstein was born in Hungary and educated in a traditional *heder* (Jewish religious primary school), and as an adult, he studied at the University of London and the University of Basel (Tidhar 1949, p. 1362). In 1935, Feuerstein immigrated to Israel and began publishing popular science books in Hebrew, many of which were aimed at adolescents. *Jewish Discoverers and Inventors* opens with the author’s dedication to his son: “This is a gift to my firstborn, Benjamin, who is about to take on the yoke of the mitzvot,” (Feuerstein [1953] 1955, p. 3). The publisher, Sherbarak, specialized in youth literature, the audience for which this book was intended (Neiger 2017, pp. 102­–106). Its table of contents includes a long list of Jewish personalities from the 19th and 20th centuries, some well-known and others lesser-known, who contributed to the development of science and technology in the modern era: Siegfried Marcus (1898­–1931) who invented the automobile; Yitzhak Meritt Singer (1811­–1875) who developed the sewing machine; Wolfgang Pauli (1900­–1958) and Albert Einstein (1879­–1955), both winners of the Nobel Prize in physics; and Chaim Weizmann (1874­–1952) a scientist who became the first president of the State of Israel; along with many others.

Feuerstein extolled the role that Jews played in the advancement of modern science and technology. The first chapter, “Jewish Geniuses Among Nobel Prize Recipients,” describes in detail the Jews who made up a high percentage of those who won this prestigious award. According to Feuerstein, the achievements of the Jewish people were obscured because their scientific achievements were recorded on behalf of the countries in which the Jewish scientists lived. He described how non-Jews, especially the Nazis, appropriated the achievements of Jewish scientists and inventors. For example, the Nazis stole the credit from German-Jewish inventor Siegfried Marcus for developing the first model for an automobile (Feuerstein [1953] 1955, p. 14). Fritz Haber (1868­–1934), a chemist from Breslau, developed the gunpowder that contributed to Germany’s victory in World War I, yet ended his life as a refugee (ibid., pp. 60­–64). Albert Einstein suffered poverty and hardships in Switzerland because he was Jewish (ibid. p. 97).

What was the main goal of Feuerstein’s book? One goal was to disseminate scientific and technological knowledge; he described the principles of how penicillin works, the structure of the atom, and the fundamentals behind producing loudspeakers and radios. Like many authors and educators in the modern era, Feuerstein believed that scientific and technological knowledge has an essential and practical value for the younger generation. Beyond this, he emphasized its important role in establishing national identity.

With this book, Feuerstein endeavored to strengthen his readers’ national pride by showing these Jewish scientists and inventors as worthy role models for the generation of young Israelis. He emphasized that the achievements of these individuals in the fields of science and technology illustrate the unique character of the Jewish people. In doing so, Feuerstein expressed a concept deeply rooted in Western culture; that the Jewish people have exceptional intellectual abilities. This myth originated from scientists and intellectuals of the 19th and early 20th centuries, who claimed that the Jews were biologically-genetically different from other people (see Gilman 1996, pp. 33­–51; Schaffer 2008).[[1]](#footnote-1) Feuerstein’s book feeds on this myth and even cultivated it among its audience of young Jews. *Jewish Discoverers and Inventors* typifies modern scientific literature for children and youth that goes beyond merely imparting knowledge and strives to also transmit to the young generation complex messages in the emotional, social, and national realms. This genre emphasizes the importance of the sciences and technology in advancing human culture, and their role as the cornerstones upon which modern society and national cultures are built. As I will show in this book, these ideas emerged in the earliest stages in the development of Hebrew popular science literature for children and youth in the 18th and 19th centuries.

# The Popularization of the Sciences in Modern Culture

A discussion of the process through which the sciences became part of popular culture for children and youth requires an explanation of the theoretical concept of “science.” The traditional view among historians of science is that this field developed in professional institutions founded mainly in modern Europe. However, an in-depth examination of how scientific knowledge developed across human cultures reveals a much more complex picture. Many cultural factors have been involved, both formally and informally, in the development of the bodies of scientific knowledge. Further, scientific knowledge may appear in a wide variety of configurations and cultural sites. A critical analysis of historical-sociological thought regarding the culture of science must address the relationship between science and modernism. The identification between these two concepts obscures the complex contexts in which science is created, consumed, and assimilated into human culture. Therefore, in referring to “scientific knowledge,” it is necessary to accept observations from a wide range of times and geographical locations, and not to be satisfied with those that are limited to the ways in which it has been interpreted in Europe in the modern era. Examining the interrelationship between knowledge and the set of social, political, and economic factors in which knowledge develops is necessary for a multifaceted understanding of the complex concept of science (Burke 2013, pp. 1­–7; Daston 2017, pp. 135­–142).

There has also been criticism of the conventional view of science as a homogenous concept whose development was linear. In his pioneering book *The Structure of Scientific Revolutions*, Thomas Kuhn rejected the commonly-accepted description of scientific knowledge as evolving through a process of accumulation. Through historical observations, Kuhn noted the revolutionary pattern in the development of science. According to Kuhn, in every era, a certain scientific theory is accepted as “truth” while others are marginalized. He attributed an important role to popular science texts aimed at a general audience in establishing the scientific paradigm. These texts create the perception that there is a continuity of knowledge and that the contemporary paradigm is ahistorical. Further, he asserted that popular science textbooks and educational materials are completely subordinated to the needs of the prevailing scientific system, and simplify scientific knowledge in order to uphold the dominant paradigm (Kuhn [1962] 2011, pp. 45­–61; 211­–220).

However, some scholars have objected to this pejorative view of popular science as superficial and passive. They have asserted that this corpus is necessary to explain the complex scientific processes that have taken place in Western culture. Additionally, some scholars have differentiated the contents and goals of textbooks and popular science works from those in the formal scientific literature. For example, Cooter and Pumfrey (1994) criticized the sweeping assumption that the knowledge transmitted in popular science books and textbooks is drawn directly from the scientific system, but in a simplified and superficial form. In their view, this literature expresses the reciprocal relationship between general culture and scientific activity. Similarly, other scholars have stated that in popular science literature, the agents of knowledge offer their own distinctive interpretation of the bodies of scientific knowledge and scientific concepts, and even develop a new repertoire of knowledge (Benaude-Vincent et al. 2005; Cooter and Pumfrey 1994, pp. 237, 249­–250; Gaukroger 2020, 340; Olesko 2006, p. 869). Recent research on popular science literature has examined a wide spectrum of issues regarding the relationship between science and culture, such as the timeline of the development of popular science literature, the roles of various agents active in the field, cross-cultural interactions that dictate the nature of this relationship, the creative input of the people who popularize the sciences, and the various means of transmitting scientific knowledge that they use (Daum 2009, pp. 321­–327; Lightman 2016, pp. 352­–355; Nieto-Galan 2016, pp. 118­–121, 123­–126).

In Europe, between the 16th and 18th centuries, the sciences gradually became a new authoritative source that competed with traditional authorities. Its impacts were evident in religious, social, and economic realms. This “scientific revolution” encompassed a set of changes in various scientific disciplines, which combined old and new concepts. These processes occurred at differing paces. They arose both in monarchies and modern nation-states (Channell 2019, 13­–15; Mazeh 2021, pp. 1­–2, 43­–60; Porter and Teich 1992; Principe 2011; Shapin 2009, pp. 79­–95, 140­–153; Wootton 2015, pp. 22­–50).

Technological innovations based on scientific knowledge reshaped the daily lives of the people at that time. Popular texts described and explained scientific concepts and technological tools, and they were addressed in literature and artistic works as well (Channell 2019, pp. 3­–9; Nieto-Galan 2016, pp. 43­–48; Noakes 2016, pp. 153­–157).[[2]](#footnote-2) At the end of the 18th and the beginning of the 19th centuries, European scientific societies and universities increased their efforts to make scientific knowledge accessible to the masses. The now-familiar separation between scientific knowledge published in specialized academic settings and that in popular science texts began to emerge. Popular science literature played an important social and cultural role in bringing scientific knowledge and ideas to the general public and was a powerful agent for the establishment of new scientific fields (García-Belmar et al. 2005, pp. 222­–224; Gaukroger 2020, 336­–338; Myers 1989, p. 173; Russell 1983, pp. 42­–43; Topham 2009). There was an assumption that scientists had an obligation to disseminate scientific knowledge to all social classes. Science textbooks were often written by well-known authorities and personalities, which contributed to the prestige of these books (Knight 2001, p. 87). Despite the difficulty of popularizing the sciences without over-simplifying them, disseminating scientific knowledge raised the level of technological skill among the working class and increased public support for the development of the sciences. The claim was made that acquiring a scientific way of thinking would contribute to citizens’ moral development and adoption of the beneficial civic attitudes necessary for a democratic society (Yeo 2001, pp. 72­–82).

Accelerated technological development in the second half of the 19th century further reinforced the status of the sciences. In the nation-states that formed during this period, great importance was attributed to scientific and technological development as a means to assure their position and prestige on the international stage, and to gain economic and military power (Gordin 2009, pp. 99­–102; Harrison and Johnson 2009, p. 8; Kim 2016, pp. 83­–85). The extensive and diverse corpus of popular scientific literature created during this time, for example, in Russia and England (Shavit 2020, pp. 336­–339; Topham), indicated the importance attributed to transmitting the sciences to the public. In general, scientific research and technological developments were presented as positive and essential, despite the difficulties and negative consequences they caused, such as impacts on the economic structure or environmental pollution (McCormick 1989, pp. 1­–17; Nieto-Galan 2016, pp. 159­–169).

Harrison and Johnson stated that the culture of science and the modern nation-state developed hand-in-hand. Eric Hobsbawm noted the effort invested in “the invention of tradition” for nations, in which the sciences and technology symbolized the future, and scientific modes of thinking and scientific bodies of knowledge were adopted as its necessary infrastructure. Science and technology education for all citizens became a core goal, both to produce a new generation of scientists and to establish public recognition of the need to support the scientific system:

Educating citizens is one of the projects that modern states undertake, and the education of scientists, in particular, has been the domain of the nation-state […] students learn not only how to be good scientists but also how to be good subjects or citizens of the states that sponsor their training (Harrison and Johnson 2009, p. 10).

How did scientific and technological knowledge spread in the general culture? How was it integrated into the promotion of social and national values? The two main channels were popular science literature and textbooks used in the formal education system.

# Popular Scientific Literature for Children and Youth and Scientific and Technological Education in the Modern Era

In the modern era, textbooks and newspapers became the primary means of disseminating scientific knowledge and concepts throughout Europe (Cooter and Pumfrey 1994, p. 237). The development of scientific and technological education is intertwined with the appearance of popular children’s literature that dealt with these issues. Both indicate an emerging recognition of the importance of the sciences, particularly for the younger generation. Initially, the boundary between popular or educational texts and professional scientific literature was not clear. Similarly, the distinction was blurred between didactic writings produced by people who were self-taught and materials about science and technology that emerged from the world of higher education (García-Belmar et al., 2005, pp. 223­–226).

There has not yet been an in-depth study on the means used to transmit information about science to children and youth, despite the importance of this topic for understanding the interrelationships between the development of science and the resultant dilemmas in social, religious, and moral realms. It is widely recognized that scientific writing for children tends to adopt the canon, and therefore may serve as a sensitive measure for assessing the spread of science and its implications. Furthermore, if the discussion about religious institutions and the state includes an analysis of how scientific knowledge is presented in texts for children, it becomes possible to reconstruct the social vision regarding the sciences that emerged at that time. This novel perspective necessitates considering various aspects such as the type of scientific knowledge that is perceived as appropriate for children’s intellectual and cognitive abilities at various ages, and the goals underlying the dissemination of such knowledge to the younger generation (McDowell 2016, p. 134; Pandora 2009, pp. 75­–79; Secord 1985, pp. 128­–129).

Early evidence of the new place that science and technology held in European education can be found in a book for children entitled The Visible World in Pictures (*Orbis sensualium pictus*) by Jan Amos Comenius (1592­–1670). This pioneering text, composed in the middle of the 17th century, introduces children to a wide range of objects and phenomena from various scientific fields, such as the natural water cycle, animals, organs in the human body, and technologies such as the printing press (Comenius 1658).

In the first half of the 18th century, the scope of popular science books for children and youth expanded. Children’s books published in the 18th and 19th centuries explained scientific concepts such as Newton’s theory of gravity (Secord 1985, p. 127). These books were hugely successful and helped spread the values of the Enlightenment and modernization to a young audience (Koepp 2006). The growth of science literature for children is related to the establishment of a public sphere in European culture, of which books served as a central pillar. Science books for children can be seen as historical documents that help reconstruct the complex modes through which scientific knowledge was transmitted in modern culture (Myers 1989; Olesko 2006).

Another indication that science became increasingly important in children’s culture in the modern era can be seen in the educational programs recommended by key figures. For example, the English philosopher John Locke (1632­–1704) argued that teaching sciences was essential, and even developed texts for teaching them (Secord 1985, p. 131). The well-known French philosopher Jean-Jacques Rousseau (1778­–1812) asserted in his seminal treatise on education, *Emile* (1762), that children should be taught about what is relevant to their world, and he taught his apprentice, Emile, geometry, geography, astronomy, physics, and chemistry using experiential learning methods (Rousseau [1762] 2009, pp. 306­–330). Following Rousseau and the ideas of the Enlightenment, an educational movement known as philanthropism, which emphasized the natural sciences, emerged in northern Germany in the last third of the 18th century (see more on this below).

Teaching science and technology to children and youth was necessary to help them integrate into the modern and industrialized economy and society. Scientific curricula were first adopted at the end of the 18th century and the beginning of the 19th century in countries that had well-funded public education systems and a high percentage of children who attended school, such as the United States, Canada, and Prussia. One goal was to make their industrial systems more prosperous (Kamens and Benavot 1991, pp. 143­–146). This educational content played an equally critical role in establishing young people’s national identity. At the turn of the 18th century, Napoleon founded an education system that included military academies. This system gradually displaced religious education and from the 1830s, modern public education had spread throughout France (Green 1995, pp. 132­–133; Lachapelle 2015, p. 49). In response, France’s rival Prussia quickly moved to also establish a modern national education system and universities (Bowen 1981, pp. 244­–257; García-Belmar et al. 2005, p. 224; Nieto-Galan 2016, p. 123). Various entities worked to strengthen the teaching of science and technology in 19th-century England, arguing that they must not fall behind neighboring nations (Green 1995, pp. 125­–126; Lightman 2016, p. 345). Similar claims were made in Russia and England from the end of the 19th century through the turn of the 20th century regarding the importance of scientific education to uphold national resilience, and these subjects were integrated into the curricula of their national educational systems (Ellis 2012, pp. 47, 59­–60; Guseva 2018, pp. 487­–490; Vucinich 1970, pp. 35­–70). Science and technology became integral parts of formal curricula throughout the Western world during the 19th century, especially in the second half of the century (see for example, Donnelly 1991, 2001, pp. 14­–20; Gaukroger 2020, 342­–347; Kohlstedt 2010, 11­–36; Lerman 1997; McClellan and Dorn 2006, pp. 309­–310).

The goals of scientific and technological education varied from country to country, depending on their social, economic, and political situations, but in general, they tended to be linked to national goals. For example, in England, science education was intended to reduce the danger of political bias by an uneducated lower class, while in the United States it expressed the value of empowering the general public (Ezrahi 1990, pp. 164­–165). In Norway, national education at the turn of the 18th and 19th centuries combined civic and patriotic content by striving to achieve economic efficiency and technological training (Nodeland 2021, pp. 194, 198­–199). However, the spread of curricula on scientific and technological subjects in the West during this period was not linear or constant, and it differed in urban and rural areas (Heywood 2018, p. 78). This trend was sometimes delayed by opposition due to concerns that science posed inherent threats to religious belief, students’ morality, and national political stability (Kamens and Benavot 1991, pp. 151­–154, 166­–167).

Reforms in formal education often suffered from inadequate or lethargic management, but children and youth often received scientific and technological knowledge in their leisure time through literature provided by other cultural entities. This was particularly noticeable in France in the 1860s, where publishing houses began to issue science books and magazines for children. For example, Pierre-Jules Hetzel (1814­–1886), who ran the main French literary publishing house for some fifty years (Lachapelle 2015, p. 48), believed that France lost the war against Prussia (1870­–1871) due to the inferior level of education among France’s population.

For many years, Hetzel edited a bimonthly magazine for children and youth that included attractive and entertaining stories about science and scientists. Hetzel also provided a platform for the famous science fiction author Jules Verne by publishing his books and including his stories in the magazine. Verne’s works, aimed mainly at youth, had exciting plots based on contemporary scientific and technological knowledge. In the last third of the 19th century, the idea took root in France that the route to their nation’s success lay in the mastery of science and technology, and that teaching scientific knowledge can be used to transmit patriotic messages, as well as educational ones (Evans 2000; Hendrick 1992; Unwin 2000, pp. 46­–48). During this same time in England, a wide range of games and books were designed to encourage enthusiasm and passion for science and technology among middle-class children from a young age (Gaukroger 2020, pp. 347­–348; O’Malley 2003, p. 6).

Various literary means were used to attract a young audience and to encourage them to ingest scientific and technological knowledge. For example, scientific themes were integrated into fairy tales and monster stories (Gaukroger 2020, pp. 348­–356). Children’s magazines were another important conduit for teaching science and offered an alternative to the official education system. The authors and editors of these magazines strove to raise children’s interest in science and to provide them with knowledge about science and technology, for example with articles about zoology or experiments in chemistry and electricity (Dixon 2001; Hellman 2013, pp. 67­–72; Kohlstedt 2010, p. 31; Noak 2004; Sheets-Pyenson 1985, p. 560; Sumpter 2016).

The writers of science textbooks or popular science texts for children were not satisfied with simply encouraging scientific curiosity and conveying factual information; they also used these channels to teach values, ideologies, and moral concepts (García-Belmar et al. 2005, p. 227; Myers 1989; Secord 1985, pp. 135­–139). They presented scientists, inventors, and explorers such as Christopher Columbus, Michael Faraday, Alexander von Humboldt, and Charles Darwin as heroes (Lightman 2016, pp. 346­–348). Biographical or autobiographical texts about Isaac Newton, Benjamin Franklin, Louis Pasteur, and the Russian physician Nikolai Pirogov became educational classics (see examples of this in Hellman 2013, pp. 145­–146; Hendrick 1992, p. 149; Secord 1985, p. 135; Sinkoff 2000; Theerman 1990). They presented science and technology as positive forces that had a critical role in shaping the morality of the younger generation. Knowledge in these fields was expected to be utilized to achieve ideological, religious, social, and national goals. For example, the *Child’s Magazine*, which began publication in the United States in the 1830s, included articles about the microscope, the water cycle, the solar system, exotic animals, and various species of trees. The purpose was to teach children about God’s wonders, and thus make them more moral and able to contribute to the nation (Connors and MacDonald 2011, p. 116). Science education in the United States had a clear national and social orientation: to create upright and productive citizens, and schools were viewed as fertile ground where the next generation of brilliant scientists would be cultivated (Slotten 1991, pp. 330­–337).

This spread of formal scientific and technological education did not bypass Jewish society in Europe. As in the non-Jewish educational system, science textbooks and popular science literature dealt not only with the dissemination of purely scientific content but strove to provoke a profound change in the Jewish educational ideal.

# Acquisition of Scientific and Technological Knowledge Among Ashkenazi Jewish Children and Youth

In Ashkenazi Jewish communities, education was focused on preserving traditional values and community structures. In *cheder* (religious schools for young boys) students were taught to read Hebrew scriptures for worship and religious study, and other areas of knowledge were hardly addressed. Few didactic texts were produced for children or youth (Katz 1957, pp. 221–222; Kleinberger 1962, p. 21; Marcus 1998, pp. 57–72; Ofek 1979, pp. 19–26).[[3]](#footnote-3) Despite this tendency toward inertia, by the 16th century, *yeshivot* (religious study halls) began to change their study patterns and the first efforts were made to integrate subjects such as philosophy and science (Elbaum 1990, pp. 17, 155­–156; Reiner 2007, 2011). However, even in the 18th and 19th centuries, mainstream Ashkenazi education was still based on the traditional ideal of the *talmid chakham* (Torah scholar), and the main texts used to teach children were the Bible, prayer book, and especially the Talmud (Sharpstein 1943, pp. 93­–117; Toriansky 2010; Zelkin 2008a, pp. 22­–23). The ways in which Jewish children and youth in this environment were exposed to science and technology, either within the education system or outside of it, differed over time, and it is not possible to talk about a uniform experience through which Jewish students became familiar with these subjects.[[4]](#footnote-4)

The Jewish Enlightenment (*Haskalah*) movement sought to reform the prevailing tradition in Jewish education. This included giving a central place to the sciences. The Haskalah movement first emerged in northern Germany toward the end of the 18th century. Its advocates for modernizing Jewish culture operated in various population centers throughout the 19th century. Followers of the Haskalah saw modern education as a primary means of influencing the future of Jewish society, and pinned their hopes on Jewish youth reforming and improving Jewish culture (Katz 1985, pp. 125­–127; Kogman 2010; Rafal 1986, Shah; Shavit 2014; Zelkin 2008a, pp. 13­–19). Jewish schools based on Haskalah ideals were founded in Central and Eastern Europe from the end of the 18th century and throughout the 19th century. They adopted a modern curriculum that included the sciences. However, these schools had limited success. In 1832, only 100 out of 1,000 children in Berlin attended Jewish schools. In the first half of the 19th century, most Haskalah schools closed, or their Jewish character was minimized (Eliav 1960, pp. 79, 94, 173­–174; Feiner 1995, pp. 423­–424; Sharpstein 1945, pp. 92­–96).

While modern Jewish education weakened in many Central European cities during this period, it did not completely disappear. The educational patterns created there were adopted, at least in part, by Haskalah educators throughout the Ashkenazi world (Feiner 2001; Levin 2001, pp. 123­–125; Stanislavsky, 1993, pp. 127, 131­–132; Zelkin 2008a, pp. 125­–128). Haskalah schools were founded in Vilna, Oman, Odessa, Kishinev, and other communities in the Russian Empire in the first half of the 19th century, by teachers who used a curricular model they brought from Galicia, which included science education (Stanislavsky 1993, p. 135; Zelkin 2000, pp. 80­–81; Zelkin 2006, pp. 244­–246). Although traditional education continued to be dominant in Eastern Europe, by the end of the century there were an increasing number of private educational institutions and *“*reformed *cheders”* that offered a modern Jewish education (Kreiz 1994, pp. 285­–296; Zelkin 2008a, pp. 147­–151; Zipperstein 1988).

From the middle of the 19th century onwards, most Jewish children in Central Europe attended public schools (Eliav 1960, pp. 204­–208; Fahn 1919, pp. 71­–74; Kieval 1987, p. 96; Machman 1979, pp. 128­–138; Rahden 2000, 158­–159; Rotman 1999, 57­–92; Wistrich 1990, p. 24). This clearly contributed to the spread of the new ethos of science and technology among Jewish youth. Once European universities became open to Jewish students, they began to aspire to prestigious careers in the sciences, and despite the many obstacles to realizing their dreams, they arrived at the universities *en masse* (Efron 2007, pp. 171­–173). In the German-speaking region, at the end of the 19th century and beginning of the 20th century, the new figure of the successful Jewish scientist emerged, who was a member of the bourgeois class and aspired to integrate into general society. The diligence, perseverance, and motivation to grapple with intellectual issues that had been instilled in them through Torah study were now directed to the challenges of science (Efron 2014, pp. 170­–174; Volkov 2001, pp. 261­–263).[[5]](#footnote-5)

Autobiographies and biographies of Jewish scientists born in the 19th century in Central Europe show that they were able to succeed because they knew the language of the country where they lived, their parents had the desire to acculturate, and they were removed from the traditional Jewish framework and education. For example, Ferdinand Julius Cohn (1828­–1898) from Breslau became a lecturer on biology at the university in Breslau and was among the few Jews who received an award for his achievements in science and loyalty to the city (Rahden 2000, pp. 225­–230). In his autobiography, he recounted his early interest in learning and particularly in the sciences. He learned to read by the age of two, and by three he read *Naturgeschichte für Kinder* *(A System of Natural History, Adapted for the Instruction of Youth)* by Georg Christian Raff (Cohn 1901, p. 16). Cohn most likely read the book in the original German, even though it had been translated into Hebrew a quarter of a century earlier (see more on this below). Cohn’s formal schooling and sources of knowledge were non-Jewish. He attended the public education system (ibid., pp. 16­–21). It is difficult to see to what extent the Jewish scholarly tradition influenced his scientific work (see discussion of the relationship between the two in Charpa and Deichmann 2007/2008, p. 98). Similarly, Jewish chemist Fritz Haber (1868­–1934), also from Breslau, who won the Nobel Prize for Chemistry in 1918 was educated solely in the public school system (Stoltzenberg 2004, pp. 12­–20). Richard Willstätter (1872­–1942) born in Karlsruhe, Germany, who won the Nobel Prize in Chemistry in 1915, acquired his scientific knowledge at a young age from postage stamps and books in German. His formal education took place in a public pre-gymnasium school, and later at a gymnasium in Nuremberg (Willstätter 1949, pp. 18­–28).

Albert Einstein (1879­–1955), winner of the Nobel Prize in Physics in 1921, was also educated outside of Jewish frameworks. The book *Naturwissenschaftliche Volksbücher* *(Popular Books on Natural Sciences)* by Dr. Aaron David Bernstein (1812­–1884), a Jew from Gdansk, had a pivotal impact on him (Charpa 2007, p. 174). Einstein read Bernstein’s books in the original German, although they had been partially translated into Hebrew and published in Warsaw in the 1880s (see below).[[6]](#footnote-6)

Young Jews in Central Europe followed primarily non-Jewish paths to science and acquired their knowledge through modern languages. Young people born into highly acculturated Jewish families took advantage of opportunities to integrate into the public education system. Even if their success in the field of science stemmed from the Talmudic tradition, as Charpa and Deichmann (2007/2008, p. 108) claim, their studies in the European public education systems also made a decisive contribution. Young Jewish students internalized the European educational ethos championing the sciences that was transmitted through public elementary schools, gymnasiums, and universities.

However, among Eastern European Jewish communities, the spread of the educational ethos of science and technology was more complicated. It was linked to the modernization of Jewish education, and Jewish youth could encounter the sciences either through the state’s public education system or in modern Jewish educational settings. While Jewish students in the state’s public schools certainly learned about science and technology, few were able to access this option. Unlike in Central Europe, there were many barriers to the integration of Jewish children in state schools. In the first half of the 19th century, Russian Jews resisted the mandatory educational requirements imposed on them. In the last two decades of the 19th century, government quotas limited their entry into the public education system (Edwards 1982; Goldstein 1986, pp. 148­–149; Kreis 1994; Nathans 2002, pp. 261­–266; Rabkin 1983, pp. 22­–23; Stanislavski 1993).

The Haskalah schools established throughout Eastern Europe from the start of the 19th century apparently had some impact in encouraging science education but, as mentioned, there was a limited number of these schools in this region. Some young Eastern European Jews were introduced to the sciences at rabbinical seminaries in Zhytomyr and Vilna, where modern subjects, including science, were taught (Dohrn 2001; Slutsky 1993; Zalkin 1995). The level of this scientific education depended on the teacher, but even if they did not provide in-depth scientific education, they made an indirect contribution to it because students learned modern languages (Zalkin 1997),[[7]](#footnote-7) which gave them access to up-to-date scientific knowledge in non-Jewish sources.

Mastery of languages such as German, French, and Russian was a precondition for autodidactic learning that was a common way of learning about the sciences and technology at the time. Jewish scholars and authors who knew European languages bridged that gap and brought the sciences to the Jewish world (Shavit and Reinherz 2011, pp. 55­–61). For example, the poet and physician Shaul Tschernihovsky (1875­–1943) learned Russian at the age of five from his aunt, and became interested in nature studies through books in that language, such as one on the “Three Kingdoms of Nature” (Tschernihovsky 1994, p. 57).

Similarly, Zvi Hacohen Rabinowitz (1832­–1889) learned German from his uncle and studied books in that language on mathematics, natural science, geography, and astronomy. This extensive knowledge base enabled him later to write a series of science books in Hebrew, *Otzar Ha-chochma Vi-hameda* *(The Treasure of Wisdom and Science)* (Shavit and Reinhertz 2011, pp. 122­–126; Zagorodsky 1886, pp. 442­–443).

Yehezkel Kotik (1921­–1947) studied in a Russian school from the age of ten. Within a single year, he learned Russian and was able to read translations of Jules Verne’s works. In the last decade of the 19th century, Kotik worked to make popular science literature available in Yiddish, because most Jewish children at that time did not read Russian (Cohen 2020, pp. 128­–130, 309­–310). At the beginning of his book *Winter Abendaen (Winter Evenings),* Kotik argued in favor of popular science writings for children. Hesaid that Jewish children need the scientific knowledge and ideas of the modern era, and rather than waiting until they were permitted to attend public schools *en masse*, these subjects should be available in their mother tongue, Yiddish (Kotick 1896, IV).

Gradually, the sciences and technology became a legitimate component of modern Jewish education in Europe. Scientific and technological knowledge was disseminated in two intertwined ways. One was through Haskalah educators and others who popularized science and technology because they viewed this knowledge as essential for students (Zalkin 2016, pp. 155­–157). The other was popular didactic texts, books, and journals in Hebrew that made knowledge about the sciences accessible to both teachers and students. Reformers of Jewish education accepted that science and technology were necessary for the intellectual and spiritual development of Jewish children and youth, to prepare them for the modern labor market, and to strengthen their Jewish national identity.

# Popular Science Texts in Hebrew: A Core Means for Teaching Science to Jewish Children and Youth

Formal education for Jewish children in Eastern Europe was limited and marginal until the end of the 19th century, and most were not able to learn the languages in which scientific literature was written at the time. Therefore, popular literature in Hebrew was a means for introducing scientific concepts to Jewish youth and satisfying their curiosity about the technological innovations they encountered in their world. Jewish thinkers and scientists in Eastern Europe recalled their early exposures to the sciences and their strong desire to study them in greater depth. Chaim Weizmann (1874­–1954), who became a scientist and a central figure in the Zionist movement, credited much of his knowledge to a gifted chemist who taught at the public school in Pinsk (Weizmann 1944, p. 27). Weizmann also thanked an exceptional teacher at the *cheder* for even earlier exposure to the sciences:

He was an “enlightened” type; that is, he was influenced by the spirit of the Haskalah, which was widespread at the time in the main centers of Russian Jewry. He managed to sneak in secular studies during the breaks between sacred studies. I remember how he brought to the *cheder*, clandestinely but with great joy, a Hebrew textbook on nature and chemistry, the first book of its kind to reach that area. I do not know how this treasure fell into his hands. Without ever having seen a chemistry laboratory, and with no knowledge of the natural sciences, as was typical among Jews living in the ghettos in Russia, he would delve into this book and explain what he had learned to select students. He even lent it to some students to read in the evenings. And sometimes – although there was a risk that his actions would be discovered and lead to his immediate dismissal – he would read us some pages which he found especially interesting. Understandably, these were read aloud with the traditional chant used when studying the Gemara, so that anyone passing by outside would not suspect that we were not engaged in the regular *cheder* studies (Weizmann 1944, p. 11).[[8]](#footnote-8)

It is possible that the book this teacher read from was the *Book of Separation and Assembly* from the previously mentioned *Treasure of Wisdom and Science* by Zvi HaCohen Rabinowitz (Vilna, 1876). Weizmann was quoted as saying that this work by Rabinowitz affected him deeply and led him to the world of science.[[9]](#footnote-9)

The Haskalah-oriented school teacher Weizmann mentioned was Rabbi Avraham Yitzchak Motolansky (Rose 1986, pp. 20­–21). Weizmann’s two sisters also studied with Motolansky when they were around 10­–12 years old, and he left an indelible mark on all of their lives. His sister Haya Weizmann-Lichtenstein (1879­–1959) mentioned Motolansky in her memoirs and said that he introduced his students to contemporary Hebrew scientific literature and taught them about how technological innovations such as telegraphs and trains worked (Weizmann-Lichtenstein, pp. 49­–50). She also noted that her brother learned from Bernstein’s popular science books (1880­–1885), which had been translated into Hebrew under the title *Yediot Hateva (News of Nature*). This shows that although traditional Jewish education did not support teaching science and often even saw it as subversive, the subject was nevertheless taught sometimes within these settings.

Similarly, Russian-born Jewish historian Ben Zion Dinor (1884­–1973) mentioned in his memoirs Haskalah teachers who introduced their students to science literature in Hebrew. Dinor wrote about a teacher who would read to his students on the Sabbath before Rosh Chodesh from books on the geography and history of Israel by Kalman Shulman, *Shulamit*, *Har’el* and *Halichot Kedem*. During summer vacations, Dinor and his friends read modern Hebrew literature together, including Kalman Shulman’s book *Musadi Eretz (Foundations of the Earth)* on European geography (Dinor 1958, pp. 37; 40; see more on Shulman’s books in Chapter 3).

For Jewish students who were denied the opportunity to participate in formal education and could not learn European languages, the only option was to learn about science from popular science books published in Hebrew. Shlomo Maimon (1753­–1800) from Lithuania, who became a well-respected 18th-century European philosopher, described how he learned cosmology from a Hebrew textbook that he secretly took from his father’s bookcase (Maimon 1792­–1793, pp. 37­–40).

Jewish students continued to learn science from popular literature through the end of the 19th century. In his memoirs, Ahad Ha’am (Asher Zvi Hirsch Ginsberg, 1856­–1927) said that when he was 11 years old, he studied mathematics and engineering from the Hebrew book *Melekhet Mahashevet* during school breaks, when he was supposed to be memorizing passages from the Gemara (Ahad Ha’am 1959, pp. 481­–482). This book, attributed to Eliyahu of Pintsov, had been published in Berlin about a hundred years earlier (1765). Ahad Ha’am said studying it became an addiction that helped him quit his other harmful habit of smoking cigarettes. But when he began to scribble mathematical formulas on the doors and windowsills of his house, his “crime” was discovered and the book was taken away from him. He said *Melekhet Mahashevet* was the foundation for his ongoing independent study in the field of mathematics: “I admit that my knowledge of mathematics began with this book. Many years later, when I studied mathematics from books more suitable for this purpose, the knowledge I acquired in the *cheder* was of great help to me,” (ibid.). He said that he read these books on mathematics in the bathroom because he was afraid that his father or other adults would confiscate them (Ahad Ha’am 1989, p. 482). Another book he read as a young child was *Yesodei Hochmat Hashiur* by Chaim Zelig Slonimsky (ḤaZaS), published in 1865 in Zhytomyr. Slonimsky, (whose life and work are described in detail in Chapter 6), was a key figure in disseminating and popularizing scientific knowledge among Jewish youth. Eliezer Ben Yehuda also said that the books of Slonimsky and Rabinowitz set him on his path to the Haskalah so that he eventually gave up his Torah studies in favor of going to university and studying medicine (Ben Yehuda 1986, p. 61). For others, such as Yehezkel Kotik, whose families would not allow them to study in secular institutions, reading popular educational texts was their only consolation (Kotik 1998, pp. 347­–348).

The role played by popular Hebrew science literature in forging a path to modernization in the 18th and 19th centuries differed between various parts of the Ashkenazi world, depending on what formal education young Jews were able to receive. By the middle of the 19th century, most Jewish children and youth in Central Europe had been integrated into public education settings and studied the sciences in the national language, and science became a means for social mobility. In Eastern Europe, traditional Jewish education was still prevalent and the integration of Jewish children into public education was slow. For these youth, popular science literature in Hebrew played an important role in modernization and education throughout the 19th century.

At the turn of the 20th century, a popular book on astronomy by Nicolas Camille Flammarion was translated from French into Hebrew as *Hashamayim* (*The Heavens*) and published in Warsaw. The translator, Michel Weber (1859­–1907) said he had to edit the original so it would be appropriate to the low level of scientific knowledge among the Jewish public, and bemoaned the unfortunate lack of comprehensive scientific education (Flammarion 1898, “Translator’s Introduction,” pp. 3­–4).

Hebrew literature on science had a particular appeal for young people, whether they learned this material openly or in secret. In general, Jewish modernization movements were led by Jewish youth who were open-minded, courageous and had a tendency toward subversiveness (Biale 1983; Hotam 2008; Werses 2000).[[10]](#footnote-10) Youth adopted new knowledge and ideas with relative ease, and this was a major force in changing traditional Jewish views, including the perception of the sciences.[[11]](#footnote-11) Learning about science could significantly undermine their worldview and change their attitude toward Jewish tradition (Sofer 2007, pp. 56­–57; Zalkin 2005, p. 250; Zalkin 2007, p. 243). For example, Yehuda Leib Katsenelson (Buki-ben-Jogli) recalled his shock when, at age 15, he read Slonimsky’s *Sefer Kukhva di-Shevit* about the heliocentric structure of the solar system (Buki-ben-Jogli 2017, pp. 71­–76), which contradicted the outdated astronomical model that was accepted still widely in the Jewish world at that time (see more about this below). He also said it was a spiritual revelation when he read about the telegraph in a Hebrew scientific journal *HaTzefira (The Siren),* founded and edited by Slonimsky. Even though Slonimsky’s journal and books were not specifically aimed at youth, it is clear that they read his works.

Jewish youth widely read educational texts, and even wrote many of them (Feiner 2011, pp. 214­–215). This is particularly noticeable in scholarly journals, which included many popular science articles (see more about this in Chapter 2), which appealed to a general audience, but were mainly read by young people. Yitzchak Eichel (1756­–1804) was one of the founders and editors of the first educational journal in Hebrew, *Hame’asef*, published in Germany in the last two decades of the 18th century and the beginning of the 19th century.

Eichel saw *Hame’asef* as an enterprise by and for a young audience: “Because we are young, and most members of our community are working hard just to buy their daily bread, both those involved in teaching the youth or those engaged in matters of business [...] new things will awaken in a young man’s heart the desire to strive for success,” (Eichel 1788, Introduction, pp. 12­–13, numbering mine).

Almost 80 years later, Kalman Shulman, a scholar and author of popular science books, said: “*Sefer* *Hame’asef* was successful and brought more benefit to youth than schools could,” (Shulman 1866, p. 26). *Sefer Hame’asef*, an anthology of this journal published in Warsaw in 1886, presented this early modern Hebrew journal as an expression of the predominance of youth culture:

They were especially happy about *Hame’asef* in Berlin, which was the cornerstone for the education of Israel [Jews] at that time. [...] Eichel and Barsley[[12]](#footnote-12) found many young people who were dedicated to the Haskalah and whose souls were connected to the ancient language [Hebrew] and longed to renew it. Even Ben-Menachem[[13]](#footnote-13) himself reached down to young people from his lofty position and published a few poems in *Hame’asef* [...] In the introduction to the first issue of *Hame’asef*, the editors printed an article by a young man who anxiously asked that *Hame’asef* open its gates to him. It was as if they wanted to open their people’s eyes and say: **A new day has arrived; the time has come for the elderly Eliphaz to give his place to the young Elihu. The time has come when the great will listen to the small when young people will prove to our people that they can teach their elders understanding and bring them wisdom**.” (Department for the Development of Language and its Literature in the Society for the Spread of Enlightenment among the Jews of Russia, 1886, p. 3, emphasis added).

A similar trend can be seen in other Hebrew journals. *HaTzefira,* edited by Meïr Halevi Letteris (1822) appealed to youth (Mahler 1961, p. 60) and was read by some Beit Midrash students (Sofer 2007, pp. 61­–62; see more on this in Chapter 6). Yosef Perl (1773­–1839), a leader of educational reform in Galicia, said that the primary goal of the journal *Kerem Hemed* was to spread values among Jewish youth (Mahler 1961, pp. 60, 158). In the second decade of the 19th century, he founded the journal *Tzir Ne’eman* for students of his school (see more on Perl in Chapter 3). Moshe Yehuda Leib Lilienblum (1843­–1910), a well-educated early Zionist, said that when he was about 15 years old, he began to read the journal *Hamagid*, and later, when he became a respected teacher, his students subscribed to this journal and discussed it in a weekly circular (HaCohen 1883, pp. 105­–107). Ben Zion Dinur said that he subscribed to *Hamelitz*, as did other students at the yeshiva where he studied (Rosolio-Davidovich 2019, p. 25).

Teachers brought the journal *Hashachar* and Haskalah books to students in a small town in Lithuania to spread the ideas of the Haskalah (Proosh 2001, pp. 72­–73). Young people not only read these publications, they became partners in their creation, as Eichel noted in his description of the *Hame’asef* enterprise at the end of the 18th century (see above). This phenomenon continued into the 19th century. The authors on which the Hebrew press in Russia relied at this time were primarily young adults (see Segev 2015, pp. 146­–160).

One reason these journals attracted young people was that they included news about science and technology. Interest in these subjects became an identifying feature of this young generation. Yitzhak Weinert, the editor of the journal *HaTzir,* which was published in Lviv in 1861­–1862, addressed political issues for the general public but recognized that news about technological innovations was of special interest to youth (see Chapter 5). Author and translator Jacob Fichman (1881­–1958) implied that the degree of attraction to science and technology differed between younger and older generations. He recalled being hosted by a Jewish family when he was 14 years old, and as he enthusiastically read aloud excerpts from the Hebrew scientific journal *HaTzefira*, his elderly host fell asleep (Fichman 1943, pp. 6­–8). This can also be seen in Buki-ben-Jogli’s description of how *HaTzefira* fell into his hands for the first time:

One of my relatives, a politician by nature, was traveling in Warsaw for business purposes. He heard that a Hebrew journal had begun publication there, and immediately subscribed to it and brought three issues with him to Russia. “I really made a mistake this time,” he lamented, holding the three issues folded together. “I thought this would be about Napoleon III and the Queen of England, but instead they print the devil knows what strange things, with pictures and drawings, like those drawings in Tractates *Kil’ayim* and *Eruvin* that I’ve always been afraid of. I am sorry that I wasted my money on nothing. I already paid for half a year. Here, you take these issues. You are well versed in Tractate *Eruvin* and might find something interesting in them” (Buki-ben-Jogli 1772, p. 73).

His elder was interested in politics and considered learning about science and technology a waste of time, but young Buki-ben-Jogli enthusiastically read about these topics. Young people’s attraction to science and technology made them the natural agents for spreading this knowledge in their social environment. After Buki-ben-Jogli read in *HaTzefira* about how the telegraph worked, he explained it to the older men at his Beit Midrash, although they were more interested in politics. He recalled this unusual experience, in which he, as the youngest in the group, imparted knowledge to his elders:

The small group had already gathered around the long table by the stove and were talking about politics. With trembling legs, I approached them and announced proudly: “Gentlemen! The secret of the telegraph will be revealed, I will reveal the secret of the telegraph!” Together they cried “Is that so?” and stood up awkwardly from their seats. “Yes, yes, I am here and I will explain it to you.” At the moment, Napoleon and the Queen of England were both forgotten and I, who already knew Slonimsky’s article by heart, took a piece of coal from the stove and drew on the white table a diagram of the electric battery and its key, the magnetic ingot and the writing machine – each in proper style. **The idea, that I, the youngest in the group, led the discussion that day, gave me the ability to explain all the details explicitly and clearly. While I spoke, they all sat down and remained silent, without interrupting me** [...] (Buki-ben-Jogli 1811, p. 75, emphasis added).

In contrast to the older generation, who studied traditional holy texts or read about practical and current affairs, Jewish youth were thirsty for scientific and technological knowledge. Buki-ben-Jogli emphasized the challenge of being a young man teaching his elders, but his mastery of the knowledge from *HaTzefira* gave him the strength and confidence to do so. Another expression of this distinction between generations also appears in “A Story of What Happened,” published in the journal *Ivri Anochi* (*I am a Hebrew*) in 1890.[[14]](#footnote-14) The story’s hero, 16-year-old Michael, was an avid reader of Haskalah books, and his “disgrace” eventually became widely known. In a dramatic scene, Michael is put on trial for possessing Haskalah books including one titled called *Achein Yesh Hashem (Surely There is a God*) (Vilna, 1875)[[15]](#footnote-15) which described the theory of evolution:

In a large, long hall [...]Rabbi Haran, in his green coat, sat in his large chair and scrolled through a small book with contemptuous eyes. At the white table, old men sat to his left and right, among them Shmuel Haroeh and Israel Katina [...] There was complete silence in this fearful place. Nobody spoke, not a word was said, those at the table were looking down at the poor and vulnerable boy, who was standing, with humbled eyes, at the end of the table, in front of the terrible gathering. For a moment, his forehead creased and his face clouded [...] as if there was no life spirit left in him [...]Rabbi Haran began angrily: “You, Michael, in this Garden of Saints, have become a heretic, and rebellion has arisen in your heart? You read foreign books and seek what is above and below? Or you are an uncouth fool!” Michael’s face fell. The rabbi’s face flushed and in his great anger he reprimanded him bitterly: “I have been young, and now am old; yet have I not seen the righteous forsaken, nor his seed seeking knowledge. Look here, men, at this book *Surely There is a God*. Surely there is a God, in clearly understood language. Woe to the listeners who hear that!”

The description of Michael as a “poor and vulnerable boy” facing his elders who were judging him highlights the gap between youth and adults and draws the lines between their interests. The young man wishing to deepen his knowledge of science is a symbol of the future of modern Jewish society, while the elderly rabbis represent the old, traditional world, in which modern science and technology have no part. This growing gap between the cultures of youth and adults led to the development of science literature in Hebrew directed especially at children and youth.

# Differences Between Texts for Children and for Adults and the Development of Science Literature in Hebrew Aimed at Children and Youth

During the modern era in Europe, public interest in science and technology grew rapidly and great importance was attributed to these topics for the future of the nation. Therefore, in many European countries, a distinct genre of scientific literature for children and youth developed. This was part of a broad trend, which gradually spread in Europe beginning in the modern era, of clearly differentiating between books for children and those for adults, and the creation of a special market for children’s books. Texts specifically aimed at children reflected modern conceptions of childhood and new educational trends among the middle class (Müller 2011; Shavit 1990). James Secord described the development of popular science literature for children in England in the 18th century, and its gradual separation from literature for adults:

Throughout this period, the specific category of “children’s literature” was in the process of being defined, and works written specifically for young people often contain long quotations from those intended for adults […] it is likely that many children had their first exposure to science through simple descriptive works from their parents’ libraries (Secord 1985, p. 130).

In research on English children’s books in which animals were represented, Ritvo claimed that at the beginning of the 19th century, the distinction between books for children and for adults was still unclear (Ritvo 1985, p. 74). McDowell examined how the theory of evolution was presented in books published in the United States at the turn of the 19th century, and noted that authors tended to direct scientific texts to children and adults simultaneously (McDowell 2016, pp. 139, 148). Many journals published in the United Kingdom in the 19th century were intended as “reading material for the family,” and therefore were aimed at children and adults alike (Connors and MacDonald 2011, pp. 101, 104). This was also true of magazines for children and teenagers published during the 19th century in the United States (Kilcup 2021, pp. 2­–4). A series of science texts for children published in the late 19th century in France was designed to teach adults as well, based on the widespread concept that learning and doing experiments together would bring children and their parents closer (Lachapelle 2015, pp. 50­–53). Some texts included separate sections addressed to children and adults, indicating ambivalence regarding separating children from adults during this period.

There was also a long process of differentiating between texts for Jewish children and adults. In traditional Jewish communities, there was little Yiddish literature specifically for children, so children read popular Yiddish literature, which appealed to them as well (Shamrock 1979, pp. 172­–174). Since children were a primary audience for Yiddish literature in the pre-modern period, many stories were adapted for them, with characteristics of children’s literature such as a simple plot structure, illustrations, and didactic content (Berger 2016, p. 10). Many books published in Yiddish and Hebrew were directed at young people and adults alike (Kogman 2013, p. 203; Shamrock 2016, p. 170; Shavit 1986; Udel 2020, pp. 6­–13). These unclear boundaries indicate a lack of differentiation between adults and children as cultural categories in traditional Jewish society. This was particularly evident in formal educational texts for children (Kannerfugel 2003, pp. 56­–58; Shavit 1993, pp. 195­–196; Weinstein 2005).[[16]](#footnote-16)

Research on translations of Haskalah texts into Hebrew in the 18th century showed the difficulty in differentiating between those intended for children and those for adults and concluded that most were aimed at both, based on a perception among Haskalah authors that the Jewish public as a whole had “childlike” characteristics (Idelson-Shein 2016, pp. 385­–386). A clear distinction between children’s and adult literature in the Jewish world only began to emerge at the turn between the 19th and 20th centuries (Ferger-Wagner 2020, pp. 256­–257; Fogel 2004, pp. 250, 295­–296; Hoge 2007).

Science literature for Jewish children and youth expanded in the last two decades of the 18th century and throughout the 19th century. This literature was mostly written in Hebrew, or as bilingual texts in Hebrew and the national languages. The authors specifically addressed Jewish children and teenagers, who were the main, if not the only, target audience of their book. This shows the emerging role of science in shaping modern Jewish identity among the young generation. As mentioned, Hebrew scientific literature aimed at a general audience was often read by youth. The opposite is also true; some textbooks for children and youth were read by adults, for example, *Reshit Limudim (First Studies*) (Lindau 1788), and *Shevilei Olam (Ways of the World)* (Bloch 1822, 1828), which will be discussed in more depth later. The authors were mostly members of the Haskalah or Chochmat Yisrael (Academic Study of Judaism) movements. These books are part of a broad corpus of Hebrew popular science literature created during this period (Shavit and Reinhertz 2011). They expressed a desire to develop Hebrew as the cultural language of the Jews (Grossman 2000, pp. 116­–119; Shavit 1993), and to expand into areas of knowledge shared with non-Jews by enriching young Jews’ scientific and technological knowledge. Not all of these texts aspired to secularize the Jewish world; some rabbis promoted knowledge of the sciences, albeit cautiously. During the 19th century, there was a trend in which national languages replaced Hebrew. This changed the status of scientific literature in Hebrew in traditional study circles, because some rabbis came to believe that the younger generation would want to learn Hebrew so they could read texts about the sciences in which they were so interested (Kogman 2017).

During the period covered in this study, the mother tongue of most Jewish youth was Yiddish. To varying degrees, they also knew Hebrew and state languages such as German, Russian, and Polish, which they learned in the public education system or informally on their own. Multilingualism varied across Central and Eastern Europe, and between urban and rural areas. Hebrew was mainly taught to Jewish boys in the traditional education system and in “reformed cheders” (Fishman 2005, pp. 29­–30; Stampfer 2010, pp. 196­–206; Zelkin 2008a, pp. 69­–74, 147­–164). Knowledge of Hebrew was less common among Jewish girls, but their command of the national languages improved as they began attending public schools toward the end of the 19th century (Manekin 2020, pp. 12­–30, 305; Parush 2004, pp. 57­–70; Stampfer 2010, 185­–186; Zipperstein 1988).

Educational texts in Hebrew texts for children and youth emerged in the last third of the 18th century and continued to expand during the 19th century. However, children’s literature in Yiddish began to appear only in the second half of the 19th century, with the establishment of a modern education system in Yiddish. The process of separation between Yiddish literature for children and adults accelerated, and by the turn between the 19th and 20th centuries, a corpus of children’s literature in this language began to take shape. However, it wasn’t until the years between World War I and World War II that children’s literature in Yiddish truly flowered (Bar-El 2008; Cohen 2021; Ofek 1988a, pp. 56, 62; Shamrock 1978, p. 171; Veidlinger 2009, p. 111). Therefore, scientific literature for children and youth published in Hebrew was the main arena in which a scientific ethos was expressed in the Jewish educational world during this time.

The current book will examine popular literature on science and technology for Jewish youth, the specific topics it addressed, the ways it was designed for a young Jewish audience, its social, religious, and ethical messages, and its relationship with contemporary science literature from the non-Jewish world. It highlights the role of intellectuals and educators who worked to spread the sciences among this population, such as Baruch Lindau, Joseph Perl, David ben Jacob Aaron Luria, and Buki-ben-Jogli (Yehuda Leib Katsenelson). The last chapter focuses on one of the main popularizers of the sciences in the 19th century, Chaim Zelig Slonimsky, and how he worked to spread scientific and technological knowledge among young Jews.

At the core of this book is the corpus of Hebrew scientific texts aimed at Jewish children and youth, including anthologies, textbooks, books, and journals. This book’s purpose is to outline the main paths in the development of popular Hebrew science literature for children and youth in Europe in the modern era. It shows how a scientific educational ethos was part of the modernization processes in the Jewish world in Europe. Analysis of these texts and the actions of the agents involved in their dissemination among youth shows how a new educational ideal spread throughout the Jewish-Ashkenazi world during the modern era. In this way, I demonstrate the role of science and technology in modern Jewish identity. Additionally, I show how clear boundaries began to be set between the worlds of children and adults and literature aimed at each.

# Chapter 2

# The Sciences in Jewish Culture: From Ancient Traditions to Modern Science Education and Popular Science Literature in Hebrew

## **The Sciences in the Jewish World from the 12th Century to the Modern Era**

Jewish culture was late in accepting new scientific concepts and knowledge. This was particularly true of the Ashkenazi communities, in comparison to the Sephardi Jews in Spain who adapted to the changes brought about by the scientific revolution with relative ease. Traditional Jews had objections and ambivalence about scientific ideas, which did not disappear easily. Additionally, Jews faced ongoing obstacles to entering the sciences, such as being largely excluded from the universities, scientific associations, and other institutions that created new bodies of scientific knowledge. For these reasons, Jews were only marginally and sporadically involved in the sciences even in the 19th century.

Nevertheless, already in the early modern era, Jews’ attitudes to the sciences began to change. As their interest in the sciences increased, the number and variety of Hebrew publications that dealt with current scientific issues expanded. The scientific literature in Hebrew produced in the early modern period relied almost exclusively on scientific knowledge from non-Jewish sources. Further, the line was often blurred between discussion of scientific topics and the study of Torah, *halakha* (Jewish law), or Kabbalah, and it is evident that Jewish thinkers addressed the new areas of scientific knowledge and their consequences in complex ways (Broyer 1990; Freudenthal 1992, 2012; Idelson-Shein 2021; Kahana 2021, 98­–96; Kogman 2017; Levine 1983; Morsel-Eisenberg 2022; Nahar 2005; Ruderman 1995). The dialectic tension between modern science and traditional ideas was a fundamental feature of many of the works that will be described below.

The only scientific fields in which there was a Jewish tradition of study were astronomy and mathematics. This began in 12th-century Spain and continued through the Middle Ages (Sarfati 1968, pp. 21, 36). Because astronomy was used for calculating the calendar, it had a special status in Jewish culture and was studied by major Jewish thinkers such as Maimonides, the Maharal of Prague, and Gersonides (Levine 1983, p. 205). However, ambivalent attitudes towards science persisted, as indicated by Maimonides’s statement that although studying astronomy was important, discussion of it should be limited to philosophical or religious needs (Freudenthal 1992, pp. 45­–47).

By the beginning of the modern era, more positive attitudes and curiosity toward the sciences developed in Ashkenazi culture. For example, some groups of Jews in Central Europe began to study astronomy informally, in addition to their religious studies. Scientific ideas and thought patterns gradually became integrated into traditional rabbinic literature, although the road to this was not straightforward (Kahana 2021, pp. 162­–164, 373­–376 Ruderman 1995, pp. 5, 10­–11). Between the Middle Ages and the modern era, there were two distinct attitudes toward astronomy in European Jewish culture. On the one hand, there was interest in astronomy, which led to the development of a written tradition in Hebrew about it. On the other hand, there continued to be anachronistic rejections of new astronomical knowledge, as can be seen in the attitude to the Copernican heliocentric model. This theory had become an accepted scientific paradigm in Christian European culture by the mid-1600s, after a century-long struggle (Ravetz 1990, p. 213; Schatzberg 1973, p. 314). However, in Ashkenazi-Jewish culture, acceptance of it took much longer, and internal struggles with its implications and consequences continued through the early 19th century (Brown 2008, 2013; Kogman 2013b, pp. 142­–147; Levine 1983, pp. 203­–225). References to the outdated geocentric model were presented in Hebrew scientific publications, such as *Ma’ase Tuvia* by Tuvia HaCohen, published in 1707. HaCohen was impressed by Copernicus’ heliocentric model but rejected it as contradicting the Torah. In his book, HaCohen presented three astronomical models: geocentric, heliocentric, and the Tycho Brahe model which was a compromise between them (HaCohen 1707, pp. 50­–4, see also Ruderman 1995, p. 240). Even later, rabbis such as Israel Zamosz (1700­–1772) and Natan from Nemirov (who died in 1844) rejected the Copernican model (Feiner 1998, p. 110; Freudenthal 2008, pp. 71­–72). Other popular science books published in Hebrew in the 18th century, such as *Sefer* *HaBrit (The Book of the Covenant)* by Pinchas Eliyahu Horowitz ([1917] 1999) supported the geocentric model. In the late 18th century and even into the 19th century some Jews expressed disapproval of the heliocentric model, while others presented it as an outgrowth of traditional Jewish knowledge (Feiner 2008, p. 222; Kahana 2021, pp. 145-146; Nahar 2005, pp. 319­–329; Ruderman 1995, p. 240).[[17]](#footnote-17)

Despite the interest in astronomy, many other branches of science received almost no attention in the Jewish community, and no tradition developed for studying or writing about subjects such as optics, alchemy, or physics (Freudenthal 1992, 44­–45; Freudenthal 2012, p. 9; Reizman 2006, pp. 5­–6). This preference for astronomy and mathematics placed yet another barrier against the Jewish community participating in the scientific revolution, which was overturning vast areas of knowledge and changing the status of many disciplines. Natural history (zoology, botany, and mineralogy) and chemistry came to the forefront of the scientific world in Central Europe (Hayut 1996; Oz-Salzberger 1999, p. 214; Ritvo 1985, p. 72). There was also great interest in technological innovations associated with scientific advances (see Chapter 5). All of this forced the Jews to address areas of scientific and technological knowledge that had no basis in their cultural-literary (Hebrew) tradition.

The first modern Jewish movement to adopt a new approach to science was the Haskalah, the Jewish Enlightenment movement founded in northern Germany in the last third of the 18th century. These German-Jewish intellectuals were pioneers in changing attitudes about the sciences in the Ashkenazi world and led campaigns regarding issues such as burial customs and vaccinations against diseases (Rundrman 2002; Smith, 1988; Westreich 2009). Haskalah leaders supported the values of rationalism and science in public debates and in their writings, which were published in Hebrew and German. They reinterpreted ancient works, such as the book *Ruach Chen* (Zamość, 1744), and they authored new works such as the *Letters of Wisdom* (Lapin, 1919). Some published comprehensive texts in various fields of science, such as *Ma’amar HaTorah v’Hachokhma* *(Article on Torah and Wisdom)* (Schnaber-Lewison 1997) and *The Art of Chemistry* (Schnemann, 1797). Most of the people writing about the sciences were not working scientists, but they were curious about and attuned to scientific and technological developments and were avid readers of contemporary popular scientific literature published in non-Jewish sources.[[18]](#footnote-18)

## **“We will bring them within our borders they will be our cornerstones…” Introducing the Sciences into Modern Jewish Educational Curricula**

In his essay “What is Enlightenment?” Michel Foucault discussed answers to this question that had been given 200 years earlier by two prominent philosophers: the German-Christian Immanuel Kant and the German-Jewish Moshe Mendelssohn:

With the two texts published in the Berlinische Monatschrift, the German Aufklärung and the Jewish Haskalah recognize that they belong to the same history; they are seeking to identify the common processes from which they stem. And it is perhaps a way of announcing the acceptance of a common destiny — we now know to what drama that was to lead (Foucault 1984, p. 33).

The “common destiny” to which Foucault referred was the challenge faced by the Haskalah movement in its aspiration to expand what it had in common with modern non-Jewish culture and to adopt core values of the Enlightenment such as religious tolerance, self-improvement, and universal morality (Feiner 2011, pp. 3­–17). Haskalah proponents criticized the Jewish world’s accepted concepts and traditions. However, they did not completely renounce their heritage. This social movement’s main activities were publishing books and periodicals that carried its message, and establishing a modern Jewish education system that presented a new educational ideal.[[19]](#footnote-19)

The interaction between the Jewish Haskalah and the German Enlightenment had a decisive impact on changing perceptions of the sciences. The Haskalah drew many educational ideas from “philanthropinism” an educational reform of the German-Christian Enlightenment, which emphasized the centrality of education, and especially self-education (*bildung*), as a core means for improving society (Musa 1997/8, pp. 6­–8; Schmitt 2007, pp. 16­–17; Sorkin, 1983, p. 66). Haskalah educators established a network of philanthropic schools in German cities, which adopted principles from the teachings of philosopher and pedagogue Jean-Jacques Rousseau (Bowen 1981, pp. 198­–199; Schmitt 2007, p. 192). Their goal was to spread secular knowledge widely through didactic materials that were specially adapted for children. In their view, a genuine learning process should be interesting, enjoyable, relevant, and useful to students. They encouraged professional and practical education and paid special attention to the sciences, especially nature studies and geography. These schools included nature study rooms, laboratories, and educational gardens, and walks in nature were part of the curriculum. Haskalah proponents wrote many books, textbooks, and other reading materials about these educational reforms (Bowen 1981, pp. 197­–201; Brüggemann and Ewers, 1982, p. 32; Schmitt, 1990, p. 165; Simon 1953, p. 151; Wild, 1990, p. 53).

Following the ideals of philanthropinism, Jewish Haskalah educators proposed far-reaching reforms to Jewish education. They founded modern Jewish schools in Berlin, Breslau, Dessau, Zazen, Frankfurt am Main, and other cities, with curricula that included modern languages, ethics, history, mathematics, geography, and nature studies. Philanthropinist textbooks served as role models for the first systematic and comprehensive compilation of textbooks and reading materials for Jewish children. These texts were enriched with parables, stories, poetry, and plays, in Hebrew or German, most of which were translations or adaptations of modern non-Jewish literature (see Ofek 1979, pp. 27­–102; Shavit 1998; Shavit 1992, p. 42; Shavit and Ewers 1996; Simon 1953; Tori 1993).

Some Haskalah educators established personal connections with the German-Christian educational reformers and were influenced by their ideas. For example, Friedrich Gedike (1754-1803) was a member of the Prussian Supreme School Board, which worked to reform schools in the Kingdom of Prussia. In 1784, Gedike published a sympathetic article about new educational institutions that were established by the Jewish community in Berlin (Feiner 1994, p. 393). In 1791, Gedike participated in the opening ceremony of a Haskalah school in Breslau (Eliav 1960, pp. 80­–81; Reinke 1991, pp. 193­–214). He gave a speech praising the Jewish people for their wisdom, and reassured them that learning modern subjects, including sciences, would not pose a danger to them:

Many Israelites [Jews], perhaps some I am standing among today, sigh and say to themselves, What is all of this to us? Will we not lose our faith by studying the sciences? Will they not remove us from our holy work, and bring us close to things that will destroy the guidance that our forefathers have instilled in us from time immemorial? If the strength of our hands is used in the work of this land, will not the high and strong walls that separated us from the nations among whom we sojourned fall? [...] No, my beloved! My Hebrew people! [...] Your walls will not fall, and your faith will not be lost, because we will hold it strong (Gedike 1796, pp. 240­–241).

Gedike’s reassurance reflects the traditionalists’ fears that exposing Jewish youth to modern knowledge and giving them a practical, professional education would distance them from the Jewish framework. While not all rabbis were opposed to simply acquiring “outside” wisdom, they insisted that it be given only a peripheral place in Jewish education. The Haskalah leaders, on the other hand, saw these fields as solid foundations on which the identity of modern Jewish children and youth would be built. They criticized traditionalists’ reservations about fully integrating these subjects into the curriculum.[[20]](#footnote-20) This can be seen in the words of Yehuda Leib Ben Ze’ev, who was active in the field of modern Jewish education:

For since our nation’s Exile and until this time, we have been considered strangers among the nations [...] and in this humiliation, we lost the glory of a free people, and the obligations of citizens of the land. Our ways and our nature have been corrupted by it [...] We made no effort to learn the languages or literature of the people we live among, nor did not invest time in learning the sciences, which would enable a person to rise to lofty positions and serve in clerical roles or be involved in affairs of the state. Since we have shamefully refrained, we have been excluded from any action or skill of the business of the state, and all these sciences have been of no use to us except to cause even more humiliation than what we have already suffered (Ben Ze’ev 1811, 6, my numbering).

Marcus Hertz (1747–1803), personal secretary to the philosopher Immanuel Kant and a well-known physician and member of the Haskalah movement in Berlin, expressed similar sentiments. He noted that rationality plays a role in shaping moral character, which is the basis for achieving personal happiness. He looked at the surrounding non-Jewish world, and concluded that the sciences were an essential foundation for developing a modern Jewish society:

We, and anyone who seeks good, have an obligation to plant the seeds of these teachings and let them take root in our children’s hearts while they are still young, before their hearts harden and become unable to bear fruit; and to spread these teachings among the people, according to our ability. Behold, in every nation and language around, paths have opened in these subjects for the education of their children while we are with the Lord, for whom this wisdom and knowledge was given, as it is said “[this great nation is] a wise and understanding people” (Deut 4:6). We are God’s chosen and his people, ונסגורה בעדנו; if we do not strive to teach this holy way also to the children of our nation, would it not be an embarrassment for us? What will we answer those who question us, if we do not give this education to our descendants? Will we not become infamous among our enemies? The time has come to critique our actions and correct the errors that we have not recognized until now. Let us give thanks to God, who has bestowed grace upon his creatures and awakened the hearts of the wise men of every generation and nation to labor before us, pave the way of wisdom, and gather the elements of these intellectual matters. With a joyful heart we will bring them within our borders and they will beourcornerstones of the foundations of a wall against our enemies, and let them be an eternal, glorious sign for us and our descendants (quoted in Landau 1788, “Letter [...] of Awe,”, 4­–5, numbering mine, emphasis added).

This quote is taken from a letter written by Marcus Hertz and published in the introduction to an early Hebrew language science textbook *Reshit Limudim (First Studies)* (Lindau 1788, see more on this in Chapter 4), with the purpose of preparing its readers for this book. Like many science texts for children at the time, it was written in Hebrew.

## **The Linguistic Medium for Writing About Science**

Haskalah ideology encouraged writing secular texts in Hebrew, and a rich library of literary, spiritual, and scientific texts began to be created throughout the Ashkenazi areas, especially in German cities, from the end of the 18th century through the 19th century. However, there were doubts and uncertainties about writing these types of texts in Hebrew. The lack of a written tradition and the absence of Hebrew terminology in most branches of science made this a particularly challenging task.[[21]](#footnote-21)

As Central European Jews became increasingly integrated into public educational settings and learned the state languages, some concluded that investing in Jewish science education in Hebrew was unnecessary. The Chokhmat Yisrael movement, which focused on the scientific study of Jewish history and philosophy (Feiner 1995, pp. 184­–168; Livna-Freudenthal 2018; Mendes-Flor 1979) did not view science education as a priority. Leopold Zunz (1794­–1886) of Berlin published a widely-read essay “On Rabbinic Literature” (Zunz, 1818), in which he praised Haskalah books, including the above-mentioned science text for children, *Reshit Limudim.* However, he approved of these books only because they opened a path to academic research on Jewish culture and the Hebrew language, not because of their contribution to bringing scientific knowledge to the Jewish public (Zunz 1818, pp. 24­–25, 27). This attitude intensified in the 1840s in Central Europe. Avraham Geiger (1810­–1874), a leader of the Chokhmat Yisrael movement, claimed that the Hebrew language was “dead” and had exhausted its potential as a language for scientific discourse, and therefore should be abandoned and replaced by modern languages. He said the spread of foreign languages among the Jews eliminated the need for scientific writings in Hebrew (Geiger 1844, pp. 384­–387). Other Jewish scholars said there was no demand for scientific texts or discourse in Hebrew, and that writing them was a waste of effort.

However, many people affiliated with the Haskalah and Chokhmat Yisrael movements did not give up their aspiration to create scientific literature in Hebrew. Yehuda (Yulio) Barash (1815­–1863), who came from the Ukrainian city of Brody and studied medicine in Berlin, wanted to launch a major enterprise of science writing in Hebrew. However, he only published one book, *Otzar Hachokhma* *(Treasury of Wisdom)* (Barash 1856). Earlier, Barash described his broad vision in the journal *Zion*, but it never came to fruition.[[22]](#footnote-22) Barash acknowledged, with regret, that while science literature in other languages was expanding, that in Hebrew was diminishing. He said this prevented many Jews across Europe, who did not know foreign languages, from gaining important knowledge about scientific fields:

Every day, the army of people writing in every language and tongue to express understanding and wisdom grows larger and larger. One tells about the wonders of nature and its creatures [...] One gazes at the skies and in a spirit of understanding soars above the heavens, and from the heights surveys the dust of their lands; one rises like a bird above the ladder of creation [...] Yet the language of the past [Hebrew] will dwell alone, bereaved and desolate, wrapped in the veil of her widowhood? [...] Can we think of a writer who is now expressing wisdom and opinions in Hebrew, drawing inspiration from the springs of knowledge in the languages of the other nations? Not so, my brother! [...] This is a people who have not learned the languages of other nations [...] And there are many more of us, throughout our lands [...] Will it be told to the thousands of Israelites who live in Turkey and the Arabian Desert, Egypt, and Morocco, each one with a soul of silver: in order to learn about God and his creations you must learn the languages of Europe.” (Barash 1840, p. 3).

Barash implied that scientific literature in Hebrew could serve as a bridge connecting the various far-flung Jewish communities, while many others thought this was unnecessary for those who had learned modern foreign languages. The disdainful attitude among Jewish youth towards modern writings in Hebrew was similarly described by Haskalah proponent Mordechai ben David Sterlisker (1808­–1875), also from Brody. In an essay he published in the mid-19th century in the journal *Megged Yerachim*, Sterlisker lamented that young Jews were rejecting Hebrew as a limited and inadequate vehicle for expressing wisdom and science. In his opinion, it was necessary to expand Hebrew, so that it could be used to write such texts and to attract young Jewish readers:

I hear the young people of our nation slandering our holy language [...]saying there is no hope of finding life in it and it will dress those who love it in rags [...] because it lacks the words and terms to express every idea, every thought, and every murmur of the heart regarding the affairs of the world and its happenings, and to properly express the wisdom of science! [...] Therefore, our generation must change this, strive on its behalf to make Hebrew as complete as possible, according to the status and situation of the knowledge and information of our times. We must expand this garden, enrich and glorify it! [...] And if people with this view increase among Israel as well, perhaps our language will reach the accomplishment it deserves, as those who love it desire. Then it will be an honor among Israel and a sweet thing in the hearts of the young people of the nation, and they will no longer wish to speak poorly of it (Streliskar 1856, pp. 185­–188).

While writings about science in Hebrew diminished in Central Europe in the first half of the 19th century, they did not disappear completely. Haskalah proponents brought from the West the educational models created by the German Enlightenment and Haskalah books, which served as sources of inspiration for those in the East (Cohen 2006, pp. 18­–19; Feiner 2001; Feiner 2011, pp. 369­–371; Silber 1987, 3­–6; Zelkin 2000, pp. 127­–131). These included the previously mentioned science books written by Chaim Zelig Slonimsky, medical texts such as *Sefer Mirpa laAm (Book of Healing for the Nation)* written in German by Friedrich Paulizky and translated into Hebrew by Yehuda Bezalel Eliasberg (Vilna and Horodna, 1833­–1841), *Limud Tachluei Yeladim (Study of Children’s Diseases)* by Christoph Gartner translated by Yitzhak Seiberling (Vilna, 1820), *Sefer Rofeh HaYeladim (Book for Children’s Physicians)* by Moshe ben Aaaron Stodantzky (Vilna 1947), *Limudei HaTeva (Nature Studies)* by Moshe Mordechai Yaavel (Chernivtsi, 1856), and the zoology and botany books written by Yosef Sheinhak such as *Sefer Toldot HaAretz (Book of History of the Land)* (Warsaw, 1841, 1859). These are only a few examples of books of this type published throughout the 19th century. A comprehensive corpus of Hebrew texts on science and technology developed, which was seen as a desirable and legitimate way to expand the realms of Jewish culture (Cohen 2006; Efron 2007, pp. 170­–174; Feiner 2011, pp. 36­–67; Shavit and Reinhertz 2009, 2011; Zalkin 2005).

Hebrew periodicals published in Eastern Europe which became the core of modern Jewish discourse, were central in changing the place of the sciences and technology in Jewish culture (Shavit and Reinhertz 201, pp. 105­–112; Sofer 2007). Many articles on science and technology appeared in journals such as *Tzir Ne’eman* (Ternopol, 1644­–1666) *Bikuori Ha’itim* (Vienna, 1661­–1662), *Kerem Hemed* (Vienna, Prague, and Berlin, 1663­–1767), *HaMaggid* (Lich, Berlin, Kraków, and Vienna, 1856­–1903), *HaMelitz* (Odessa, St. Petersburg, 1860-1904) *Ivri Anokhi* (Lemberg and Brody, 1865­–1890), *HaLevanon* (Jerusalem, Paris, Mainz, London, 1863­–1886), *Carmel* (Vilna, 1860­–1871; 1871­–1880); and *HaTzerifa* (Warsaw, 1862­–1931).

Along with the emerging Hebrew science literature, popular science books, and journals were published in Yiddish at the end of the 19th century. Using Yiddish for disseminating information, education, and modernization had begun already at the beginning of the modern era. Yiddish medical books were popular and the practice of publishing such books in Yiddish continued into the modern era (Cohen 2007, 183; Shamrock 1978, p. 190; Turniansky 2008, p. 16). Scientific knowledge was also included in travel books written in or translated into Yiddish, such as those by Isaac Mayer Dick, Menachem Mendel Lefin, Chikil Ben Ze’ev, and Wolf Horovitz (Frieden 2009, 6­–7; Sinkoff 2020, pp. 195­–196; Wolpe 2012, 18­–19). Due to the growing interest in science, literature on these subjects increased during the second half of the 19th century in Eastern Europe in Hebrew and Yiddish alike.

Some authors, such as Mendele Mokher Sforim (S. J. Abramowitz, 1836­–1917), were active in popularizing the sciences through texts written in both Hebrew and Yiddish. Many journals, almanacs, and pamphlets published at the time addressed diverse scientific fields such as zoology, climatology, astronomy, physics, chemistry, economics, and especially medicine, health care, and hygiene (Cohen 2020, pp. 123­–143).

Popular science literature in Hebrew and Yiddish was aimed at a general audience. Presumably, many young Jews turned to it as a rich source for information about the sciences, in addition to the Hebrew scientific texts mentioned above, the focus of the current book will be on science texts that were explicitly addressed to the younger generation since these offer the clearest insights into how the sciences were brought to the world of children and youth. As noted, it wasn’t until the end of the 19th century that this type of literature began to appear in Yiddish (see Chapter 1), and it is therefore outside the scope of the discussion given the period designated for the present book. In contrast, there were scientific texts in Hebrew whose target audience was children and youth published as early as the end of the 18th century, and they continued to appear throughout the 19th century. The following chapters are devoted to an in-depth discussion of the goals of these works and the educational and cultural contexts in which they were created.

**Chapter 3: Scientific Knowledge Dressed in** **Jewish Clothing**

An examination of texts on the sciences published by the Haskalah authors for the younger generation reveals that many of them were meant to be compatible with the framework of Jewish-religious knowledge. These authors processed the bodies of knowledge and scientific concepts of their time in the spirit of Jewish tradition, and emphasized in them the points of connection to the Jewish world and their relevance to the Jewish identity of the Jewish child. This approach, common among Haskalah authors, was termed “the adjustment tactic” by Yaakov Shavit (Shavit 1992, 99–96). In this chapter I will examine the attempt of Jewish authors to spread up-to-date scientific knowledge among the young audience, while integrating it with religious messages and connecting it to the Jewish world.

**Bridges between Old and New – Science, Morality and Religion in Texts for the Young Audience**

One of the most prolific and diverse authors of the Haskalah movement in Berlin was Isaac Satanow Satanow (1732–1804), his works distinguished by his integration of scientific concepts with traditional Jewish wisdom. Satanow was born in the Podolia region of Eastern Europe. In 1772, when he was 40 years old and after having lost his property, he moved to Berlin and established strong ties with the Haskalah circle. The Haskalah philathropist David Friedlander (1750–1834) employed him as a private tutor and later appointed him to a management position in a Haskalah printing house, Hinuch Na’arim (Education of Young Men). Satanow served as manager there for many years, and he published most of his works through it. Managing the printing house allowed Satanow to express his literary talent and educational vision. He published most of his works through this printing house, including 26 books for which he was either the author, commentator, or otherwise involved in the publishing process.[[23]](#footnote-23)

Like others in the Haskalah movement, Satanow believed that the Jewish culture of his time should conquer new areas that were heretofore foreign, or otherwise risk becoming discredited and scorned by other nations (see the end of Chapter 2). In a public letter that he published in 1784 in the journal *Hame’asef*, Satanow presented his perception of the Hebrew literary enterprise of the Enlightenment. A connection between science and faith was, in his eyes, the heart of the Haskalah enterprise: “Ignite the sparks of wisdom in the heart of a wise man, so that science and faith can ride side by side,” (Satanow 1784, p. 53; see also Morlok 2020). Satanow intertwined themes of science with religious-Jewish faith in his writings, which were rooted in Jewish sources, while also discussing contemporary scientific issues and tools from a wide range of fields: optics, astronomy, geometry, chemistry, botany and zoology. He also mentioned the phenomenon of electricity as well and discussed the causes of disease, animal reproduction, gravity and blood circulation. Descriptions of scientific tools repeatedly appear in his books, and his explanations show his deep interest in the sciences and his desire to get to know them closely. In his day, Satanow was criticized for having only an amateur knowledge of science. In 1797, the editor of *Hame’asef* wrote a disparaging piece about Satanow:

And who would write a book of literary critiqueon the subject of language on all the poems and exhortations that are written and reprinted [and reprinted], because he has many hands in the craft of grammar, and in this he would be a useful teacher But he should not write optics and catoptrics and the natural sciences, and the wisdom of nature and what is beyond nature since his hand cannot reach (ibid., pp. 398–399).[[24]](#footnote-24)

However, Satanow’s scientific discussion of Newton’s theory of light, which I will present below, shows precisely that he indeed acquired proficiency in its fundamental elements.

His work excels in presenting sharp contrasts – current scientific and non-Jewish concepts shaped in traditional patterns. He tended to present modern scientific knowledge as traditional Jewish knowledge; that is, he made use of the adaptation tactic mentioned above.[[25]](#footnote-25) Satanow fulfilled his educational vision of bridging the old with the new in his books of parables, widely considered to be his most important works. In the three volumes of *Mishlei Asaf (Collected Parables)* (Satanow 1789, 1792, 1793) and *Megilat Hasidim* (Satanow 1802), Satanow specifically mentioned that youth were his target audience (although, as mentioned in Chapter 1, many books had dual appeal to adults and youth). The first two volumes of *Mishlei Asaf* were indeed successful as textbooks for the youth (Klausner 1930, vol. 1, p. 170).

At the beginning of the first volume, Satanow set out his educational goals: “To give youth the wisdom and motivation to become a good young man who loathes evil.” Satanow differentiated between the Hebrew terms for “youth” (נער)and “young man” (בחר) and explained the linguistic roots of the two Hebrew words: “Take note that a person in early childhood is called a youth, and others keep evil people away from him [...] but in later days, he is called a young man, since he now has wisdom and is repelled by evil,” (Satanow 1789b, *siman* 5 and its explanation). Satanow did not specify the age range of his audience, but it is likely he was referring to a similar distinction currently made between children and adolescents, although he did not use the terms that are used today.

The literary template Satanow chose was the parable, a model used by many educators and teachers in his time. Satanow must have been influenced by the great educational value found in the Haskalah literature and European educational literature, and believed that drawing upon both would be an excellent way to spread modern ideas among the Jewish youth. His efforts to connect the Jewish tradition with the modern Haskalah reform is clearly evident in the style of the parables he chose, which combined the model of the biblical parable with the text of the German (Toury, 1992, pp. 76–77; Pelli 1999; Rezler-Bersohn 1980, 94; Shavit 1998, pp. 145–147; Werses [1963] 2000, pp. 178–181).

The typographical design chosen by Satanow is traditional and reminiscent of sacred literature accompanied by commentary: the body of the text appearing at the top of the page is written in dotted, square and capital letters. At the bottom of the page is an explanation written in Rashi letters. In the main text, Satanow brought proverbs with religious and faith messages taken from the Holy Scriptures. These criticized fools and praised the wise, advocated values of modesty and honesty; and preached adherence to religious belief and observance of the mitzvot. He often incorporated scientific knowledge into these parables to reinforce the religious messages.

To illustrate the unique combination that Satanow created between traditional content and current scientific knowledge, I will present here his treatment of knowledge in optics, a subject in which he showed a special interest. It is not known which languages Satanow spoke, but his mastery of Yiddish presumably enabled him to understand texts in German quite well, and it is likely that he used this to acquire scientific knowledge.[[26]](#footnote-26) As expected, the prevalent metaphor linking physical light and enlightenment (Pelli, 1972, pp. 184–185) recurred frequently in Satanow’s work. Nonetheless, he did not confine himself to this well-worn symbol. Without mentioning the name of the great researcher, Satanow wove Isaac Newton’s modern theory of optics into the Jewish framework. Apparently, Satanow became familiar with Newton’s theory of optics while studying the German-Christian literature of his time, in which these scientific concepts took root. The Newtonian theory was widely accepted and widespread in 18th-century-European culture, and not only in the scientific system. This doctrine was disseminated through popular science literature for children in England (Secord 1985), and even through popular texts of poetry and prose in the German language (Schatzberg 1973, pp. 310–311). The properties of light according to this theory of optics – such as the fact that light is a substance that moves in straight lines, along with the phenomena of refraction and reflection (Satanow 1784a, p. 16; Satanow 1798, p. 6; Satanow 1795, p. 105). In many cases, he used this scientific knowledge to analyze texts appearing in the Holy Scriptures, also seeking to spread messages of faith and morality (Satanow 1775, p. 41; Satanow 1784a, p. 16, 36–37; Satanow 1785, pp. 130–131; Satanow 1798, pp. 47–48).

*Mishlei Asaf* is replete with references to the Torah of Light and its connection to matters of faith and morality. For example, Satanow applied Newton’s theory of optics (white light as a mixture of light rays), to explain the symbolic connection between the white color of the *tzitzit* (traditional fringed garment) and the colors of the rainbow, which represents the covenant that God made with humanity after the Flood (Satanow 1802, p. 37). He also used the theory of light as a basis for the custom of wearing white clothes on Shabbat and holidays and black clothes during mourning, finding a foundation in the current theory of light: the color white, which includes all shades, is suitable for days of “light and joy.” while its black contrast is intended for days of mourning, since it is “the absence of all lights” for mourning (Satanow, p. 38, commentary on parable 16). The third volume *Mishlei Asaf* included the following text:

All the luminaries in the heavens will express their goodness, for there they are in charge to illuminate the darkness of the earth to open eyes [...] They will thank me for his grace, for they have thin and straight rays of light from His hands [...] pass quickly through the straights and the narrow passages [...] nothing can stop them, they do not move in crooked paths, like that the mules who go astray in their carts will not pass through them (Satanow 1792, pp. 4–7).

Satanow drew on Newton’s theory of light in order to present the world created by God: the light that moves in straight lines symbolizes the orderly and established regime of God, and is the one that allows all creatures to witness the splendor of creation.[[27]](#footnote-27) But for Satanow, the goal of teaching the latest scientific knowledge was no less important than giving moral and religious lessons. In his parables, the scientific knowledge appears in the main text, and its explanations for scientific concepts and scientific instruments are detailed. For example, in his third book in the series, Satanow presents cosmological information in the body of the text: “Wise to gather God, how terrible are your deeds in the heavens above [...] and how wonderful are your plots in the earth below [...] You placed sun and light within and around it countries will circle and move on its paths around [...] With his light you will illuminate your darkness and with his heat you will warm their hearts” (Satanow 1997, 7). Satanow’s extensive commentary to this text did not address its moral or religious meanings, but rather offered additional information about the solar system according to the modern heliocentric view:

And some of the stars are lit, RL, receive light from the suns like the moon and our earth and the rest of the planets that have no light of their own [...] and the sun stands in the middle and around it are seven countries called by the names of the planets and they are Saturn, Jupiter, Mars, Venus, a white star, and Earth (Satanow 1793, p. 7).

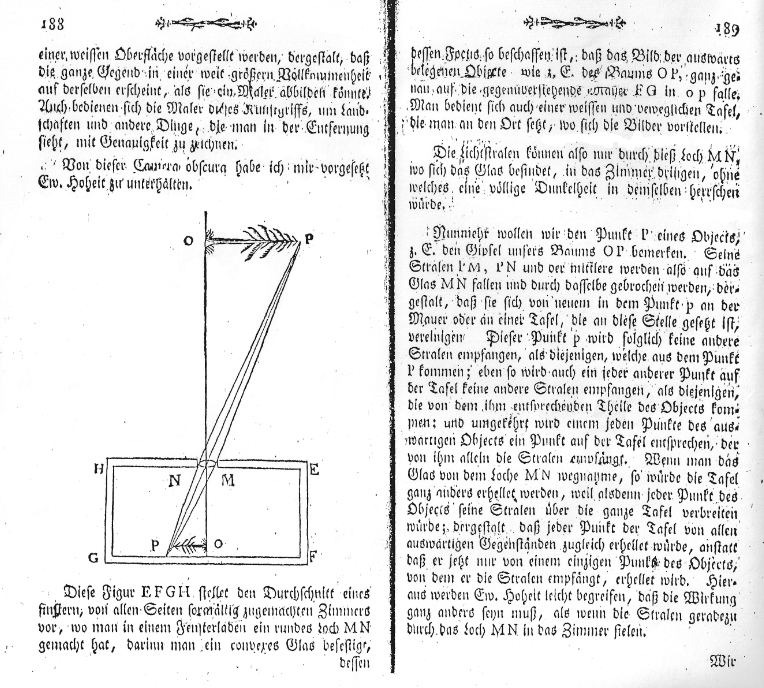
Current scientific knowledge and scientific instruments that had not yet been domesticated and established in Jewish culture, were given special prominence in Satanow’s series of parables. The recurring motto in these parables is “the beginning of the study of wonder” (Satanow 1789, p. 13, parable 6; Satanow 1792, p. 64, note to parable 15). Satanow adopted the physico-theological model in his writing, creating a connection between religious belief and knowledge (Satanow 1789, p. 13, parable 6 and its commentary; 1792, p. 64, commentary to parable 15).[[28]](#footnote-28) According to Satanow, humans are fascinated and perplexed by the wonders of the Creator, and therefore are inspired to study and investigate them. Thus, for example, in the commentary to “You alone will know how wonder you will discover the mystery of wisdom,” Satanow wrote that humans, unlike animals, are driven by wonder at the phenomena around them and are driven to investigate them: “If there is no wonder there is no research and if there is no research there is no knowledge,” (Satanow 1793, p. 15, commentary to verse 5). Believing that the world that God created offers constant stimulus for thought, Satanow tightly bound scientific investigation with religious belief.

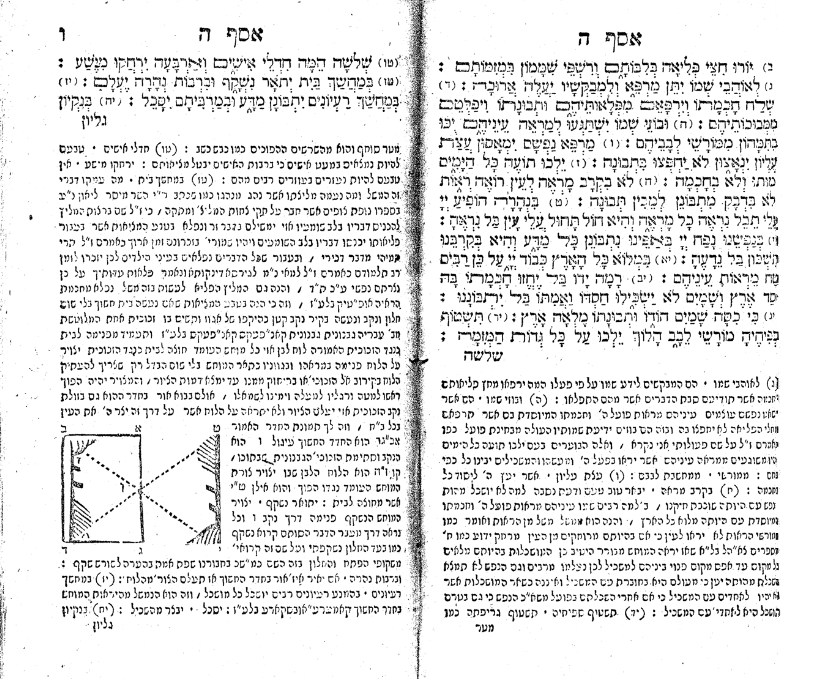
Satanow often presented various scientific tools, such as those developed in the pre-modern period for scientific experiments, and which were often well described in the contemporary scientific literature (Clark 1992, 96–97). Among these devices can be found the air pump, microscope, telescope, magnifying glass, magnet, and the compass (Clark 1992, pp. 96–97; Satanow 1775, p. 41; Satanow 1802, p. 54, explanation to parable 7; Satanow 1793, p. 8, explanation to parable 9 and p. 44, explanation to parable 6).]. The potential inherent in them to perfect the human ability to acquire knowledge about the world aroused great enthusiasm in the scientific community in the modern period and many authors of scientific texts in Hebrew were swept up in it (Sheifin 2009, pp. 161–162). For example, in a commentary to *Ruach Chen,* Israel Zamosz cited inventions such as the air pump and the microscope and used them to discuss the dialectic between rationality and faith. These inventions, which enabled the development of new scientific knowledge, posed challenges to the religious tradition (Elior 2016, pp. 178–186; Freudenthal 2008). In *Sefer HaBrit* (*Book of the Covenant*) Pinchas Eliyahu Horowitz also described exciting technological developments of his time, such as the barometer, the air pump and the diving bell, and used them to refute the existence of an immutable scientific truth (Ruderman 2014, 48–51). But Satanow, unlike the authors mentioned above, did not use these devices to delve deeper into complex epistemological questions. Presumably, he preferred to use these inventions to relate clear and simple educational messages due to his desire to compose a didactic text that would suit a young audience. Above all, he wanted to convey the message that science and faith complement each other harmoniously.

An example that aptly illustrates the connection between the scientific knowledge he created appears in the second volume of Satanow’s *Mishlei Asaf*. Here, he discussed the camera obscura, and even accompanied it with an illustration. A camera obscura is an optical device that had already been used in various ways for several generations. It is built from a dark chamber with a small hole through which light rays penetrate and create inverted images of external objects on the screen in front of the hole. For many generations, astronomers have used this instrument to observe aurorae eclipses. In the 16th century, painters used it to project a bone onto a screen and copy it. In modern times, this tool also became a scientific instrument, and important scientists who studied the properties of light, such as Johannes Kepler and Isaac Newton, performed experiments using it (Batchen 1997, pp. 78–83; Dupré 2008; Wade 2001).

Satanow chose the camera obscura to illustrate one of the central themes in his work, the close connection between religious belief and scientific truth. In the body of the text, he incorporated the rather obscure parable: “Science observes ideas in the darkness, and most will be disproven.” In the commentary he explained: “Every wise person takes care to avoid too: “By avoiding many ideas, every intelligent person will be wise, and this is the simile of the tangible vision in the dark room of a camera,” (Satanow 1792, p. 6.) His meaning was that there is a parallel between the way the camera obscura works and the ability of humans to reach scientific truth. The sharpness of the image on the screen is conditioned by preventing the penetration of light through additional openings. Arriving at the study of scientific truth, according to Satanow, also occurs “by avoiding many ideas,” that is, rejecting concepts that distance a person from religious belief. In this way, Satanow “domesticated” and “Judaized” the scientific optical instrument camera obscura. He reshaped this tool as a parable that strengthens the Jewish world, using the parable of this optical tool to strengthen Jewish faith. Satanow thus revitalized the worn-out metaphor that connects enlightenment with light, and created an original and unique combination of old and new.

Apparently, knowledge of the camera obscura and the source of the illustration that Satanow used are not Jewish. The discussion of this device in Hebrew texts until the 18th century was extremely limited, and the use of illustrations within Hebrew texts was even rarer. The illustration of the camera obscura and the text describing it may have been taken from Leonard Euler’s popular science book *Letters to a German Princess* (Euler, [1768–1772] 1780).

Figure 1: Description and illustration of the camera obscura from *Letters to a German Princess* by Leonhard Euler

 Figure 2*:* Description and illustration of the camera obscura in *Mishlei Asaf* by Yitzhak Satanow

In both Satanow’s book and Euler’s book, the illustrations contain the common elements of a dark room with corners indicated by letters, and similarly shaped trees. The descriptions that appeared next to the illustrations similarly describe the camera obscura as a dark room with a white inner wall and a hole in it for placing a centralizing lens of the light rays. In both illustrations, a tree is shown reflected through the hole and projected upside down onto the opposite white wall. Both texts include information about the focus and the shades of the image, about the importance of ensuring that light enter through the pinhole only and about the use of a convex lens. The Hebrew word קאנ”פעקס is probably a mistranslation of “convex.” Satanow’s translation, “kan"pex” is probably an ad hoc translation of convex (that is, “kamur” in Hebrew). His struggle with the proper Hebrew nomenclature is evident in the following sentence from his book: “one polished glass from two [words] ‘kan’’pex kan’ and ‘xxxxxx.’” implies that the source for this text was not Hebrew (Euler [1768–1772] 1780, pp. 187–189; Satanow 1792, p. 6).

It is impossible to determine with certainty that Euler’s book was the source for Satanow’s Hebrew text, but the wide availability of Euler’s work. *Letters to a German Princess* was written by Leonhard Euler (1707-1783), a famous mathematician and physicist born in Switzerland. In 1741, Euler was invited to Berlin by the King of Prussia and established close ties with the Prussian royal family. His book includes his correspondence with the king’s niece about the natural sciences. First published in French, this book was highly successful and was translated into many European languages, with six editions of the book published in German (Gillispie, 1981, p. 471).

Eurler’s books received attention and interest from Jewish scholars, such as Moses Mendelssohn, Aaron Halle-Wolfssohn, and Salomon Maimon (Kogman 2013b, p. 114). Henrietta Hertz points out that *Letters to a German Princess* was used by her as an elementary textbook (Neimark-Goldberg 2014, 96). Mendelssohn’s private library also included works by Euler in Latin (see: Meyer 1786, pp. IV–V, 10–14, 111, 117, 128, 183–185, 211). In fact, Mendelssohn even wrote an essay based on one of Euler’s essays about music (Altmann 1973, p. 67). Halle-Wolfssohn mentioned the German edition of *Letters to a German Princess* in his article “The Path of Nature (Second Conversation)” published in *Hame’asef* (Wolfson 1790a, p. 111), and it is known that Salomon Maimon read Euler’s books on mathematics (Lachover 1953, p. 13).

It is likely that Satanow chose Euler’s text as a source because it was accessible and adapted to laymen, since this book was created as an educational text and was intended to spread this knowledge among a young audience, as was his series of parables, *Mishlei Asaf.*  This work was designed for the young audience in the form of didactic parables, which were often based on modern scientific knowledge and auxiliary devices for scientific use. The textual model of the parable has been chosen for pedagogical reasons, and it indicates that Satanow had absorbed the educational concepts that were prevalent in German culture during his time. The integration of scientific materials in his writings indicates his awareness of the new importance attributed to the sciences in the general culture and modern education. However, he also believed that acquiring scientific knowledge should be compatible with the traditional Jewish frameworks, strengthening rather than replacing them. Through these parables, Satanow offered his young recipients bridges connecting the world of Jewish faith and morality with the current bodies of scientific knowledge of his time.

**Nature as a Religious Textbook: Physico-Theology for Jewish Children**

Marcus Hertz contended that teaching science was an important part of religious education, as detailed in his long letter in the introduction to *Rešit Limmudim* (Berlin, 1788), the most important text of the German Haskalah.

Does not the Torah, given to us by God, and our holy religion passed to us by our ancestors, teach us the valuable lesson that there is a God who dwells above in the heavens, the Creator of the world and all its hosts, who acts in kindness to all His creatures, also command us to know God through our investigations, to inquire after the measure of His goodness, mercy and grace […] to look upon all His works to see His exaltation and glory [...] and the man who does not stand on this high knowledge on the path of learning does not escape God likening him to being on the wrong path, in physical attributes [...] and ends up complaining about the deeds. What is done before his eyes day by day, and to talk about the order of the world [...] The man who sets his heart to know his Creator […] will adopt his strength [...] for his mind and this is the strength of the intellectual soul. This power will open our eyes to show us the wonders of His sublime creation, and then we will know His greatness, His exaltation, His goodness, His grace, His righteousness, and His judgment with a whole heart [...] All this will not come to our hearts by way of chance or inheritance or inheritance, but by examination and investigation in all our ways. **Without investigation and without wisdom, there can be no knowledge of the glory of God.** (Lindau 1788, “Letter [...] the admirer”, pp. 3–4, emphasis added).

This text by Hertz is based on the “physico-theology” concept, also known as “natural theology” (Woolford 2011, pp. 2–3). According to this view, God created the natural world and left His mark on it. Therefore, nature deserves to be the main object of study in an attempt to know God. This concept originates in the ancient world, and has many expressions in the Bible and in Greek and Hellenistic texts (Byrne 1989, pp. 8–10; Collins 1998; McGrat 2010, pp. 26–32; Sorkin 2008, p. 60), as well as in Jewish biblical sources, such as the Book of Psalms (Shemesh 2007, pp. 102–104). In the modern period, many scientists and intellectuals used this model in their writings, sometimes merging it with romantic concepts that were prevalent at the time (Connell 2009; Harrison 2005, pp. 193–204; Martens 1986, pp. 219, 221; McClellan and Dorn 2006, pp. 324–325; Outram 1995, p. 49; Topham 2010, p. 64).

The physico-theological model was adopted in the 18th century by educators and authors of German-Christian children’s literature, due to its effectiveness in achieving two simultaneous goals: teaching about the natural physical and geographical environment in which the children lived, and deepening their religious faith through learning about the wonders of God’s creation. Textbooks for the teaching of the Christian religion written at that time often incorporated the experience of observing nature. The philosopher Jean-Jacques Rousseau, whose work on education also contributed to this trend, had a decisive influence on the development of education in Germany at that time. Rousseau saw the unmediated contact with nature as the correct and most suitable way of learning for children (Brüggemann and Hans-Heino Ewers 1982, pp. 31, 34; Doderer 1975, p. 119). At the time, children’s science literature published in Western and Eastern Europe emphasized the wonders of nature and conveyed religious messages (Cosslett 2006, 17–19; Gaukroger 2020, pp. 341–342; 356–358; Hellman 2013, pp. 83–84; O’Malley 2003, p. 11; Slotten 1991, pp. 337–338).

The physico-theological model was also widespread in Haskalah literature written by educators who recognized its inherent potential for conveying their pedagogic messages (Gilon 1979; Kogman 2013a; Morlok 2020, p. 309; Shavit and Reinhertz 2011, pp. 70–74; Wolpe 2012). The connection this model made between faith and science was particularly attractive to them, enabling them to present scientific materials from non-Jewish sources with an authentic Jewish tone, and to present Judaism as a broad and flexible framework that could incorporate contemporary knowledge. These were powerful messages intended to make the young readership understand a homogenous modern Jewish identity, seemingly free of tension and difficulty.

Natural theology is indeed an ancient model, but the study of it shows that the changing relations between science and religion over the generations left their mark on it. It was used in different periods for different, and even contradictory, purposes: of fighting heresy, sanctifying scientific research, examining the implications of the new science on theology, and creating cohesion and a space of common agreement between science and religion (Topham 2010, pp. 63–64). Haskalah authors used various forms of “natural theology” to convey diverse messages about the relationship between science and the Jewish-religious framework. Below I will present examples illustrating the flexible and creative ways that Haskalah scholars used this model to present cosmological knowledge about the earth, the solar system, stars, and astronomical devices used to study them. These examples show their flexibility and creativity: some wanted to use it to promote the spread of scientific knowledge among the younger Jewish generation, while others preferred to emphasize the educational importance inherent in it for strengthening Jewish religious faith, but they all emphasized that using this model showed that there could be harmony between religious belief and scientific concepts and knowledge.

The most well-known and widely used Hebrew educational text of the 19th century was the anthology *Beit Hasefer* (*The School)* by Judah Leib Ben-Zev (1764–1811). It covered a wide range of subjects, such as Hebrew language, Jewish history, moral education, and science. The author was born in Poland and then moved to Berlin, becoming active in the Haskalah movement. He later moved to Vienna, where he worked as a Hebrew language editor at a major publishing company owned by Anton Schmid, and wrote and published many successful textbooks for teaching Hebrew, including *Beit Hasefer* (Kogman 2013b, pp. 123–124). This anthology consisted of two parts: *Mesilat Halimud* (Ben-Zev 1802) which was aimed at young children at the beginning of their education, and *Limudei Hamesharim* (Ben-Zev [1802] 1806), for older students. Both parts were intended for teaching Hebrew and had texts for practicing reading. In the first part, Ben-Zev touched on a wide range of modern secular subjects: parts of the day, the natural water cycle, natural resources, water sources, flora and fauna, human society and culture, their needs, tools, and more.

This book was an extraordinary success, especially its first part. It was printed in many editions and in different versions even many years after Ben-Zev’s death. More than ten editions were printed across Central and Eastern Europe (Vienna, Warsaw and Lviv), and it was translated into Italian, German and Russian. As early as the beginning of the 20th century, a Zionist teacher in Israel cited it as a prototype for Hebrew textbooks (Ofek 1979, 47).

In the 26th edition, which Ben-Zev still managed to publish in his lifetime, there was a chapter, “Betrachtungen” (Observations), that was based on the physico-theological model (Ben-Zev [1802] 1806, pp. 73–84). In it, the author addresses the reader as “my son,” and asks him to raise his eyes to heaven so that he can experience the majesty and splendor of the earth (Ben-Zev [1802] 1806, p. 73). The use of this form of address is intended for several purposes. First, it links the text to biblical proverbs also written in this style, thus giving the text a traditional tone (Pelli 1994, p. 50). It also drew on the many scientific writings, from the time of ancient Greece through the modern era that used a dialogue model (Myers 1989, pp. 171–173). But above all, the image of this text is distinctive for its resonance with the educational philanthropist literature of the time, which, as mentioned, exerted a strong influence on Jewish Haskalah scholars (see Chapter 2). German-Christian philanthropist texts often included dialogues between an authoritative figure of a father and his children, or a teacher and his students. These dialogues were often placed in story situations of a trip to nature, during which teachers conveyed concepts and knowledge about nature, geography, religious belief, and moral behavior to the children (Brüggemann and Ewers 1982, p. 34; Doderer 1975, p. 119).

The speaker in Ben-Zev’s text takes his young addressee on a hypothetical trip, and in an excited tone describes to him the heavenly bodies and the structure of the earth. The universe is designed in this text in such a way as to arouse in the young readers the feeling of transcendence and to illustrate the might of the Creator:

Who is this shining sun their day? And who brings out a precious moon at night? Who is this that raises up clouds from the end of the earth to water the face of the earth: who is this that will send half a lightning? And who makes a thunderous sound? Who is this that will light up their day? And who will darken the night? Who will keep the traditions of the times from the beginning of the year to the end of the year. Spring and summer, winter and autumn, will circle the year around and their order will not change? And the sun will not hasten and will not be late in its departure and arrival today on a yearly basis in a year. Who does all this? […] Now listen, my sons, with awe and in his age. God is one. Higher than all high and lofty dwellers in the clouds that our eyes cannot see Him, He created the heavens and the host of their stars. the land and every crop. And man and every animal and beast and everything that is on it. He is the Lord of the world, He is the Creator and founder of the entire universe (Ben-Zev [1802] 1806, pp. 73–74).



Figure 3: “Betrachtungen” (Observations) in *Mesilat Halimud* (Ben-Zev [1802] 1806 [1805/1806])

The connection between scientific knowledge and belief in the Creator is intended, on the one hand, to give legitimacy to knowledge from non-Jewish sources and on the other hand, to shape it according to the Jewish pattern. Ben-Zev presented as a sort of thought journey, in which the essence of God and nature was revealed. He attached this section to a chapter that included scientific knowledge, thus giving this chapter a religious context. This deep connection between science and religion was reinforced by the many illusions to the biblical creation story that he embedded in these two texts. See, for example, the opening quotation in a description of the forces of nature, typified by strong winds and ocean waves: “The wind hovers over the face of the whole earth, all around,” (Ben-Zev [1802] 1806, p. 38), echoing the first verse in the book of Genesis: “And the Spirit of God, floating on the surface of the water.” He linked the description of water reservoirs, such as seas, rivers, and lakes (Ben-Zev [1922] 1966, 38–37), to the book of Genesis, Chapter 1, verse 10: “And God called the dry land, the earth, and the waters called the waters.” When he describes the elements of the sun, he does so in a similar order to that which appears in the story of creation. In contrast, the next chapter “Observations,” also based on the physico-theological model, is replete with biblical passages, mainly from Psalms. The phrase “causes the clouds to rise” (in the passage above) is from Psalms 135: 7. Similarly, a phrase that appears later “How great are Your works, O Lord! You have made them all with wisdom; the earth is full of Your possessions!” (Ben-Zev [1802] 1806, p. 78) is from Psalms 104: 24.

Alongside the traditional contexts, Ben-Zev chose to use an image that has become popular in modern popular science culture – the image of the clock. The mechanism of the clock became the symbol of the era of automation, and ambivalently expressed the harmony of the laws of nature and their constancy, but also the subjection of man to these laws (Clark 1992, pp. 103–104; Ezrahi 1990, pp. 149–150; Kahana 2021, pp. 43–44; Sheifin 2009, pp. 43–473, 160–166; Wootton 2015, p. 441). In the physico-theological literature, the clock is used routinely to demonstrate God’s relationship with his act of creation. The 18th century Christian theologian William Paley (1743–1805) claimed that just as the complex structure of a clock can only be created by an expert watchmaker, so the wonderful world around us testifies to the existence of the Almighty Creator (Brown 2009, pp. 31–32). Similar words in this spirit were uttered by Ben-Zev: “Behold, the shadow of the dial at the top of the tower, and count the hours until the bell will sound at the right time. Can not only the hand of its Creator turn its gears, a wheel within a wheel?” (Ben-Zev [1802] 1806, p. 73). Conveying the message that there is no tension between scientific knowledge and Jewish religious sources, Ben-Zev adapted models from the Christian theological Enlightenment movement to reinforce the Jewish faith. Like other educators of his time, he avoided seriously discussing the dilemmas arising from the tension between religion and science. To the young recipients, he presented a harmonious world in which science propels humanity forward, without renouncing the values ​​of the old tradition.

A somewhat different use of the physico-theological model appears in a text published simultaneously in Hebrew, German, and French by the Haskalah scholar and educator Moses Ben-Zvi Bock (1781–1816). Bock founded three modern Jewish schools in Berlin at the beginning of the 19th century: a day school for boys, a day school for girls, and a boarding school for boys. He wrote his trilingual anthology reader to be used by the students and teachers in his schools. The Hebrew version was titled *Moda l’yeladei bnei Yisrael* *(A Companion for the Children of Israel)*. The German version was titled *Israelitischer Kinderfreund*, echoing the title of the pioneering text *Der Kinderfreund* published in 1776 by the well-known German educator Friedrich Eberhard Rochow (1734–1805).

Bock’s anthology included diverse material with a variety of texts dealing with history, Jewish religion, moral stories, and biblical stories, along with science. In the third chapter of the text, Bock presented detailed scientific knowledge in the fields of astronomy, climatology, geography, zoology, botany, mineralogy, and the anatomy of the human body; he even discussed human society and the division of time (seasons of the year, months, days, and so on). Bock’s approach to knowledge was distinctly utilitarian (see more on this in Chapter 4). He opened the chapter on the study of religion in the Hebrew version of his text by explaining to his students the uniqueness of the eternal God, who created the universe, and the earth and the animals and plants on it. Bock addressed his young recipients to look around them to experience the greatness of God:

All the creatures will speak and testify that there is an essence that is the highest of the highest that cannot be equaled. It is not because there is a first cause for all these creatures whose very essence is without structure and from ancient times preceded it. [...] Lift up your eyes and see all the things that nature will give you. And you will find in them crafts that are not equal to their beauty and order, that it is not possible for man to invent even a trace of it. Only when we said, a purposeless object invented everything that our eyes will see, I entreat you to look at the sky and see how the heavens above and the earth below are embraced, look at the stars, for we have been deceived [...] see how wonderful and beneficial are the plants and vegetation, and all the animals according to their kind, the marvelous structure of the human body, and the seasons of the year in their order [.. .] From this we will learn, that the world and all creatures are the work of a purposeless creator (Bock 1812, pp. 154–155).

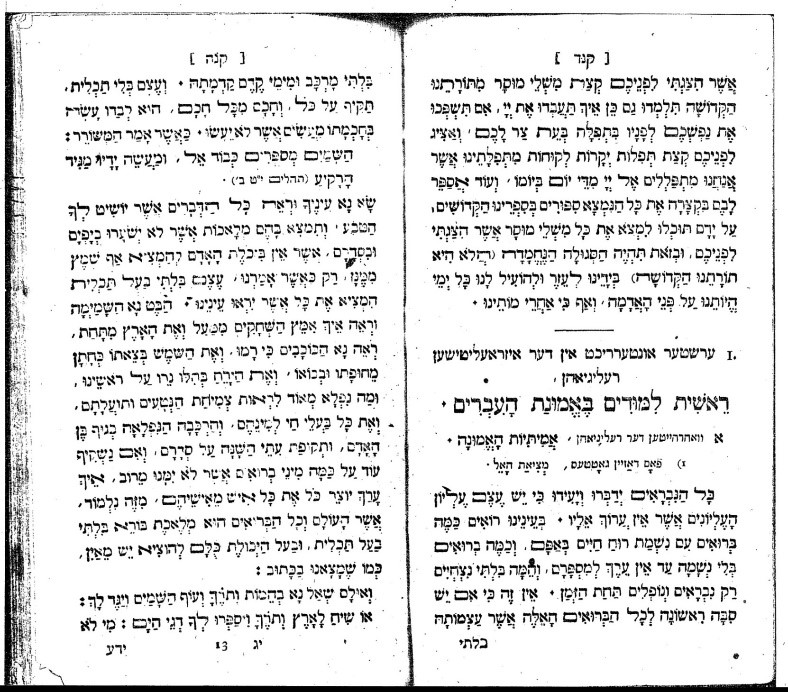


Figure 4: A physico-theological model in the anthology *Moda l’yeladi bnei Yisrael* (Berlin [1811/1812])

Unlike Ben-Zev, Bock did not place physico-theological texts alongside scientific texts, but included them in a separate chapter on Jewish religion. Bock saw this model as intended mainly to reinforce religious content, more than to work for the dissemination of scientific knowledge per se. This is also clearly evident from another text that he incorporated into the German version of the Bible. In the introduction to the Jewish religious studies in the German version of his book he addressed teachers and instructed them on how this subject should be taught. The beginning of religious studies is a critical stage for him, during which the students’ perceptions regarding this subject are determined. Therefore, considerable must be invested in it, and Bock recommended that it be held outdoors in direct contact with nature:

One day I would take a journey into the countryside with my students, and there, among the heartwarming sights of nature, either in the spring or autumn, we would review our lessons about the natural world.[[29]](#footnote-29) On a fine evening, I would read to him the teacher’s appeal from chapter four,[[30]](#footnote-30) to touch his heart and elevate him spiritually. The next morning, at dawn, I would take him to a nearby hill, and promise that on that very that day I would teach him his first lesson on religion. Surely, the child would be attentive, his heart tender and gentle. The sight of the wonderous natural world, the herds from the neighboring village, the open plains, the clear sky; all these would lift his heart and put him in a joyous mood. Then – in this solemn silence – I would take his hand and hold it to my heart, and begin to teach him about the wonderful works of creation. We would walk in serenity towards the east, the horizon painted in beautiful colors. Like a lightning strike, a beam shines in the eyes of my children, nature is filled with life, the sun suddenly appears in every corner and I call to my children: This is God! How great and unforgettable must have been the impression of this first lesson! And what a distance there is between the sensations it causes, and those I expect in a class held in a damp, dusty and gloomy classroom, full of many noisy students, a class in which the student has to be introduced to the first concepts of the superior and benevolent being in the presence of punitive measures that will often be applied to him (Bock 1811, XII).

Bock, therefore, perceived that immersing oneself in nature outside the confines of the classroom as an effective way to teach about God. Unlike Ben-Zev before him, he did not content himself with a story about an imaginary trip, but guided the teacher on how to conduct an actual educational tour. This encounter between teacher and student in nature at dawn echoes a similar passage that appears in Rousseau’s book *Emile*, in which the teacher invites the boy Emile to witness the sunrise. The purpose of going out into nature according to Rousseau, however, is not to learn about God but to acquire scientific knowledge about the basics of geography in an experiential way (Rousseau, [1762] 2010, pp. 308–309).

Influenced by Rousseau, some philanthropic educators took their students on nature excursions and composed texts for them describing going out into nature (see above). The idea that direct contact with nature is the key to proper education did not lose its charm, and German-Christian educators during the 19th century also expressed it (Schlumbohm 2006, pp. 306–309). Influenced by this tradition, Bock emphasized the aesthetic and emotional importance of being in nature and the deep impression that watching the sunrise will leave on the soul of the student. This experience will strengthen the connection between religion and nature in the child’s soul, and will connect them in a harmonious relationship. Like Bock, other educators encouraged going out into nature for recreation, play and enjoyment.

Other educators encouraged venturing out into nature for recreation, play, and enjoyment. Josel Pick of Reichenau, who served as a teacher of Moshe Mendelssohn’s son, published an educational manifesto in the above-mentioned anthology, urging teachers to take their students on educational tours (see Reichenau 1789). Satanow (1799, p. 48) also proposed a curriculum that encouraged taking daily walks as a productive break from studies.

However, the idea that people benefit from direct interaction with nature was seldom legitimized in traditional Jewish culture or the educational approach in the “cheder” schools (Feiner 2011, p. 46; Zelkin 2008b). As a result, some in the Haskalah movement were resistant to this new perspective. Thus, in his aforementioned book, Ben-Zev suggested that spending time in nature was a beneficial activity for children, but he also laid out a collection of instructions for children warning them of the serious dangers they might run into while spending time in the fields and outside the city (Ben-Zev [1802] 1806, pp. 116–118). This conflict over interacting with nature appears in another textbook that used the physico-theological model, *Sefer Michtavei Ivrit (Book of Letters in Hebrew)* (Neumann [1815] 1817). The author, Moses Samuel Neumann (1769–1831) was born in Hungary, studied in a yeshiva in Moravia, and then moved to Prague, where he became involved with the Haskalah movement. In 1803, he moved to Vienna and worked as a private tutor. Here he met Ben-Zev, who encouraged him to become involved in scholarship and educational writing (Kressel 1967, p. 454). Neumann devoted the rest of his life to teaching, writing many texts for Jewish children. *Michtavei Ivrit* was highly successful, with 15 editions published during the 19th century and the early 20th centuries. Like many educational books of the time, this text was not content with simply teaching Hebrew writing, but used the Hebrew correspondence to convey contemporary values and ideas. For example, in one letter, a young man shares with his older brother his desire to visit faraway and exotic places (Neumann [1815] 1817, pp. 132–133). The older brother’s response, striking in its authoritative tone, reflects the book’s normative principle. He completely opposes this idea, detailing the many dangers his brother may encounter. Along with this, the older brother praises his sibling’s desire to explore the world, writing that curiosity is what makes humans superior to animals. Nonetheless, the older brother suggests that instead of undertaking such a dangerous journey, the younger man should go on a physico-theological journey in his local area.

For to all the feet of your feet, and to all the sight of your eyes you will see from the wonders of the innocent: a bull of clouds bound on your head. Look at the sky and see the stars and all the luminaries. Who created all these? Go, please, to the fields, the forests, the vineyards, the valleys covered in wildflowers, the vine will give its harvest, the tree will give its fruit […] a bird will take wing before your eyes and traverse the clouds, while another animal crawls down through the dirt; one builds its nest atop a pine tree, while the other laboriously digs his dwelling place in the depths of the earth, a skillful artisan weaves its cloth; another creature uses its skill and wisdom to make honey — Who ordered all this and who made all this? The hand of God did all this, His hand is in everything and His wonders are in all the land. (Neumann 1815 [1817] pp. 135–136).

The older brother’s sentiment is clear: “Your wisdom on the other side of the ocean will not be greater than your wisdom in this land,” (Neumann [1815] 1817, p. 136). In other words, a person need not travel far to learn about God and the world He created, since all the necessary knowledge is right before our eyes, whenever we step out of the house. The journey that the older brother suggests is a theoretical journey in the mind, rather than a physical one.

Neumann made use of this model in another of his books, *Sefer hayashar v’habrit: Reshit limudim l’bnei* *Yisrael* *(Righteousness and the Covenant: A Primary Reader for the Children of Israel)*, which he published in Vienna in 1821. This is a retelling of the Bible, beginning with the story of creation and ending with the death of Moses. The book is bilingual, with the Hebrew text in the upper part of the page with and German text transliterated into Hebrew letters below. The first chapter describes a hypothetical journey, during which an adult narrator teaches a boy about flora and fauna and the structure of the earth and the universe:

My son, have you not heard, although you are young, that the world in which we live very large: if you leave the city, you will see meadows and fields, mountains and hills and forests, springs of water and rivers: and if you go further to walk, your eyes will see villages and cities, fields and vineyards and fields of grass [...] such you will find And your eyes will see, even if your feet will not rest for many years, you will go and walk through the land: [...] When you go to a garden, you will rejoice at the sight of beautiful roses, and various nice plants because they are wonderful: Go, please, the field, wherever your feet walk and everywhere your eyes look, you will find grass and green grass A fruit tree and a grain and many grains of all kinds: also every creeping thing and bird and winged beast and beast of the forest and field without number all dwell in it (Neumann 1821, 3–5).

The text is interspersed with phrases drawn from **Genesis** 1, such as springs of water, (Neumann 1821, p. 3); seas and oceans (ibid., 4); swarms of living creatures, (ibid., 5); and creeping things (ibid., 6). Like Ben-Zev’s text described above, Neumann linked this passage to the biblical story of creation. The description is meant to evoke wonder and admiration for nature, and to channel these feelings for the purpose of instilling religious faith. The imaginary journey is presented in great detail, indicating that Neumann, like other modern educators, attributed great academic and educational importance to unmediated contact with nature. This journey would lead students and their teachers to a state of spiritual-religious transcendence, and the chapter concludes with a text that expresses natural theology: “He is the One who is called The Lord Our God: He created everything, He made the entire universe, He is the one God. His wisdom and understanding, His greatness and goodness are complete; there is none like Him,” *(*Neumann, 1821, p. 8). However, in comparison to Neumann’s previously quoted physico-theological text, as well as the examples cited above from the books of Ben-Zev and Bock, the following text notably emphasizes up-to-date and detailed scientific knowledge rather than lessons about religion. Describing the star-filled universe, Neumann writes:

Although the earth is large, compared to the heavens it is very, very small: in the evening, to the very sky that will be purified, because you will lift your eyes, you will look at small lights shining stars without number: and you will see only a few of them, you cannot see all of them because they are high and very far from our eyes (\*): the sun, this great light, even though to your eyes it looks no larger than a small plate, is much, much larger than the earth (\*\*): there are also other stars like it and even much larger than it (\*\*\*) (Neumann1821, p. 7).

In the footnotes, Neumanngave details about the relationship between the size of the earth and the moon: “This great earth is round like the moon, spherical in shape, but not the same in size, because the circumference of the earth along a straight line is 5,400 measures (estimated) and its depth to the center, along a straight line, is 1,700; and the moon is but one fifth of it,” (Neumann1821, p. 4). In addition, he named specific planets, such as Jupiter and Saturn, and scientific instruments like the telescope and the microscope (Neumann*,* 1821, pp. 6–7). In this case, Neumannused the physico-theological model primarily to teach about astronomy, and strengthening religious studies was a secondary goal for him.

Jewish scholars and educators continued to use the physico-theological model as a basic framework for disseminating scientific ideas and knowledge along with modern values. For example, between 1813 to 1816, the Galician journal *Tzir Ne’eman*, published an extended calendar series focusing on science in conjunction with the Haskalah school in Ternopil, which was founded by Joseph Perl (1773–1839), a leader of Central European education. Like many Hebrew texts at that time, these appealed to children and adults alike.[[31]](#footnote-31)

The 1814 issue of *Tzir Ne’eman* described the realms of plants, animals, and inanimate objects. In the 1815 issue, the discussion was devoted to worms, insects, fish, and amphibians (Perl 1815, pp. 11–25). In 1816, the journal described birds (Perl 1816, pp. 15–2). These were not a random collection of scientific descriptions, but involved a zoological discussion based on the scientific taxonomy of the time. The 1815 issue listed seven animal kingdoms: worms, insects, fish, amphibians, birds, mammals, and humans. It seems that the author intended to continue the discussion of mammals and humans in the subsequent issues, but the journal ceased publication, thus ending this endeavor.[[32]](#footnote-32)

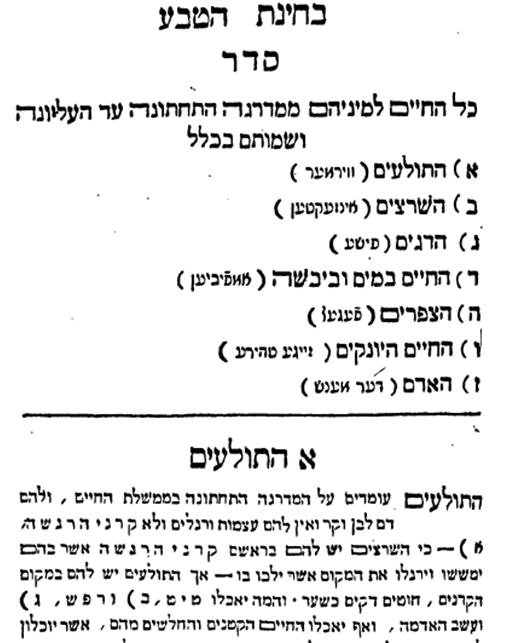


Figure 5: Zoology in *Tzir Ne’eman* 1814/1815

*Tzir Ne’eman* exceled at combining traditional and modern materials, and the physico-theological model was its general organizing principle. It included calendars with the dates of exhibitions and important dates for the Jewish community, such as fast days. There were texts that expressed loyalty to the ruling parties, such as a history of the Russian royal family, along with excerpts from traditional Jewish sources with discussions of the moral lessons derived from them, moral parables, and even riddles. The 1814 issue opened with a lengthy religious and faith-based justification for engaging in the sciences:

“How great are Your works, O Lord! You have made them all with wisdom; the earth is full of Your possessions! (Psalms 104:24)

My brother and neighbor! Know and understand that it is not an empty thing, to learn the wisdom of nature, and the world and all its creatures, so that we may be wise and knowledgeable in the works of the great and awesome God [...] because the purpose of all wisdom and science is to know the God who created us. Studying nature is more powerful and awesome than all the wisdom of man [...] Therefore, for time immemorial, the wise and learned have turned their hearts to investigate and be enlightened by the works of God, which surround and encompass us from every side and in every direction; because the wisdom of nature is not in the heavens, nor beyond the sea [...] but it is close to us, to see with our eyes, and to understand with our hearts, and in every place where we raise our eyes, there we will find the hand of God, and the wonders of the Almighty ([Perl] 1813, pp. 1–2, numbering mine).

A notable illustration of the integration of scientific and Jewish knowledge can be found in an article in the 1815 issue of *Tzir Ne’eman* that includes a detailed description of honeybees and their social lives. It lists the types of bees: the queen, the workers (females, for which he uses the Hebrew word for teeth – “שיניים”), and the males (drones, for which he uses the Hebrew word for people – “אנשים”), and includes how males are treated after they have completed their role in fertilizing the queen. The article also details how bees construct and maintain the beehive, how they collect nectar and turn it into honey, and how the queen would leave the hive with a swarm of male bees. The author framed this knowledge using the physico-theological model:

These insects are marvelous to all who observe them. From the beginning of time until today, the great and wise have been fascinated by their behavior! When we look at the ways of the bees, their labors and their work, we too will be amazed at the wisdom and might of the Creator of the world, and we will bow before His feet, and it will be said: There is none as holy as the Lord our God, and He is our only Rock! In the beginning, all the bees were wild, and from field studies of the lands where they are still found in large forests, we know that they nest in the hollows of trees, and make homes for themselves to live in. Samson, a hermit of God, found a colony of bees and honey in the carcass of a lion, which he scraped out with his hand (Judges 14:8). When the people saw how the bees’ labors could benefit them, they arrived at the idea of domesticating them. Yet humans also respected the bees under their control, and placed them in small houses called beehives. ([Perl] 1814/1815, pp. 17–18).

Focusing on the honeybees’ distinctive society, the text in *Tzir Ne’eman* seeks not only to convey a message about humans’ control over the living world and their success in channeling it to their needs (see more about this in the next chapter), but also to strengthen faith in the Almighty God who created these wonderful creatures. Conveying religious content through zoology was prevalent in children’s texts published in Europe in the modern era, and even the theory of evolution was sometimes used to spread religious messages (Ritvo 1985, pp. 77–78). The story of Samson and the lion appearing in the text places the discussion within a Jewish context, as do other messages expressing the educational ideology of the Haskalah found in the text. A similar example can be found in the following text in which the author described how bees get rid of individuals that were no longer essential, at times when their food ran low:

Behold what they do: the hardworking ones will work and toil [...] all the days of the summer, they gather and store sweet nectar, so that they will have something to eat in the autumn days, when cannot find the food that sustains them in the fields. And the slothful drones among the bees, who did no work of any kind in the summer, their reward will be returned to them according to their labor: for when the days of autumn arrive, then the female worker bees will rise up against the drones, and some of them will be killed, and some of them will be thrown out to die of hunger and deprivation, or they will become prey for the birds of the sky; Because the honey that the bees gathered in the summer will not be enough for all of them to eat all the days of autumn, and therefore the lazy will die; **Because industriousness will live and indolence will die.** Now pay attention to this, and learn this wise lesson! (Pearl 18915, p. 19, emphasis in the original).

By presenting honeybee society as a metaphor for human society, *Tzir Ne’eman* was following a literary and cultural tradition that hearkens back to ancient times (Merrick 1988; Thomas 1996, p. 62). Particular emphasis is given here to the value of education for the sake of productivity, an important theme at that time. Similarly, the writings and curricula of Haskalah educators, who aspired to establish a professional Jewish educational system, stressed the individual’s contribution to society through work (Bodian 1984; Feiner 2011, pp. 107–110; Zelkin 2008a, p. 159. For more on this topic, see Chapter 6).

The textbook *Omer Bisadeh (A Sheaf in the Filed),* published in the mid-19th century in Eastern Europe, combining materials from Jewish sources and science texts, also used the physico-theological model as an overarching framework in which tradition and modernity fit together harmoniously. The author, David ben Yaakov Aharon Luria (1811–1873), was a prominent Jewish educator and regional school inspector for the Russian authorities (Kersel 1967, p. 238; Zelkin 2000, pp. 69–70; Stanislavsky 1993, pp. 128–132). Integrating materials from Jewish sources and science texts, the first part of *Omer Bisadeh* the book presents verses from the Holy Scriptures accompanied by with a modern commentary, while its second part is devoted to animals. The book’s final section is a catechism advocating loyalty to the [Russian] kingdom. The scientific chapter on the world of animals begins with a long introduction based on the physico-theological principle:

Beloved children! If you saw a pleasing palace, a tranquil abode, with ornate rooms, designed like a temple [...] and this palace stood in a desert savannah, surely you would judge and conclude that a wise and skillful builder constructed it so magnificently [...] And if you look each day at a watch[[33]](#footnote-33) that shows the hours, minutes, and seconds, you know in your heart that it could not exist unless the hands of a master watchmaker put it together, gears within gears, and fixed it in perfection and usefulness, because nothing could become so perfectly set and orderly by itself [...] Now, they responded and said, when gazing on the heights of the heavens: the prairies and the skies, the sun in its glory and the moon in its brightness; the stars shining like jewels [...] the earth, where myriad creatures of differing types and appearances dwell; a forest and all the trees in it: larch, hazelnut, chestnut, oak and birch [...] The glorious sights of the world and the concealed treasures in its depths, so many that they cannot be numbered [...] all this my son! Were not by chance action [...] Indeed, a mighty and awesome Lord existed and measured the earth, and stretched the sky like a tabernacle to be dwelled in, invented the whole universe [...] from absolute zero to existence (Luria 1853, pp. 97–99).

Luria uses the well-known image of God as the watchmaker, which, as noted, had already been used in educational literature for Jewish children. He tells his young readers to observe natural phenomena, which would lead them to the inevitable conclusion that the Almighty God created the wonderful world and everything in it (Luria 1853, p. 102). This introduction served to justify the following texts, in which Luria combines traditional materials with zoological knowledge from non-Jewish sources (see more about this in the next chapter).

Thus, for Haskalah educators, the physico-theological model served as a powerful tool for shaping scientific knowledge in their texts for children. This model, deeply rooted in both in Jewish and non-Jewish culture, given even wider legitimacy by the modern Enlightenment movement, was then used by Haskalah educators to balance the attraction to nature and the desire to scientifically study nature with the Ashkenazi world’s still ambiguous attitude towards science. With this model, Jewish educators were able create a mutual exchange between Jewish tradition and non-Jewish bodies of scientific knowledge, thereby bridging these once distant realms The physico-theological texts were usually not aimed at imparting scientific knowledge per se, as seen in their incorporation of didactic and moral messages, using superlatives and emotional devices, to intensify their impact on the hearts of the young students. These texts for children and youth presented a harmonious relationship between the Jewish religion and science, while overlooking the tensions inherent in natural theology noted by traditional rabbis (see, for example, criticism of this approach by Rabbi Natan of Nemirov in Feiner 1999, p. 110; Frieden 2009, pp. 31–33).

**“The Jewish Point:” Making Science Relevant to the Identity of Jewish Youth**

Authors of Hebrew-language scientific literature for youth also attempted to bridge the Jewish and non-Jewish worlds by using another model that drew on Jewish traditions, writings, and customs to emphasize the “Jewish point.” Unlike the above-mentioned “adjustment tactic,” in which current scientific materials were portrayed as if they had Jewish roots, in this case, the discussion of selected materials related to the Jewish world was expanded to refer to other issues.

This was particularly noticeable in academic writing on geography (Frieden 2009, pp. 3–43; Pelli 1991). Many works were devoted to biblical geography, such as: *Sefer Kitzavei Aretz* (Hrodna, 1833), *Sefer Gililot Eretz Yisrael* (Breslau, 1819), *Mechkarei Aretz (Studies of the Land)* (Vienna, 1819), *Eretz Kedumim* (Vilna, 1839), *Halikhot Kedem (Ways of the East)* (Vilna, 1859) and more. This trend reflected the flourishing of travel literature on the Land of Israel and the Middle East, compiled by many non-Jewish explorers and scientists who visited the area in the 19th century. These texts often included geographical information woven into a travelogue (Ben-Arieh 1989, p. 70; Cohen 1982). Hebrew periodicals also addressed the geography of the Land of Israel. For example, in 1874–1875, the journal *Ivri Anochi* printed a lengthy series called “A Journey in the Land of Palestine,” and in 1882, the journal *HaTzerifa* presented confirmation of the story of the exodus from Egypt based on contemporary studies (Citron August 29,1882, pp. 252–254).

Biblical geography provided authors with opportunities to establish the truth of the stories of the Jewish people and to connect Jewish issues with the modern science of geography. The educational goal was to develop a strong modern Jewish identity among young readers. For example, Samson Bloch Ha-Levi (1784–1845), wrote *Shvilei Olam*, a two-volume geography textbook, the first about Asia (published in 1822 in Lviv), and the second about Africa (published in 1828 in Zholkva).[[34]](#footnote-34)

Bloch made extensive use of scientific writing models. His first volume opens with an introduction to the terms in Hebrew for geographical features, such as the poles of the earth, island, and inlet, and an explanation of how latitude and longitude were measured in degrees and minutes (Bloch 1822, pp. 1–2). To validate and legitimize the information in his book, he draws on the writings of philosophers and naturalists such as Gottfried Wilhelm von Leibniz, Christian Wolff, Immanuel Kant, Georges-Louis Leclerc Comte de Buffon, Carl Philipp Funke, Eberhard August Wilhelm von Zimmermann, and Heinrich Friedrich Wilhelm Gesenius (Bloch 1822, pp. 12, 40, 60, 107–109, 125; Bloch 1828, p. 1). His method was to present the information in a systematic and orderly manner. First, he gives the geographical location of the country under discussion, then its climate, crops, the customs of its people, and the size of its population. The first volume was well received by readers and when he published the second volume, six years later, he had an impressive list of signatories, including some prominent rabbis such as: Mordecai Benet, Moses Mintz from Óbuda; HaHatam Sofer, Eleazar Fleckeles, Samuel Landau (son of Noda Biyhudah) and Moses Kunitz from Óbuda.

At the beginning of the second volume, Bloch published a letter he had written to JudahLöb HaKohen Rapoport (also known by Hebrew acronym Shi’r, 1790–1867). He refers to the rabbis’ agreement to be listed there and asked: “And what are these living geniuses of our world, who are involved in issues of Torah, doing as guests in this book, *Shvilei Olam*? [...] Who predicted or knew what the rabbis of our time would read in this book, including knowledge that those who understand the Torah did not give us as part of our inheritance? […]

Later he answers this question himself: “Religion and knowledge are in harmony here, because the chief Ashkenazi rabbis have brought them together in their hearts, as happened previously in the hearts of our ancestors in Spain and the lands of Ishmael,” (Bloch 1828, “In honor of [...] JudahLöbHaKohen Rapoport,” pp. 4, 15, numbering mine). Like many other Haskalah authors, Bloch took pains to emphasize the points of congruence between science and the Jewish tradition, in contrast to rabbis who denied any valid links between them.

Bloch’s target audience was young Jews, although the readership of his books was actually much broader (Kugman 2017, pp. 265–268). In a letter to Nachman Krochmal (1785–1840) at the beginning of the book, Bloch relates his personal experiences and the circumstances that led him to be interested in the sciences. The Torah education he received as an adolescent did not include any science studies, and, like all his peers, he was intellectually ignorant of them. Only later was he introduced to the sciences, at the home of his uncle, Baruch Zvi Naya. He describes his changed attitude in romantic and poetic terms: “What a jewel I have found, it is beautiful, beautiful to behold! Like grapes in the desert to an animal in a wasteland, I have found what my soul craves, suckling on wisdom, in my uncle’s house” (Bloch 1822, “In honor of [...] Nachman Cohen Krochmal,” p. 3, numbering mine). Following this letter to Krochmal, Bloch criticizes the neglect of scientific knowledge in the Jewish world. He insists that it was necessary to bring this to the people, and even refers to high-ranking figures such as the Rambam, the Ramban, and the Vilna Gaon to strengthen this position (Bloch 1822, pp. 9–10, numbering mine).

In a letter to Shi’r at the beginning of the second volume, Bloch expresses regret that his target audience of young Jews belittled his work, and wonders if anyone has any interest in a book in Hebrew that draws on knowledge from non-Jewish sources (Bloch 1828, in honor of [...] JudahLöb HaKohen Rapoport, p. 13, numbering mine). Here, he is referring to a trend towards suppressing the Hebrew language in the first half of the 19th century in Central Europe (see Chapter 2). Given this situation, Bloch must transmit scientific knowledge in a way that is relevant to his young audience and the development of their Jewish identity. He explains that he chose to focus the first volume on Asia because this offered an opportunity to link the Jewish people’s foundational historical events with knowledge of geography:

In this book, I also fulfilled the desire of many of the enlightened among our people, whose souls longed for knowledge about the lands where our ancestors lived, the place where our Temple stood, and other lands discussed in the sacred writings and sayings of the Sages [...] and that is why I wrote the first volume about the attributes of Asia, because most of the stories in the Holy Writings took place there (Bloch 1822, “In honor of [...] Nachman Cohen Krochmal,” 13–123, numbering mine).

Bloch took every opportunity to place geographical lessons in a Jewish context. He wrote about the Jewish communities in various cities, their history, and key Jewish figures who lived or spent time in them. For example, in the section on Turkey, he provides information about cities within the borders of the Land of Israel that were under Turkish rule. He describes in great detail the city of Safed, its large Jewish community, the Jewish leaders who lived there, and the recent settlement of the students of the Vilna Gaon in the city. In contrast, he only briefly mentions Nazareth as a large village with a palace in it, and the birthplace of Jesus Christ (Bloch 1828, p. 17). Along with his selective criteria regarding what knowledge he perceives as relevant and essential, he also resorts to emotional tactics to strengthen Jewish identity. He opens the section on the Land of Israel with an emotional passage on its decline from greatness:

Stop here, dear reader! If you do not give reprieve to your eyes, the tears will flow like a great stream of water, your tears will melt this book [...] For I am not bringing you back to a delightful land like the days of the past, not to a land flowing with milk and honey [...] but to wasteland and wilderness [...] a land over which God’s curse hovers […] This desolate and impoverished land, in the clutches of the fear of robbers, is now subject to foreign and encroaching rulers, and its gates are closed to us. (Bloch 1828, p. 19).

Bloch devotes several pages to the description of the city of Jerusalem, and especially to the corrupt rule of Turkish tyranny over it (1829, pp. 19–25). Similarly, the discussion of the Arabian Peninsula, which forms the border between Asia with Africa, opens with a description of the Israelites’ journey in the Sinai desert, during which they received the Torah. Only then does he mention that a “false prophet and teacher” was born there, meaning Muhammad. Bloch adds that Muhammad was influenced by Judaism and strove to discredit idolatry: “The pillars of the religion he founded are based on the teachings of Moses,” (Bloch 1828, p. 30). In his description of Mount Sinai, he notes that Saint Catherine’s monastery is located there, but repeatedly returned to showering praises on Moses and the Torah of Israel (Bloch 1828, pp. 32–33).

Bloch expresses a clear preference for rationalism and a scientific approach, and sharply criticizes folk beliefs. He describes in great detail the Arabs’ glorious heritage of learning and wisdom, but bemoans their decline in his times. He writes that his “soul is sickened” by the amulets and witchcraft to which the Arabs were attracted and criticizes his Jewish readers because such false beliefs were also widespread among them (Bloch 1828, p. 45).

Bloch locates the “Jewish point” in every issue: connections between Persian and Jewish customs (Bloch 1828, pp. 61–62); the similarity between the caste of impure untouchables in India and the Jews’ status as inferior outcasts (ibid. p 74); the port of Ophir on the island of Ceylon, to which King Solomon sent his ships to receive its natural riches (ibid. p. 96), and a description of the Jewish community in China (ibid., pp. 110–111).

In the second volume, on Africa, Bloch wrote extensively about the Jews of North Africa. The section on Egypt recounts the history of the Jewish people, from the patriarch Abraham and the Jews going down to Egypt, through Moses, and through the Rambam, and emphasizes the suffering of the Jews. He mentions important rabbis who lived in Algiers, Isaac bar Sheshet (Ribash) (Bloch 1828, pp. 7–8; 13) and Simeon ben Zemah Duran (Rashbatz) (ibid., pp. 62, 106). In this way, Bloch connects rational and scientifically accurate discussions based on academic sources with historical knowledge that he considered essential for his readers, thereby reflecting the ideology of the *Chochmat Yisrael* movement and its pedagogic perspective (see more about the educational foundations of this movement in Livna-Freudenthal 2018, pp. 100–102; Salzer 2019, pp. 36–38; Von Krone and Thulin 2013, p. 265). Bloch wrote geography books with the intention of shaping a new, traditional yet modern identity, in which familiarity with the sciences was combined with in-depth understanding of the roots of Judaism.

Bloch was not the only author who used the “Jewish point” method to establish Jewish identity among youth. This method also characterized the work of Kalman Schulman (1819–1899), a prolific educator and author who worked in Vilnius. Most of Schulman’s books were devoted to biblical history and geography, based on knowledge he drew from the travel writings of pilgrims who had recently visited the Land of Israel (Cohen 1982, pp. 230–255; Sasson 1998, pp. 173–212). *Halikhot Kedem (Ways of the East)* (published in Vilna in 1854) and *Shulamit: Kolel Pelai Eretz Hakedusha v’Artzot Kedem (Shulamit: A Comprehensive Guide to the Wonders of the Holy Land and the Eastern Lands)* (Vilna, 1855) were both intended for Jewish youth. In the *Halikhot Kedem*, Bloch directly addresses his young readers and explains why he had decided to write a geography book on the Land of Israel for them. Schulman describes his envy about the many books about the Land of Israel that had been published in foreign languages by non-Jewish authors:

Listen, for your sake, my sons who study the holy books! For your sake, I bring this book [...] And I will lead you and bring you to a fertile land, my sons who are listening! With abundant love I bring you after me to all the places revealed in the name of God [...] I, who from the days of my youth dedicated my pen to the sacred language, saw the words of the wise men of the non-Jewish nations who had visited the Holy Land and traveled around it, and wrote innumerable books about it [...] I was jealous and envious on behalf of our holy language, the language of truth and the mother of all that is holy, and I said in my heart: Is it fitting that studies of this land be done only in other languages, languages that have never been spoken in this pleasant land? [...] I read these works closely, and from a selection of recent travel books, I took sections about the greatness of the Holy Land and its ways [...] I put the words of those many travelers into the voice of one man traveling those ancient path [...] and this man, who tells the story, will tell it in the language that he speaks, so that these stories will be engraved in the hearts of the readers even more strongly (Schulman 1854, “Introduction,” pp. VII–XII).

According to Schulman, familiarity with the geography of the Land of Israel could strengthen young people’s affinity for their people and their language. In the Introduction to *Shulamit*, Schulman emphasizes that he wrote these books specifically in order to connect the youth of that time to the heritage of their ancestors, which had been revealed in the Holy Land (Shulman 1859, “Introduction”, pp. XV–XVI).

Schulman embedded geographical information about the Land of Israel in the framework of a story of a fascinating imaginary journey, culminating in a religious experience. Schulman himself never visited Israel, and apparently drew all the details from recent travel books. His books used many of the elements that were common in Hebrew physico-theological science literature for children and youth: a narrative framework of a journey in which scientific knowledge was combined with messages of religious faith. Schulman’s innovation was that his story was set in the Land of Israel. When the hero set his foot on the Holy Land, he was filled with awe, and fell onto its soil. When he reached Mount Sinai, he witnessed a thunderstorm and imagined the biblical event at Mount Sinai (Shulman 1854, pp. 9–10). The dramatic story of the journey to Jerusalem stands out above all. The narrator describes the Land of Israel as desolate and forsaken, infested with gangs of robbers who lie in wait for travelers. After he and his companions managed to escape from robbers, they arrived exhausted and broken, at their desired destination: Jerusalem.

I heard that we were close to the city of God. My heart trembled in fear within me, my astonished spirit left me, and only with effort could I draw breath. Every mountain and hill that I saw, I imagined it was Mount Zion, the hill of Jerusalem. A few moments passed, and my heart yearned and my spirit was consumed by the prolonged anticipation, each moment a year, each moment a year, it seemed to me. Oh, when will I come to your gates, Jerusalem?! When will my tears be shed, for the daughter of Zion, my holy God?! [...] Suddenly, I fell off my horse […] The city of God! [...] Peace upon you, Jerusalem, the holy city!! ... I raced across the land […] I passed through the gates of Jerusalem, I walked into the city with bare feet, in sackcloth and ashes. I tore my clothing […] I kissed the stones of the city of God, and tears streamed from my eyes […] No tongue can express, and no writer’s pen has the power to describe a single trace of it (Schulman 1854, pp. 10–11).

The journey to Jerusalem is presented as an adventure story, culminating in entering the city itself. The speaker described his ecstasy at that moment, and the many exclamation marks, question marks, and ellipses all impart the narrator’s emotional-religious experience, which “no tongue can express.” The goal was to make a similarly strong impact on the readers. His choice to use the Land of Israel as a vehicle for presenting geographical knowledge, integrating it with religious ecstasy, was intended to connect young readers to scientific knowledge relevant to their ethnic roots.

This method for presenting scientific knowledge to Jewish children was used in other books for Jewish children in the 19th century, such as the *Kerem l’bnei Yisrael (A Vineyard for the Children of Israel)* published in 1890 in Berdychiv. The author, Israel Dov Riesberg (born in 1858), was a teacher who founded a school in Pereiaslav near Kiev (Riesberg 1891, “To the Reader,” p. 4). In addition to being an active educator, Riesberg helped write various textbooks for children. His *Kerem l’bnei Yisrael* included excerpts from literary and scientific works written by various Hebrew authors: Mendele Mocher Sforim, Abraham Mapu, Peretz Smolenskin, David Frischmann, Judah Leib Gordon, Kalman Schulman, and more.

He devoted an entire chapter to the Jewish communities in Asia and Africa, such as in Kurdistan, Yemen, China, Morocco, Egypt, and Ethiopia (Riesberg 1890, pp. 84–92). Riesberg described the Jews in these places as backwards, and suggested raising the level of education of the Jewish children there through initiatives offered by European Jewish organizations, such as the French organization Kol Israel Haverim that operated in Aleppo, Syria (Risberg 1890, p. 84). He praised the English colonial power for contributing to the development of India, and having a positive influence on the Jewish community there. Riesberg asserted that a European education and knowledge were necessary for progress, a sentiment that appeared repeatedly in modern Jewish science education. Riesberg expanded upon these topics in his book in order to strengthen Jewish children’s sense of identification with their brethren in distant and foreign lands, thereby establishing their common Jewish identity.

In conclusion, science texts for Jewish children and youth during the studied time period were characterized by the use of the adjustment tactic, the physico-theological model, and the “Jewish point.” These models were intended to strengthen the young readers’ Jewish identity, which was presented as if there was no contradiction with the latest scientific knowledge and technology. As noted above, Haskalah literature as a whole tended to balance and integrate the old and the new. However, it seems that this inclination was even more pronounced in the children’s texts produced by this movement, apparently because writers for children wanted to soften the tone, blur contradictions, and present a simple and clear message (see Shavit 1996, pp. 103–102, 364–339; Nodelman 2008, pp. 8–18). As a result, these texts present scientific knowledge, religious fundamentals, and Jewish identity as being in complete harmony.

**Chapter Four**

**Zoology in Animal Stories – Exoticism, Morality, and Human-Animal Relations in Texts for Jewish Children**

Never before has knowledge of nature drawn mankind towards it with the cords of love, nor taken their hearts – as it does in our time, in this era; for in this century we can justly say of it that it is the “queen of wisdoms” and in all enlightened kingdoms they will knock on its doors with a feeling of love and a brave spirit (Hoffman 1887, “To the Reader,” 5).

Throughout the generations, engagement in the history of nature – in botany, zoology, and mineralogy – has appeared only on the margins of Jewish writing. The treatment of animals appeared in theological or medical debates, in questions related to kosher slaughter, and in issues of animal suffering (see more on this in the second chapter). The prevailing perception regarding animals in Jewish society was anthropocentric. In halachic literature, animals were presented as subject to man’s control, and if restrictions and limitations were imposed on the use of farm animals, it was done mainly for utilitarian reasons for the benefit of people (Belberg 2019; Levy and Levy 2002, pp. 57–68; Reisman 2006, pp. 103–106, 171–172; Shemesh 2004; Shemesh 2006, pp. 509–510; Shemesh 2007). This anthropocentric perception was also common in Christian culture. It had been the foundation of the work of animal researchers and Christian thinkers in Europe from the Middle Ages to the modern era, and was reinforced by monotheistic theology. The absolute control of man over nature was presented as a subject of aspiration, and the study of nature thus served the purpose of integrating man’s ability to exploit his environment. Some of the thinkers even presented the animals as mechanical and soulless objects, and the very comparison between a person and an animal was considered an insult (Serpel 2007; Thomas 1996, 60–61; Salisbury 2011).

The discovery of the new world and its fauna stirred the imagination of natural researchers and led to a surge in animal research. During the 18th century, new classification theories were introduced, such as the comprehensive taxonomy of the Swedish scientist Carl Linnaeus (1707–1778), and systematic and pioneering research works on animals were published, such as that of the French researcher Georges*-*Louis Leclerc, Comte de Buffon (1707–1788). These changes in research laid the foundation for the theory of evolution that developed in the 19th century (Anderson 2013; Egerton 2012; Furniss 2018; Guerrini 2007, 142–144). Among the Jews, zoology began to be perceived as an important subject of study, and Hebrew books proliferated in which animals were described from a scientific perspective, such as Nehemiah Dov Hoffman’s (1860–1928) book *Siporei Hateva (Stories of Nature)* (Hoffmann 1887) from which the opening quote of the current chapter is taken.

The study of animals in the modern period increasingly focused on the description and analysis of objects from nature, and the symbolic or utilitarian reference to animals was gradually abandoned. These trends were accompanied by the emergence of a new public discourse about human-animal relations, critiquing the exploitation of animals and advocating a more compassionate attitude towards them (Arbel 2001; Salisbury 2011; Serna 2012; Serpel 2007; Wolker 1976). The growing interest in animals due to scientific, ethical, or traditional utilitarian reasons also found expression in modern European education, and modern European schools began introducing animal studies into the curriculum (see Chapter 2). The idea that studying about animals and having direct contact with them is of great value for children became more and more entrenched. Reflecting this perception was the spread of zoos in Europe that began in the 17th century, designed as complexes aimed at entertaining and educating children (Atkin 2016; Cole and Stewart 2016, pp. 52–53; Kalof 2007, p. 119).

The idea that captivated many educators is that discussion about animals is an effective didactic tool for conveying educational messages (Ritvo 1985, 76–77). By the early 19th century, the Western world increasingly acknowledged that the way people cared for and treated animals was an expression their moral character. As a result, educators and parents dealt with the question of the ways in which children should be educated to treat animals with respect, including house pets, farm animals, and wild animals. The abuse of animals by children was considered an early sign of potential moral delinquency.

European children’s literature, which grew and expanded in the modern period, was characterized by an abundance of scientific texts and literary stories about animals (as it is to this day). Many adults believe that the connection between a child and an animal is a natural one, and that the presence of animals in the world of children, whether literally or fictionally, is vital for them. Western children’s literature of the 18th and 19th centuries spread the message that it is the duty of children to treat animals with respect and compassion, and cruelty towards animals was portrayed with great disapproval (Cole and Stewart 2014, pp. 43–44; Cosslett 2006, pp. 10–22; Grier 2006, pp. 133; 166–177; O’Malley 2003, p. 100; Secord 1985, p. 138).

The appearance of Hebrew texts for Jewish children that were interested in animals in the 18th and 19th centuries was innovative and bold. It testifies to the awareness of Jewish educators about the new scientific and educational perceptions described above, and their desire to base the knowledge of the young Jewish generation on this educational ethos. At the same time, the significant influence of traditional perceptions of animals in the Jewish world is evident in these texts.

**Study and Entertainment Together: Animals in Texts for Jewish Children**

The expression of this new aspiration to study zoology in Jewish education first appeared in the 1780s, in the most important distinctively science textbook for children and adolescents created in the context of the Haskalah in Berlin – *Rešit Limmudim*. Written by a young intellectual named Baruch Lindau (1759–1848), a native of Hanover who associated with the circle of German-Jewish intellectuals, *Rešit Limmudim*was published in two parts. The first part was published in Berlin in 1788 (Lindau 1788), while the second part appeared in Dessau in 1810 (Lindau 1810). Both were clearly intended to provide scientific education to Jewish children. The first and most important volume of the two was published during the flourishing period of German-Jewish education and provided an important pillar in the educational project to develop a new Jewish bookcase. This volume encompasses knowledge in a wide range of modern disciplines: astronomy, zoology, botany, mineralogy, geography, climatology, and human anatomy. About half of the 159 pages of the book are dedicated to zoology (42 pages), botany (17 pages), and mineralogy (18 pages). Zoology, therefore, occupies a central place in this book. Lindau’s ground-breaking textbook was used by generations of Jewish readers throughout Central and Eastern Europe for a century following its publication.

*Rešit Limmudim* was received enthusiastically by educated people of Lindau’s generation, as evidenced by the endorsement from Marcus Hertz published in it, which has already been mentioned here (see more about this in Kogman 2013b, 52). Lindau received another endorsement from the doctor and zoologist Marcus Elieser Bloch (1723–1799) mentioned earlier. Bloch was a graduate of the University of Frankfurt am Main, and is considered one of the founders of ichthyology, the study of fish. Between 1782–1795, Bloch published a pioneering series of research books in German that contributed to the advancement of this research field and to the development of the commercial fish farming sector (Lesser 1999). Bloch wrote about Lindau’s book:

Throughout my life, I have been engaged with the wisdom of nature and with studies, and I have found it soothing to my soul. I saw that among all wisdoms, nothing is as beneficial in refining a person’s heart to understand the exaltedness and greatness of God as this wisdom. It is easy and pleasant to engage with, and it expands a person’s soul to understand from his heart about creation. It fills his soul with moral instruction and fear of God, which is the end and purpose of everything. And as long as I was happy with this wisdom, I was saddened to see that the words were not given to the faithful descendants of Israel in the scriptures, and their youths had no place for its delights in their hearts; and many times I said to my heart, who will give me a swift scribe’s pen in our holy language, and I will do good for Israel by writing these things before them as I wrote them in the language of the nations. Now I am comforted and filled with joy upon seeing the delightful composition that was written by [...] Baruch Lindau [...] I saw his book and blessed him for the good he has done in Israel. And here I am, asking all my lovers and acquaintances to give this book into the hands of their children’s teachers, for their benefit (Lindau 1788, “Words of... Mordechai Bloch,” 1–2, numbering mine).

Bloch, understanding that learning about nature filled one’s soul with “fills his soul with morality and fear of God” and contributes to the cultivation of human morality, adopted the physico-theological model (see Chapter 3). He pointed out the vacuum found in scientific educational literature for Jewish children, and even admitted that he considered writing such a book for Jewish children himself. He praised Lindau’s book for its focus on zoology, a field closest to Bloch’s heart, and most neglected, as mentioned, in the Jewish world.

In his book, Lindau adopted the scientific-encyclopedic writing model. The zoological values were evaluated according to the accepted taxonomy from complex to simple: animal, plant, inanimate. He adhered to the method of naturalist Carl Linnaeus, and placed the name of the animal in Latin or in German letters next to the Hebrew name appearing in parentheses next to it. He usually described the animal’s habitat, food, traits, and so on. His book is a Hebrew adaptation of a contemporary German textbook, *Naturgeschichte für Kinder* (*Natural History for Children*), by the contemporary German-Christian educator Georg Christian Raff (1748–1788).[[35]](#footnote-35)

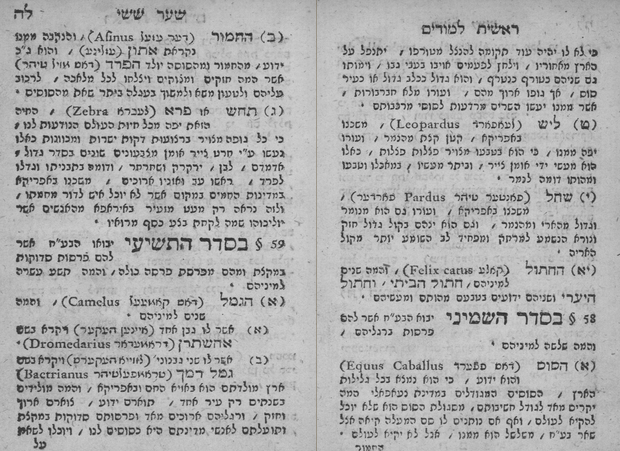


Figure 6: A page from *Rešit Limmudim* (Berlin, 1788) – Zoology for Jewish children.

Linda tended to engage with the exotic and unusual, and when describing an animal common and prevalent in Europe, he usually abbreviated and condensed the text, or, alternatively, focused on its lesser-known aspects. For example, when he introduced the horse, he carefully pointed out that it never vomits (Linda 1788, la). In his description of the dog, he noted the existence of a breed of dog from East India that does not bark (Lindau 1788, p. 33). Moreover, most of the animals that he chose to include in his book are not found at all in the immediate environment of his subjects – Europe – but on other continents – Africa, India, and the Americas, describing exotic animals such as the orangutan, hyena, lion, leopard, zebra, elephant, sloth, opossum, and armadillo. His tendency to engage with the exotic aspects of unfamiliar animals is evident in his tendency to minimize or even completely overlook their zoological descriptions, instead providing his young readers with dramatic stories centered around animal heroes. An example of this is the story about a giant shark, which he refers to as “the man-eater.”

The man-eater (*der mentshan fresser*) is the largest of all the fish of the island (shark,[[36]](#footnote-36)), they were ten to twelve cubits long, and four to five cubits wide., and their throats were so wide that they could swallow large animals whole without chewing them. Fishermen who captured this species have found a whole horse in their stomachs. In 1758, an astonishing thing happened. A sailor fell from a ship into the Mediterranean Sea, and in the blink of an eye, a fish of a certain species approached and swallowed the fallen man. When the ship’s crew saw this, they fired cannons at the fish and pressed it until it vomited the swallowed sailor back into the sea. The crew pulled the man out of the water alive, unharmed and with no injuries. They then pursued the fish and killed it. The ship’s captain gave it to the rescued sailor, who traveled with it throughout Europe to show people this giant fish, which was ten cubits long, four cubits wide, and weighed three thousand two hundred and twenty-four liters (it could be that this fish was of the same species as the one that swallowed the prophet Jonah, as the story goes). On each side of its mouth it has six rows of triangular teeth that move and it can raise them at will, enough to hold its prey (Lindau 1788, p. 55).

Here Linadau deviated from his usual practice of beginning each entry with an animal’s Latin scientific name and its name Hebrew or German (transliterated into Hebrew letters), instead dubbing it a “man-eater,” a term that already hints at the emphasis the author himself placed on the heroic struggle of sailors against an almost demonic creature, a giant predatory fish. Like other authors of his time who chose to emphasize the superiority of man over the animal (see below), Lindau used the story to discuss the resourcefulness of the sailors. He later linked the tale to Jewish sources, mentioning the fish that swallowed Jonah. Lindau’s goal was to arouse feelings of attraction-repulsion in his young readers towards this powerful predator, apparently even using the scientific description of its terrifying dental system for this purpose.

Lindau tended to expand the discussion in his book on large predators, such as hyenas, constrictor snakes, and crocodiles, incorporating into these articles illustrative descriptions showing the terror and fear they spread in their environment (see accordingly, Lindau 1788, pp. 34, 52, 53, respectively). For example, this is how the tiger was designed in Lindau’s composition.

The tiger (טיגער, Tigris), which resides in Africa and East India, is more dangerous than the lion, as it hunts and preys all day long, even after it cannot eat any more anymore. He is also cruel his children and offspring and their mother, and when he is hungry, he will devour [his offspring] children. If the mother stands up to him, he will attack her along with the children, and he will not fear any living creature, even if those larger and taller than him. He is very light on his feet, he will run and dance, and leap at once a distance of five or six cubits. He is very strong and terrifying, in his mouth he can carry a bull as a man carries a kid on his shoulder, and he will also dare to attack the elephant (elephant) to uproot its trunk in order to smash its brain and eat its flesh. And when the captured one sees that there will be no more uprising to escape from his predator, he will fall to the ground behind him, and sometimes he will press his enemy with the thickness of his back, that both predator and prey will die, as the predator is torn apart. He is as large as a big dog or as a city horse, but his body is longer than theirs, and his skin is full of bruises, which the officers make into horsewhips for their chariots (Lindau 1788, 34–35).

The symbolic perception appears here between the lines: Linda uses the word “cruelty” to describe the leopard’s behavior towards its offspring, thus creating an analogy between human behavior and that of the leopard. However, the intention of this text is not to engage in complex philosophical questions about the differences between humans and animals, or the existence or absence of a moral relationship in the animal world. Rather, his intention is to stimulate children’s curiosity and imagination by relaying dramatic feats of strength, as evidenced by the description of the struggle between the leopard and the elephant, which ends in both of their deaths. More than conveying knowledge about the natural world, these texts were designed to elicit a strong emotional response from the child readers and to create astonishment and wonder. Another example of this is Lindau’s description of how beavers build complex dams in rivers: “Whoever has not seen such a magnificent construction would not believe it is possible, and would say that it is a wonderous miracle that such a small animal could create works like a great craftsman” Lindau, 1788, M). Apparently, Lindau believed that stories like these would attract children to this field of knowledge, and would encourage them to learn more about the world of life.

Lindau’s tendency to try and stir the emotions of his young readers on the one hand, and on the other hand, to avoid dealing with heavy ethical questions raised by animal stories, is notable when comparing his work to other contemporary texts not necessarily intended for a young audience. For example, in the book of Pinchas Eliyahu Horovitz (1765–1821) *Sefer HaBrit* (Horovitz [1797] 1990), which appeared about ten years after Lindau, Horovitz devotes a wide-ranging discussion to the living world. Horovitz presented detailed descriptions of creatures such as the hyena, lion, leopard, elephant, beaver, eagle, the stork, hyena, and various types of marine animals. In writing this book, Horovitz relied on both Hebrew and foreign sources from which he drew the scientific information, and incorporated into it the discussion in Chaim Vital’s Kabbalistic book *Shaarei Kedusha* (Rosenblum 1989). Many of the descriptions of the animals that appear in this book were taken from the beginning of Lindau’s *Rešit Limmudim*(see on this Kogman 2013b, 54). Horovitz intertwined his descriptions of animals in very different contexts from those that served Linda. Horovitz pointed out the great value of the discussion in the natural world to the religious-belief framework (Ruderman 2014, 43–51). For Horowitz, the great abundance and diversity of different life forms on earth prove the greatness of God, who triumphs with His wonderful power over every detail in His creation.

He oversees all of these with immense precision, watching over each and every one of them individually, because the supreme supervision over them consists entirely of what is in the detail and the details of the details on all their fine limbs and senses. In the abundance of His mercy, He narrows His attention to bind and straighten the subtleties of their inner tendons and their external limbs to fix them in their place and set them properly (Horowitz [1767] 1760, 224).

It is clear that the model Horovitz uses here is the physico-theological model, which presents God as responsible for the hidden yet amazingly precise workings of the natural world (see Chapter 3). But according to Horovitz, this is not the main message learned from observing the living world. He concludes chapter 14 of his book, devoted to the description of animals, by stating that his primary concern was to clarify the nature of the animal soul (Horowitz 1797 [1989], p. 227). Horovitz, relying on Chaim Vital, determined that humans are the most superior creature, as not only do they contain within themselves the soul of the plant and the soul of the animal together, but the quality of these souls found within them is chosen. All of these present him as the chosen one of creation, the highlight of the divine act of creation:

Certainly, all the physical aspects and forms in a human are superior to those of animals, and those of animals are superior to those of plants, and those of plants more superior to those of inanimate objects [...] The function of the soul’s powers that grow within man, which are the powers to nourish, grow, and reproduce, are more exalted in humans than they are in animals, and even more so than in plants. Similarly, the function of the animal soul’s within it, which consists of ten powers [...] is nobler in humans than in animals and certainly in a plant [...] Everything that comes later in the order of creation is superior to that which preceded it (Horowitz 1797 [1989] p. 230).

Horovitz presents here the concept of the “great chain of being,” which connects all living things in a holistic and hierarchical system, an idea deeply rooted in human thought since ancient times (Lovejoy [1936] 1968). On the other hand, he intertwines the scientific description with the Kabbalistic idea of the reflection of the ten *sefirot* (forces) in the human soul. Horovitz aimed to bridge the scientific discourse and the mystical, and to point out the harmony between the systems. This connection that Horovitz provided to the discussion on animals was very different context that given to it by Lindau.

A comparison between Lindau’s textbook for youth and another educational book from the same period reveals similarities*. Kiryat Arba* by Jakob (Ben Israel) Soldin, a Haskalah author and poet who worked in Copenhagen at the time,[[37]](#footnote-37) was also devoted to the description of animals and was published a year before the appearance of *Rešit Limmudim.*



Figure 7: The title of Jakob Soldin’s book on animals (Soldin 1786/1787)

In his book, Soldin presents fascinating descriptions of animals in distant lands, sequentially presenting zoological texts intersperse with stories about lions, tigers, elephants, rams, camels, giraffes, monkeys, bears, seals, and “thorny pigs” (porcupine),[[38]](#footnote-38) He too, like Lindau, is attracted to the exotic and the special. However, Soldin elevates this discussion to engage with the wonders of God who created these creatures, in accordance with the physico-theological model. He presents the divine creation as entirely intended for the needs and comfort of humans. Even the creation of flies and worms, in his opinion, is an expression of God’s will, required to punish sinful humans (Soldin 1777, pp. 1–2). Alongside the physico-theological discourse, Soldin claims that the diversity and multiplicity of God’s creatures was intended for another purpose, which is to inspire man to investigate nature and its creator:

And behold, it appears that the goodness of the Creator, who created countless multitudes of animals, each unique in their form, their sustenance, and their habitats, is not only for the benefit of humans: but also to investigate [...] to explore the nature of each one of them [...] to know the Maker of all living things (Soldin 1787, p. 230).

Soldin subsequently presents an extensive philosophical discussion on the differences between humans and animals. As I described at the beginning of the chapter, during this period, many natural scientists and philosophers dealt with the question of the boundary line between the human and the animal. It is evident that Soldin recognized the contemporary claim that the behavior of animals is fixed from birth and known in advance from the moment of their birth (Yuval 2007, 318–323), and that only humans have the ability to learn, develop, and change (Soldin 1787, pp. 3–5);

Super-predators provided Soldin with an opportunity to discuss the existence of animal morality and the differences between it and human morality. As was customary in European literature of the time, the lion and the tiger were presented as complete opposites: the lion as a symbol of bravery and generosity, and the tiger representing cruelty and greed (Ritvo 1985, 87–88). These are accepted cultural images, appearing, for example, in the writings of the philosopher and Renaissance man Michel de Montaigne (de Montaigne [1580] 2007, 160–163). Soldin, too, describes the tiger as a heartless and ruthless animal, that kills every creature in its vicinity, and even harms its offspring and mate. He incorporates into his text the story that also appeared in Lindau’s book, about a fierce battle between the leopard and the elephant. It seems that Soldin, like Lindau, drew this story from Georg Christian Rupf’s German textbook *Naturgeschichte für Kinder*, already been mentioned here. This book served as a source for many Haskalah writers during this period. In the German book, the fall of the elephant on the tiger is described as a result of his distress during the struggle (see Raff [1778] 1781, 476), and Lindau accordingly presented a similar explanation in his book. But, wanting to use this story as a starting point for discussing moral questions, Soldin describes the elephant as the one who punished the tiger for his bad deeds while sacrificing himself:

Even when facing the elephant, the lion, which is smaller, will not shy away but will challenge it to a fight, or bite its trunk, or jump on its back, or seize it with its teeth and bite until blood flows. However, the elephant will exact its revenge and throw itself onto its heavy back, killing itself along with its enemy (Soldin 1947, p. 6).

The elephant is presented as possessing a sense of morality, taking revenge on the tiger for deviating from ethical norms. According to Soldin, the elephant is no less moral than humans, and perhaps even more so. Soldin emphasizes the elephant’s unwavering loyalty to its master, and wraps this in a condemning and scornful statement towards humans, who tend to betray their own kind (Soldin 1787, pp. 9–10). In the article that Lindau wrote about the elephant, on the other hand, the question of the elephant’s morality does not arise at all. Lindau chose to focus on the physical attributes of this animal and presented it as a huge animal with enormous strength, summing it up as follows: “It is the largest and most wonderful of all land animals (Lindau 1788, p. 38).

If the tiger (or leopard) [[39]](#footnote-39) is distinguished by its cruelty, then Soldin’s portrayal of the lion is completely different. Soldin links the description of the lion in his book to biblical stories, such as the one about a “man of God from Judah whom the lion killed but did not devour, and the story of the prophet Daniel in the lions’ den. Soldin presents the lion as a creature to whom God gave, along with his animal form, human qualities such as mercy and loyalty (Soldin 1787, p. 23). Soldin openly and emphatically grapples with the question of the boundary between humans and animals, focusing on the moral dimension. The idea that animals are no less moral than humans, hinted at in the story of the elephant, is presented more explicitly in this text:

Indeed, if we look closely at its [the lion’s] nature or the nature of other harmful animals, they excel in several aspects over humans who do not harm their own kind and do not seek approval from others. Many of them are compassionate and recognize goodness. If humans had a temperament and nature similar to theirs, they would undoubtedly corrupt it with cruelty and wickedness [...] However, humans have disgracefully exchanged their honor and use their wisdom to harm others. Each person contemplates the evil of his fellow in his cunning and deceitful heart (Soldin 1787, p. 3).

Clearly, the messages that Soldin conveyed through his discussion of animals differed fundamentally from those of Lindau. Soldin, unlike Lindau, did not settle for describing fascinating and exotic animals in order to surprise and entertain his readers. The purpose of Soldin’s book was to address issues that were then on the agenda of nature research in Europe and to touch on the boundary line between man and animal. It seems that he was familiar with the claim that animals are no less moral than humans, in part because they cannot lie (Thomas 1996, 122). Lindau, unlike Soldin, chose to avoid discussing the moral differences between humans and animals, for the same reasons that the first authors of popular science literature for children in England in the 18th century chose to deal with plants and animals and were reluctant to deal with complex questions in the fields of chemistry and astronomy (Secord 1985, 130). Lindau’s appeal to a young audience probably led him to focus on conveying seemingly simple and neutral knowledge. The way he chose to adapt these materials to Jewish children is through a detailed description of various animals, their food and habitat, occasionally peppered with fascinating, dramatic and suspenseful stories about exotic animalscreatures in distant lands.

Adaptations of material in his books aimed at young people are quite distinct from other another contemporaneous zoological text that was not specifically intended for children. In 1788, the very same year in which Lindau published *Rešit Limmudim*, the journal *Hame’asef* published an article about elephants by Haskalah leader Aaron Wolfsohn (1754–1835) in which Wolfsohn gives a detailed and accurate zoological-anatomical description of the “ivory” of the elephant: the structure of its teeth, its tuft on the little finger found at its end, as well as its sutures (Wolfsohn 1788, pp. 275–276).[[40]](#footnote-40) Wolfson does not limit himself to a zoological description of the elephant. Like Soldin, he includes stories illustrating the elephant’s “human” qualities: its long memory, loyalty, and wisdom. He recounts a story about an elephant that, having suffered great cruelty at the hands of its owner, eventually killed him. The owner’s despairing wife threw her children in front of the elephant, begging it to kill them too. However, the elephant’s rage quickly dissipated. It lifted up the eldest boy with its trunk, set him on its back, and from that day on served the boy faithfully. From this story, Wolfson draws a lesson about the moral capacity of animals, which in many ways is not inferior to that of humans.

And you, the reader! If you have ever seen a living elephant with your own eyes, and judged by what you saw, and inferred its internal nature from its exterior, I am sure that you would perceive and declare that the elephant was completely ignorant and God did not give it any portion of His wisdom. For how can there be wisdom and understanding in such a crude and coarse body, and in a material formed from such dust? However, your eyes see from all that I have told you, that the elephant’s soul has many good qualities, that some humans lack (Wolfsohn 1788, p. 280).

Wolfsohn concluded the text with an additional message that judging people based solely on superficial and external impressions leads to mistakes, just as the elephant’s external appearance is misleading and does not reveal its moral character (Wolfsohn 1788, p. 280). Perhaps Wolfsohn was alluding to how traditional Jews disqualified and rejected scholars, including Wolfson himself, solely because of their adherence to Haskalah values, without fully understanding their nature. In contrast, Lindau’s writings, aimed at youth, did not use the animal world in such a metaphorical way. of how animals were presented in *Rešit Limmudim* with zoological texts of the period that addressed an adult audience shows the growing distinction between these groups of recipients. Lindau’s disregard for the question of the boundary between humans and animals likely did not stem from his unfamiliarity with it, as he was well versed in the scientific and zoological discourse of his time (Idelson-Shein 2014, pp. 108–150).

As Haskalah leader Isaac Euchel put it with a touch of cyncism, the focus on descriptions of natural phenomena frees theoretical thought from the complexity and confusion it brings, thereby revealing its great advantage as didactic material:

Observing creation and its creatures is very easy and pleasant to engage in [...] It is fitting for every teacher to educate the young in this part of wisdom [...] This part of wisdom, to which we have become devoted, is not investigative or learned, but rather intuitive, born from a little contemplation with the straight mind that every person has a share in [...] Many deep researchers have turned to it after exhausting themselves in the labyrinths of their imaginations and their confusions, which they descended into without the power of comprehension (Euchel 1799, 28).

According to Euchel, descriptions of nature and animals are simple and understandable reading material for children, and may help them develop the skill of observing natural phenomena. Euchel’s words echo the perceptions of the important pedagogues of his time Jean-Jacques Rousseau (whose views have already been described here) and Johann Heinrich Pestalozzi (1746–1827),[[41]](#footnote-41) who saw the unmediated sensory contact of children with natural phenomena as the key to effective education. Lindau, who, as noted, shared this educational perception, often incorporated detailed information about the characteristics of various animals into captivating and enticing stories, bold and imaginative, in order to arouse curiosity and interest among his young readers, and even to entertain them. On the other hand, he gave up on delving into the philosophical meanings arising regarding human-animal relations, probably due to his perception that this discussion does not correspond to the needs of the young recipients.

**Combining Scientific Knowledge with Literary Models**

There were few representations of animals in the system of texts for Jewish children established. They can primarily be found in zoological descriptions, such as in the book *Rešit Limmudim*, and in animal parables translated into Hebrew.[[42]](#footnote-42) The incorporation of animal characters in fictional texts, a phenomenon that has become increasingly prevalent in European children’s literature (Cosslett 2002; Ratelle 2015, 410; Müller 2011, 20–23), is absent in early children’s texts written in Hebrew (Kogman 2016, 251–253). One of the first attempts to combine scientific information with fiction in a Hebrew text was the aforementioned *Omer Bisadeh*, already mentioned here, which appeared in the mid-19th century. An entire chapter was added to this text featuring descriptions and stories about various animals (Luria 1853, 103–115). In the introduction to this chapter, the author David ben Jacob Aaron Luria presents his clear anthropocentric and Cartesian view. According to Luria, man is the pinnacle of creation and only he has an eternal soul (Serpel 2007, 17; Yuval 2007, pp. 311, 320–321).

Know this, my sons who listen to my voice! Man alone is the most complete in his perfection and glory among all earthly creatures, he is the head of all the created beings and the ruler over all creatures of the world [...] He will ensnare even the great crocodile; he can pull up a mighty Leviathan with a hook, and with his understanding, he will crush its arrogance;he will spread death traps for the lion and the tiger, and in his nets, he will catch all predators; and although man resembles the rest of the living [...] he is superior and more precious than all of them in a high and lofty degree, for his creator has endowed him with understanding, his heart will comprehend, his mouth will speak great and wondrous things, and his delicate soul will fly in flight to the high heavens [...] and he will be unto death (Luria 1853, 99–100).

Like other Jewish educators described in this book, Luria urges his young audience to fulfill their lofty destiny as humans, embodied in reason, the ability to speak, and the existence of the soul. He warns them that God will not forgive if “man closes his ears as if deaf, and refuses to heed the advice of his mind,” (ibid.). Alongside the didactic lessons arising from the discussion on animals, Luria adds an exotic flavor to them, aware that zoological texts had to be adapted to a young audience. Many of the animals described are not found on the continent of Europe: the lion, leopard, elephant, camel, and monkey. He intersperses the scientific discussion with dramatic and captivating descriptions of these animals based on their unique behavior.

Luria’s references to monkeys are particularly interesting. More than any other animal, this creature served as the focus of the debate on the boundary between human and animal (Wolker 1976; Yuval 2007, 305). Hebrew literature of this period emphasized the human characteristics of the monkey.[[43]](#footnote-43) Luria also stresses the similarity between apes and humans, particularly pointing out the resemblance of the orangutan to man. He quotes from the letters of the important French naturalist Comte de Buffon (mentioned above):

The celebrated Buffon recounts: I saw a monkey jumping over the threshold and reaching out to grab a bunch of bananas to bring home; I saw him sitting at the table, eating with a spoon, cutting with a knife and fork, drinking his cup, wiping the plate and turning it over, and so on (Luria 1853, 11).

Luria includes this information about the orangutan in a translation of a parable about a monkey taken from *Fénelon’s Fables* written by the 17th century French theologian, François Fénelon (1651–1715). In this story, the spirit of an old and cunning monkey was transferred to the body of a parrot in the underworld. After the parrot dies, the spirit of the monkey rolls into the body of a foolish and wild man (Luria 1853, 116–118). The moral of this story is that the monkey is merely a pale reflection of a human, and at most, it excels in his negative qualities, such as malice, excessive talkativeness, and foolishness. This parable echoes prevalent perceptions that spread in this century and the preceding ones regarding monkeys. Jean-Jacques Rousseau, for example, argued that monkeys imitate humans because they are more successful than them. He even compared the imitative monkeys to children who adhere to social codes without understanding them (Rousseau [1762] 2009, p. 212).

Luria links the informative text with the parable that followed it, warning his young readers against wasting their childhood on futile activity, because of which “you will be likened and compared to the monkey of the forest” (Luria 1853, p. 116). In creating a close link between the zoological and literary texts, Luria took another step towards a modern children’s text in which animal characters simultaneously display the characteristics of real animals, but also incorporate fictional elements. Conversely, Luria did not deviate from the accepted norm of his time and attributed negative qualities to the monkey. He made no attempt to introduce young readers to the blurring of the sharp differentiation between humans and animals, particularly between humans and primates. Nor does he attempt to hint at the question marks placed on human superiority over animals from an intellectual or moral standpoint.

**Anthropocentrism, Utilitarianism, and the Appearance of Empathetic Messages Towards Animals in Children’s Texts**

As previously noted, early texts for Jewish children rarely included animal stories, aside from occasional ethical and moral messages about human-animal relationships. In many children’s texts, this perception continued to dominate, and the discussion of animals was justified through it. An example of this appears in the popular Hebrew book *Mesilat Halimud* by Ben-Ze’ev (Chapter 2). One of the chapters is dedicated to presenting scientific knowledge, including about animals and humans, began in this way:

The supreme being on the face of the earth is man: for he is intelligent and speaks, and with his wisdom, he rules over everything and subdues every beast and animal: (Ben-Ze’ev 1802/1806, p. 48).

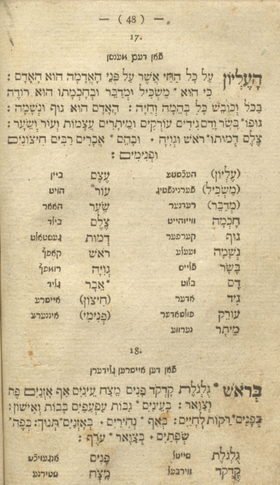


Figure 8: Man as the Chosen of Creation, in Yehuda Leib Ben-Ze’ev’s *Mesillat Halimud* 1802/1806

The phrases “has dominion over everything and conquers every beast and animal” echo verses that appear in the story of creation, which bestows superiority on humans over all other living things:

And God said: “Let us make man in our image, according to our likeness, and let them have dominion over the fish of the sea and over the fowl of the air, and over the cattle and over all the earth, and over every creeping thing that creepeth upon the earth.” (Beresheet 1:26) […] and have dominion over the fish of the sea, and over the fowl of the air, and over every living thing that creepeth upon the earth.” (Beresheet 1: 28).

Indeed, the creation story is perceived as one of the foundations for the anthropocentric perception that spread in the Western world (Harrison 1999; Simkins 2014, pp. 400–403). Later in the chapter, Ben-Ze’ev writes that humans’ superiority over the other creatures is based on their intellectual ability:

What is the height of a small human? What is his power and what is his strength? [...] He will work, he will tire, he will run and he will exhaust. If a man goes a day or two without food, he weakens: many beasts and animals are larger and stronger than him by tenfold: what is the strength of man compared to the strength of the lion, and what is his might compared to the might of the ivory [the elephant]? Yet, despite all this, man is more honored than all of them, and with his skill and cunning wisdom, he rules over them: the bird, in the height of its flight, he can bring down to earth with his arrow: the leviathan from the bottom of the sea he can raise with his net: both the lion and the bear he can trap with his snare: even the ram and the elephant he can subdue with his cunning, to put rings in their noses and a bit and bridle in their mouths, and despite all their strength and power, the weak man can bring them down (Ben-Zev 1802/1806, p. 70).

According to Ben Ze’ev, humans are physically weak creatures compared to animals such as whales, lions and bears, but they are able to kill or dominate them through cunning or by using the various tools and devices they have developed. It is their wisdom that gives them superiority over animals, as the author concluded: “Man is the most honorable of all in talent and cunning wisdom.” This emphasis on human’s intellectual abilities illustrates Ben-Zeev’s commitment to the values of the Haskalah and education (see Chapter 3). Humans’ dominion over animals is not only due to the divine permission granted to humans at the time of creation, but is repeatedly conferred upon them through the wise use of their abilities and talents. Ben-Ze’ev praises humans’ research and discovery abilities, the wonder of inventing devices and tools such as the telescope and the hot air balloon,[[44]](#footnote-44) and the founding of various disciplines of sciences. According to Ben-Ze’ev, the purpose of science is to improve the ways of exploiting nature:

The history of every living creature will be investigated according to its species. Every animal and every beast, every bird and every creeping thing. Every worm and every insect: every plant and every sprout, every vegetable and every grass, every herb and every drug, every root and every stem, every branch and every leaf, every bud and every fruit: from these, food is prepared, and from these, drink is made, and from these, bandages and medicine are made, and the rest are types of remedies to heal every illness and every pain in the work of healing (Ben-Ze’ev 1802/1806, p. 71).

According to the author, humans do not study and research plants and animals simply to satisfy their intellectual curiosity or broaden their horizons. Ben Ze’ev pointed out that the main goal of this activity is using nature’s creatures as food, as a drink, or as medicines that help his health. In this early 19th-century text, Ben-Ze’ev clearly expressed a traditional utilitarian view, with no hint of the increasingly popular idea emerging in European scientific culture that studying nature was an end in itself. It is notable that Ben-Zev neither suggested the existence of any ethical limits on man’s rule over nature, nor attempted to balance the anthropocentric view with any reservations about human activity, not even those set forth in Jewish sources.

Similar statements appear in the *Sefer hayashar v’habrit* (Neumann 1821; see Chapter 3). In this book, the narrator reflects the physico-theological model by taking his young readers on a hypothetical journey into nature to strengthen their religious faith and disseminate scientific knowledge. Both Ben-Ze’ev and Neumann’s texts are sprinkled with numerous biblical allusions. As the readers explore God’s miraculous world, Neumann takes care to remind them that everything they encounter was intended for the use and benefit of humans.

All are for our use and for our benefit: the cattle and the sheep for our work and our food, the beasts of the field and forest, their skins cover our flesh. Also, every bird, every fowl have meat for food and delicacies for us to eat, and some sing in a voice that is pleasing to our ears and which our children enjoy (Neumann 1821, p. 5).

The purpose of the natural world, then, is to provide raw materials for humans to prepare food and clothing, and also as a source of aesthetic pleasure. The song of the bird is presented not as a behavior intended as a means for birds to communicate among themselves, but as a way to please the person listening Here, Neiman expressed the romantic-emotional perception that connects man to nature, but ignored the idea of conduction research about it, thus reinforcing the utilitarian view of nature.

A particularly strong utilitarian approach can be seen in the book *Moda l’yeladei bnei Yisrael* (see Chapter 3), in which the author, Moses Ben-Zvi Bock devotes a chapter to the sciences. In its introduction, Bock focuses on what his young readers could gain by acquiring scientific knowledge:

Just as you desire peace and tranquility with the members of your families, so you will also want to know the wisdom of nature [...] in particular, the nature of the land where you dwell, and the names of cities and the people who live in them. When you see artisans, each in their own craft, doing their work, you will want to be able to judge whether their work is successful or not [...] All that your eyes see of the natural world around you, the sun and moon and stars, mountains and valleys, trees, forests, flowers, herbs, stones, metals; please do not merely gaze at their surface, but study them to know their nature, their substance, and their form; then you will know how to use for your benefit the gifts that the Lord your God has given you. (Bock 1812, pp. 88–89).

The author’s aim in addressing his students is to convince them that scientific knowledge was relevant for them. Bock adopted here one of the fundamental educational principles of philanthropic reform, which required students to be motivated in order to achieve meaningful Bock’s approach to science is distinctly utilitarian, as in his view, the scientific research that reveals the characteristics of the living, the vegetation, and the inanimate will enable young readers to make optimal use ofto utilize their environment. The chapter on the sciences is devoted to a detailed discussion of the physical and political geography of Europe, Germany in particular, of Asia, Africa, America and Australia, and a description of the animal, plant and inanimate kingdoms, anatomy of the body, and more. In the section “The Progeny of the Earth and their Uses,” Bock lists the latent benefits of the three kingdoms of nature to humans: “From the animal kingdom will come different species [Arten] for human needs, from silk [...] animal and beast skins [...] milk [...] pearls [...] honey” (Bock 1812, pp. 117–118). Bock notes that since people also want natural resources that are not found in their immediate vicinity, they developed trade routes. Alongside commerce, scientific research also contributes to the possibility of fully exploiting nature: “And by studying the books written by the scholars of nature, we will know how to distinguish between species within our countries and recognize their nature (Book [Bock] 1812, p. 118).

Bock provided a scientific description of the natural world according to the accepted taxonomy of living, plant, and inanimate, and within this, he made an internal division to the living world for mammals, birds, amphibians, insects, and so on. However, our main concern is the presentation of the potential benefits to humans from understanding nature, which he presented in the most comprehensive way (Bock 1812, pages 122–129). In this section, Bock writes in detail about the variety of uses that man makes of animals, plants and inanimate objects, without making any distinction between them:

All of these were given to us by the Lord our God as a gift, and they will greatly benefit us. Not only did we have the flesh of beasts, animals, birds, and fish for our food, but their skins, hairs, and wool also greatly benefited us for our needs. The wool of ewes and lambs for our clothing, the hides of bulls and calves for our shoes, the hairs of rabbits and hares (and beavers) for hats on our heads [...] hairs from the pig’s back for cleaning our clothes [...] the intestines of the lamb for the strings of the lyre and harp [...] the excess from the hides of animals and beasts that cannot be used for work is boiled into glue [...] the vegetables are for food, or for medicinal herbs, or to make clothing to wear [...] all parts of the plants will benefit mankind. [...] Various works will be made from the results of this type of research. “Pots are made from clay to cook in them [...] You will not find anything more beneficial to mankind on the face of the earth and its offspring than salt [...] which is quarried from the mountains as stones are quarried, or sea salt (Bock 1812, pp. 123–127).

In this text, Bock presents the farm animals and wild animals in Europe, those found in the immediate surroundings of his respondents. He details the uses of calves, rabbits, foxes, wolves, and hedgehogs, which serve humans with their meat, skin, hair, feathers, fat, and animals such as the horse and the dog that serve humans by their labor. Unlike the author of *Rešit Limmudim*, Bock was not interested in captivating and entertaining his readers with descriptions of exotic animals, but rather in conveying to them vital, concrete knowledge. Even when he mentions various animals found in distant lands, he discusses the benefits derived from them, such as combs made from elephant tusks or the various uses of whale body parts. Bock, like previously mentioned authors, adopted the anthropocentric-utilitarian approach then common in Western children’s literature at the time. This literature presented the various ways in which animals serve humans and their contribution to the wealth of the country. In it, one can find illustrations of animals, such as bears, beavers, foxes, and seals, and alongside them, the products produced from them, such as coats, hats, and types of perfumes (Ritvo 1985, 78–84).

Like other Jewish educators of his time, Bock pointed out the unique right of a person to utilize the treasures of nature according to their will, a right granted by the Creator himself. The following text from the chapter in his book presented humans as superior to all other beings:

Man is the choice of creatures on the face of the earth, not in terms of his physical body, because in this he somewhat resembles other animals, but in this he is distinguished from all other animals in that they have a breath of life in their nostrils, even if it is not visible, we still recognize it by its actions (Bock 1812, p. 129).

In this section, Bock adopts the traditional perception, rooted in Aristotelian philosophy, that the physical body is what primarily distinguishes humans from animals, while it is the human soul that differentiates between them (Bock 2013, pp. 216–220; Levi and Levy 2002, pp. 24–28; Yuval 2007, pp. 309–310).[[45]](#footnote-45) At the beginning of the chapter on faith and Jewish tradition, devotes a long section to unique place of humans in the order of creation. In an extensive discussion, he urges his students to study well and to understand, so that they can realize the intellectual potential given to them as human beings:

Here, I have already told you to learn the wisdom of nature in *Rešit Limmudim* and from the world that surrounds you, and due to your desire to know them, and to derive what you need from it. But I also knew that your soul was yearning to know more about these matters than you have known until now, to reach the level of a complete person. For only in this will you rise above all living creatures that were created from matter like you; and God gave living creatures the desire to pursue their sustenance and to prepare for them their dwelling places like you, but the contemplation [thinking], and the choice [...] and the desire [...] for sublime things, they were given exclusively to human beings, and the rest of the living creatures have no part in them. Therefore, my son! Be careful not to discard these precious gifts that the Lord your God has given you, and set your eyes and heart on them to study with great perseverance the wisdoms that you have not known from them until now and ascend higher and higher (Bock 1812, pp. 149–150).

With these words, Bock gave expression to a fundamental issue that, as mentioned, preoccupied many philosophers and natural researchers at the time – the boundary line between man and animal. Humans’ ability to improve themselves intellectually was often cited as a distinguishing characteristic between humans and animals, an idea that reflected the Enlightenment movement’s emphasis on education. Similarly, Bock said that studying theory and philosophy would raise his students “higher and higher” above the level of animals. He did not see studying and researching nature as the goal, but rather the means by which people can fulfill their destiny as thinking beings and be able to satisfy their needs and desires.

In most of the Jewish children’s and youth texts published in the early decades of the 19th century, the utilitarian anthropocentric perception that was dominant in traditional Jewish thought stands out. This trend did not disappear even in the continuation of the century. Even in the Hebrew scripture *Derech Emet* *[The Way of Truth]* published in Fürth in 1826, it was established that humans are distinct from all other living beings because God breathed a soul into them (Stern and Mandersen 1826, p. 14). Similar sentiments were expressed by Abraham Aryeh (Leon) Mandelstam (1819–1889), in his book *Aleph-Beit*, published in the middle of the century in Vilna. Mandelstam was the first Jewish graduate of a Russian university and he greatly contributed to the development of modern Jewish education (Ofek 1988b, pp. 389–390). In his writings, Mandelstam described the great strength of various animals immediately upon their departure from their mother’s womb, and the relative weakness of the human infant. But this weakness is only temporary, since “and in a little while, and behold, he will be the governor of all the land.” (Mandelstam 1849, p. 82). Mandelstam presented animals as bound by their innate nature, whereas humans are the only creatures with the ability to break these limits, to evolve and control their environment.

The ideas that humans were granted divine permission to control their environment and subjugate animals were also expressed in the first Hebrew magazine for children and youth, *HaTzir.* This bi-weekly magazine, founded and edited by Isaac Weinert, was published in Lviv in 1861–1862 (see more about it in the next chapter). *HaTzir* included news from the fields of zoology, geography, and technology (see more about it in the next chapter) and descriptions of various animals and plants, whose appearances are special and intriguing, usually those found in the New World. Thus, Weinert describes the rock hyrax, the honey badger, the viper snake, as well as the cinchona tree that grows in South America and the sago palm in India. The descriptions that appear in *HaTzir*reflect accepted methods of writing accepted in zoology and include detailed information about the animal’s body, its habits and its habitat, and they are sometimes accompanied by different stories. Here too, as in many previous texts, the attraction to the exotic stands out. Weinert delves into strange and unusual phenomena revealed in natural creatures. When he describes a well-known animal in Europe, such as the stork, he chooses to present a species of stork found in India, whereas in presenting the bat, he focuses on the one found specifically in Egypt and not in Europe (see Weinert 1862 [issue no. 10], “Amri Noam,” pp. 38–40).

The section dealing with falcon training is an illustrative example of Weinert’s tendency to incorporate dramatic stories into his scientific description of animals. First, Weinert describes the zoological characteristics of falcons, noting they are fearless birds that relentlessly attack creatures even larger than themselves, but are afraid of humans and shy away from them, describing the complex methods humans had devised to tame them. Weinert provided a detailed description of these training methods:

To tame the falcon and train it in the art of hunting, its first owner was very cruel to it at first; for he placed it on a wooden ring suspended in the air by a flaxen rope [ropes in the air], which was easy to move back and forth and to shake violently. And it happened that as the bird began to doze off for a moment, its trainer suddenly came and moved its perch back and forth. The bird thought it was going to fall to the ground, and it made a great effort to stand on its feet so as not to be suddenly overtaken by a fall. Thus they continue for three days without respite and the hunters [trainers] renewed themselves at all times so as not to slacken in this work, and sleep or slumber. Thus, by being awake for three consecutive days, the bird lost all his vitality and became stunned, and his spirit almost fell asleep [...] As he gradually got used to his work and human society, he also got used to his trainers’ studies (see Weinert 1861 [issue no. 6], “Amri Noam,” pp. 23–24).

Weinert describes the types of “tricks” used to subdue the hawk: tying its legs to a rope to prevent it from flying, depriving it of sleep for the purpose of taming it, and even dunking its head in water to stun it (see Weinert 1861 [issue no. 6], “Amri Noam,” 24). Why did Weinert give such detailed information about this? He saw this as a demonstration of human intelligence overcoming and subduing the animal, in the spirit of anthropocentric perception. But there was probably another reason for this – Weinert believes that the description of the falcon training will entertain his readers: “The schemes that his foster-mother advised in order for him to get used to sitting with him will be mentioned here for our readers’ amusement” (see Weinert 1861 [issue no. 6], “Amri Noam,” 23).The author does not restrain his language at all when describing the brutal tactics used, even though he was clearly addressing an audience of children and teenagers. On the contrary, he believes that this is a humorous story, which does not contain problematic educational messages regarding man’s relationship with animals. This suggests that the idea that children need to develop respectful and empathetic attitudes towards animals had not yet taken root in the modern Jewish educational space. A similar conclusion arises also from examining the portrayal of dogs in Hebrew texts for Jewish children during this period.

**Messages in the Field of Human-Animal Relations – The Dog as a Test Case**

Modern perceptions of human-animal relations, which blur the differences between humans and animals, are rare in the early texts examined in this corpus. Contrary to Western children’s literature of the 18th and 19th centuries, which often featured pets in children’s books, Hebrew literature for Jewish children seldom did so. In non-Jewish texts, pets are depicted in a heartwarming and endearing manner, and are often portrayed as faithful companions to children. In particular, the dog was presented as a beloved figure maintaining close relations with family members, which reflected the distinct status that the European and American bourgeoisie gave to the dog as a pet and the analogy built between them and children (Brantz 2007, pp. 76–77; Grier 2006, pp. 123–127; 166–178; Ritvo 1985, pp. 84–85; Tague 2015, pp. 19; 40–44; Thomas 1996, pp. 110–122).

The portrayal of dogs in Jewish children’s literature was fundamentally different, relying on a cultural tradition that attributes impurity to the dog. Their possession was permitted only when it was beneficial to humans, and clear boundaries were set on forming intimate relationships with them (Bar-Joseph 2018, p. 269; Shemesh 2007). One expression of this aversion to dogs can be seen in the Jewish custom of wrapping a child in a shawl the first time he was brought to *cheder* or the teacher’s home, purportedly in order to shield him from the gaze of a Gentile or a dog (Marcus 1998). Jewish leader Jacob Emden (1698–1776) condemned the increasingly popular custom of keeping pets among Western bourgeoisie in the 18th century, and mocked displays of love for dogs and financial and emotional investment in them. He even hinted that this led to forbidden sexual relations, especially between women and their pets.[[46]](#footnote-46) He warned against the intrusion of these gentile customs into the Jewish sphere. On the other hand, he approved keeping dogs as guards (Feiner 2017, p. 357).

The scientific writing for children reflected these trends. In the science textbook *Rešit Limmudim*, Lindau includes a short article about the dog, noting that while there are many breeds of dogs and they differ greatly in size, there is no need to elaborate and describe the dog, as it is a familiar creature found everywhere: “The nature, essence, intelligence of dogs and their usefulness to man are known and renowned,” (Lindau 1788, pp. 33).[[47]](#footnote-47) As I claimed above, Lindau tends to focus on special and exotic animals rather than giving extended descriptions of common animals. However, he found it appropriate to mention their usefulness to humans, but not their role as pets. The Hebrew textbook *Moda l’yeladei bnei Yisrael* also emphasized benefits to humans, for serving as a partner in hunting, as a protector of the home from thieves, and as a guard of the flock against wolves (Bok Tka’b, 123).

Dogs, of course, also served as working dogs in the 19th century, but the complete disregard of Jewish educators for the dog as a pet is explained by the general trend, presented here, to draw a clear demarcation between man and other creatures and to focus on the way they serve man. This remote and utilitarian approach to the dog also appears in Hebrew literary texts written for children, which gradually began to appear during the 19th century. One of the first instances where it appears in the story *Derech Emet,* which was published in the second decade of the 19th century in Fürth by two Jewish teachers from Bavaria, Avraham Moshe Stern and Jacob Manderson. The authors included in it a story that centers the character of a dog:

Two small boys are walking together to play in the city street and they see a dog running towards them. They said to each other, “Let’s take stones and throw them at the dog.” When it happened that when the dog approached them, they did as they said. And they took stones and pursued him. And an old man saw them passing by on the road and said to the boys, “Oh my sons! Do not do this. Because the dog bites. And what did the dog do to you? You chased him.” And the boys laughed and mocked him. They are still talking. And the dog came back and stood up on the boys, and bit them on their legs and hands. The boys screamed and cried profusely. And no one from the townspeople rose to save them. They said, “You have created this obstacle for yourselves.” But the old man took pity on them, hurried to save them, and drove the dog away. And he said to the youths: I know, yes, I know, that you are foolish sons. But listen to what I am commanding you today: Do not despise the advice of your elders. And do not lift your souls in your palms for nothing (Stern and Mandersen 1826, pp. 68–70).

The old man criticized the boys’ cruelty to the dog, but not because mistreating dogs is inappropriate, but rather because the dog might retaliate fiercely, which indeed happened. As reflected in its title, “The Old Man and the Boys,” the story does not deal with the proper treatment of dogs, but rather aims to convey to young readers the importance of obeying elders. There is no reference here to the dog being a faithful friend of humans, nor is there a moral statement endorsing a compassionate approach to dogs. In this story, the dog embodies a menacing creaturethat one should be wary of. The story relies on the traditional negative stereotype of the dog, which had taken root in both the Christian and Jewish worlds. In ancient Christian writings, the dog was accused of being a thief and unclean, and sometimes it was even used analogously to the Jews in order to denigrate the latter (Salisbury [1996] 2016, 50; Salisbury 1996, p. 56; Stow 2006, pp. 4–7).

These perceptions echoed in Yiddish folk literature, where dogs embodied the blurring and undermining boundaries between the Jewish man and the beast, and their depiction also remained as such in the Hebrew literature through the early 20th century (Idelson-Shein 2020, pp. 333–334; Mishayker 1971, pp. 57–58, 60–61). The religious and social constraints created by Jewish tradition against raising and keeping dogs had their effect. Therefore, the appearance of the character of a dog in texts for Jewish children, as part of a scientific or literary text, was rare, and even in these cases, no compassionate and empathetic treatment of man’s faithful friend appeared.

In the second half of the 19th century, a negative and demeaning perception of dogs began to appear in writings for Jewish children. In *Shevet Sefer*, published by the poet Menachem Mendel Dolitsky (1856–1931) in Vienna, there is a story about a boy who befriends a dog. As shown above, many other textbooks and workbooks were not satisfied with merely transmitting knowledge and incorporated various educational messages. In one of the letters in this collection, a son described his experiences at his uncle’s house to his father. He tells about a boy named Barsha who studies with him, but who neglects his studies and spends his time with dogs and winged animals:

Yet my heart greatly grieves when I see Barsha, the fourth student of my teacher, deviating from his path like one of the empty ones, and not heeding the lesson that our teacher imparts to us with his wisdom. Almost every day he plays with the small dogs that his father raises in his yard, and his heart follows after the pigeons and doves that he bought with good money to play with them, and he does not pay attention to the lessons. Even on the rare occasions that he comes to my uncle’s house, he annoys us all with his bitterness, as he is agitated, laughs, and there is no peace in his company. And we, not once or twice, tried to instill in him moral values with gentle words, but he would stubbornly close his ears like a deaf ear, and even dares [...] to call us “fools” for our innocence and the cleanliness of our hands (Dolitsky 1883, p. 37).

The close contact of a criminal with dogs and other animals is presented as a negative pattern. Contact with animals in this text expresses a departure from the important Jewish ideal of studying. The author and educator Avraham Mapu (1808–1867) made a similar use of the dog’s character in his Hebrew booker *Amon Pedagog*, published in Königsberg in 1867. Mapu incorporated a story about Tuvia and Ada, a brother and sister known for their generosity, and their relationship with the naughty child, Bela. The association of Bela with dogs symbolizes his wickedness. In Bela’s yard are dogs he had trained to attack unwelcome guests. On the eve of Passover, as worshippers gather in Tuvia and Ada’s yard, Bela whispers in Tobia’s ear that six puppies had just been born in his yard, and offers him one of them. The latter vehemently refuses, and considers the very discussion of it in the house of prayer an abomination (Mapu 1867, pp. 52, 58).

Messages of compassion towards animals and the importance of moral education for a kind and loving attitude towards children, appeared during this period only in texts for Jewish children written in German, clearly influenced by German-Christian literature. For example, in several texts written in German for Jewish children that appeared in the first decades of the 19th century, there is a story about cockfights in England, presented in a negative light (Kugman 2013, pp. 187–188). In the popular German-Jewish primer *Maslul Halimud* by Emanuel Bondi (1820–1908), which was published in many editions and versions throughout the 19th century, detailed zoological descriptions of many animals appear, including the lion, bear, horse, deer, camel, elephant, whale, eagle, parrot, hyena, and rooster. The author arranged them according to the accepted scientific taxonomy of the time, and interspersed within them poems and stories that appealed to young readers’ emotional and experiential nature. These texts conveyed a clear moral message and demanded that children treat animals with empathy and respect. They include a story about a pleasant visit of children to an aviary; a conversation between a child and a bird during which the child expresses his concern for it and wonders how it survives in the cold days; and a story about two little girls who struggle to part even for a moment from a chick that has just hatched from its egg (see Bondi 1851, pp. 77–78). Another story describes how a father plays with his children by the fish pond in their yard. After a lengthy moral discussion between the father and his children, they return several creatures they caught back to the water. The story concludes with a description of the children’s wonderful feelings as they release these animals into the wild (Bondi 1851, pp. 82–84). It appears that the sources Bondi used were not Jewish. The story about the fish pond is identical to one that appeared in the popular German-Christian text *Der deutsche Kinderfreund* by the clergyman and educator Friedrich William Wilmsen, first published in 1802 (see Wilmsen 1802, 87–91). Bundy also included in his text a story about the faithful dog who bravely bears the taunts of his master’s children and is eventually rewarded for his suffering (Bondi 1851, p. 66), a story that had previously appeared in Wilhelm Hey’s book of rhyming parables for German-Christian children, *Fifty Fables for Children* (*Fünfzig Fabeln für Kinder*) (Hey 1833, p. 26). In the Hebrew version, Bondi added various reading sections, such as parables and biblical stories (Bondi 1851, pp. 42–48, 64–100). His choice not to translate these didactic animal stories is probably due to the great deviation of these messages from Hebrew children’s literature and Jewish culture in general.

Only towards the end of the century can we find the first evidence of a change in attitude towards dogs in Hebrew texts, and messages advocating compassion and demanding fair treatment towards them begin to appear. These texts primarily belong to the new Hebrew bookshelf created by the revival movement in Eastern Europe.[[48]](#footnote-48) Here, I will present a typical example of these texts from a Hebrew children’s primer published in Vilna in the last decade of the 19th century, *Michtavei Neurim (Letters by Youth)*. The author of the pamphlet, Israel Dov Reisberg, who has already been mentioned here, voiced a clear criticism against the mistreatment of dogs by children in it:

Hello, my dear friend! Yesterday, a quarrel erupted between me and the boy Dan, because as I passed his yard, I saw that he was tying a basket full of broken pottery to a small dog that was crouching under the weight of its burden. “Have you seen my galloping horse and my chariot?” Dan called to me proudly. Oh cruel! I said to myself, and all my compassion was stirred for the abused dog; how could I not pity this wretched creature? You are strangling his neck! “Come on, innocent tzaddik” The bad guy got angry and hissed: “Who put you among the reprovers at the gate?” But I no longer answered this fool as he was [as his folly], and I will go my way (Reisberg 1891, p. 12).

The dog in Reisberg’s story is no longer presented as a tool, as it was in previous texts. The opposite is true – a dog is a delicate creature that should be treated with kindness and consideration. Compassionate and empathic attitudes towards animals began to emerge in Hebrew writing for children only at the turn of the 19th and 20th centuries, although they had appeared in general Western educational texts and children’s literature some two hundred years earlier (Cosslett 2006, pp. 9–17; Grier 2006, pp. 127–128; Ratelle 2015, pp. 6–9). In the introduction to his anthology, Reisberg wrote that his work was born out of direct contact with children, as he moved among them and heard what preoccupied them (Reisberg 1891, 4). If we accept Riesberg’s testimony, then there is perhaps a hint here that not only was the preaching against animal abuse accepted as an important value by the Jewish educators at the time, but that this value indeed began to be gradually absorbed among the children themselves.

In conclusion, most of the Hebrew texts in which animal representations appeared during this period exhibited a prominent anthropocentric and utilitarian approach. Jewish educators tended to depict an exotic image of the natural world to their young readers, emphasizing its wonderful ways, with the aim of captivating their students and increasing their motivation to learn.[[49]](#footnote-49) Animal stories that began to appear usually did not serve to convey modern educational messages about man’s relationship to animals, but rather preserved traditional and symbolic perceptions of animals. The modern depictions of Western children’s literature, in which animals appeared, emphasizing the emotional connection between children and animals, were absent from the Jewish sphere even in the second half of the 19th century and only appeared at its end. Indeed, the authors of the Hebrew texts on zoology opened a window of knowledge to their readers about the animal world that was not common in the Jewish world, but at the same time, they maintained the traditional anthropocentric approach towards animals. They did not give a literal expression in these writings to modern scientific perceptions and non-Jewish educational models that challenged it.

**Chapter 5: Science and Technology in Texts for Jewish Children in the Second Half of the 19th Century**

The new technologies in the modern era, especially from the second half of the 19th century, made a profound impact on the economy and society and transformed people’s daily lives. While there is a tendency to link this technological and industrial revolution with rapid advances in various scientific fields, in fact, the relationship between the two trends was complex. Some changes in these two realms were related and mutually reinforcing, while in other cases, changes occurred separately and independently (Dror 2006, pp. 8–22; Gaukroger 2020, pp. 295–302; Layton 1971; McClellan and Dorn 2006; Wengenroth 2003, p. 13; Wootton 2015, pp. 476–508).

In modern Hebrew literature, scientific knowledge and technology were usually linked. An example can be found in the book by the physician Mordechai Gompel Schnaber, *Ma’mar HaTorah v’HaChachma,* in which he offered a comprehensive overview of arithmetic, geometry, mechanics, optics, astronomy and physics, and also described the workings of the microscope, telescope, and camera obscura (Schnaber-Lewison 1771, pp. 18; 13, respectively). Similarly, Isaac Satanow, (see Chapter 3), intertwined descriptions of technological inventions with scientific knowledge. Baruch Lindau, author of the German textbook *Rešit Limmudim* (see Chapter 4), also wrote articles for the Haskalah journal *Hame’asef* about the barometer, thermometer, and diving equipment (Lindau 1788, 1789a; 1789b).

This chapter analyzes the design of texts for children and youth that conveyed scientific and technological knowledge written in the second half of the 19th century, at the peak of the technological revolution that swept Europe. In most cases, these texts expressed admiration for technology as a testament to human ingenuity, and considered science and technology a vital element in children’s education. However, toward the end of the 19th century, other voices began expressing an ambivalent view of technology and concern about the threats it might post to the young generation’s connection to their Jewish roots.

**“Reveal this sublime and wonderful wisdom to the ears of the children of Israel” – Children as the Target Audience for Education About Technology**

Like a number of Eastern European periodicals that emerged in the 1860s, the previously mentioned bi-weekly journal *HaTzir* (published in the Galician city of Lviv), exposed a diverse Jewish audience to a wide range of topics from history, current events, and politics, to science and technology. *HaTzir* was notable for presenting state-of-the-art technological innovations: the steam train, steamship, hot air balloon, diving equipment, mechanized lungs, the telegraph, Archimedes’ scales, and electricity. Often illustrations accompanied these texts to clarify and explain the operation of these devices.

*HaTzir* was not specifically aimed at youth, but they were its primary readers, as was the case with popular science literature in general (see Chapter 1). As editor Isaac Weinert stated in issue 16 (two months after the journal began publication) *HaTzir* was meant to educate “the Jews in general and the youth among the children of Israel in particular.” He claimed that it was the first journal to “reveal this sublime and wonderful wisdom to the ears of the children of Israel.” The journal used simple language and illustrations so that adults and children alike could understand it (Weinert 1862 [issue 16], title page, p. 63). One issue even included an article written by a child from Brody (Weinert 1861, issue 7, p. 27). As previously noted, there was not yet a clear boundary between the culture of youth culture and that of adults, which enabled the journal to appeal to both. *HaTzerifa,* another Hebrew journal addressing similar topics, began publication in Warsaw around the same time, reflecting the growing enthusiasm about technology among Jewish youth.[[50]](#footnote-50)

The special appeal of *HaTzir* to a young audience can be seen by comparing an article in this journal about how a steam engine works with a text on the same subject in a Hebrew book for adults, *Michonat HaKitur (The Steam Engine)* by Abraham ben Simcha Katzenelnbogen, published in Danzig in 1845. Katzenelnbogen had studied water engineering and worked to improve the water supply system in Vilnius and southern Lithuania. In his book, he emphasized that the sciences could simultaneously contribute to strengthening faith in God and improving people’s quality of life (Zalkin 2005, pp. 260–262). He prefaced the book with quotes from Jewish sages and the Bible, particularly the story in Genesis in which God created the waters, writing that his book would explain “the great and awesome works of God, and the workings of the steamship” (Katzenelnbogen 1845, “Preface,” pp. 4–5). He further declared that a person’s mind is what ensures their survival, a clear expression of the Haskalah value of intellectualism.

Katzenelnbogen noted that human society had long benefitted from their ability to sail and develop extensive trade routes, and he had faith that technologies such as the steamship would continue to make people’s lives and work easier (Katzenelnbogen 1845, “Introduction,” pp. 3–10). Most of the book is devoted to a detailed description of the steam engine, accompanied by simple diagrams of its parts: the combustion chamber (firebox), boiler, valves, cylinders, and pistons. Throughout the text, Katzelenbogen adopted an informative style using technical language, characteristic of the professional scientific writing style of the time.

Weinert also presented the steam engine’s operation with illustrative diagrams in the journal *HaTzir* (Weinert 1861, issue 1, p. 4, 6) and even expanded the discussion to the operation of steamship (Weinert 1861, issue 2, p. 7, 9). However, it appears what was important to him was primarily to connect to the emotional experience that the new technology aroused. Weinert almost completely abandoned linking the discussion to Jewish sources, instead focusing on the relevance of these technological developments to the lives of his young readers. The narrative style he adopted to describe modern technology is particularly striking, reflecting the perspective of a child filled with curiosity about how the new things they encountered in their daily lives worked. An example is his description of the exciting experience of riding on a steam train (Weinert 1861, issue 14, p. 55).

Behold, dear reader! The iron horse (locomotive), how fire comes out of its mouth and smoke rises from its nostrils, and with great splendor it races along the railroad tracks, with a sound of thunder and noise; did you see it? I am certain that if you did, you said in your heart at that time: Oh, if only I could understand the workings of this great vehicle, this new creation, into which man has breathed the spark of life with his wisdom and spirit of understanding [...] I, too, said this in my heart, and then I went and sought it in books of knowledge (Weinert 1861, issue 1, pp. 3, 5).

In contrast to Katzenelnbogen, Weiner’s view was that the experience created by contact with technology, and not the dry knowledge about it, is what excites young people and speaks to their hearts. Weinert used narrative elements to enhance the attraction of his young readers to technology. He adopted the model of the imaginary journey, typical of many texts on science for Jewish children (see above), transforming trains, ships, and hot air balloons into heroes in an exciting story of a journey story, experienced together with the author and his young readers.

You, my friend and reader, will journey with me on the iron rails and ride the iron horse that marches heroically across the face of the earth, and you will rule the land and its people. Sail in a ship across the vast expanses of the sea. Raise the staff of wisdom at the edge of the mighty and fearsome waters and part the seas and pass through them on foot. Unfurl a flag and a banner, and rule the sea. Come, let us spread the wings of wisdom and rise on the winds, up to the skies like a bird. Then we will descend to gaze from the heights on the earth below, and the people who have no part in this understanding will look like grasshoppers to our eyes! [...] Then you will also rule the winds in spirit (Weinert 1861, issue 3, p. 10).

For Weinart, technological developments are positive and desirable, embodying humans’ control over nature, a perception that was not only anthropocentric, but also colonialist. He saw the conquest of the New World by Europeans who arrived in steamships as bringing civilization to savages and heathens (Weinert 1861, issue 2, pp. 7, 9). He emphasized that technology gave people complete control over their world, whether on the ground (via trains), at sea (via ships), or in the air (hot air balloons). The hot air balloon, in particular, was a metaphor for people’s ability to break free from limitations and “rule the winds,” and pioneers of aviation such as the Montgolfier brothers (the “French brothers”) were presented as role models (Weinert 1861 issue, 3, p. 10).

In *HaTzir,* Weinert used poetic language to glorify new technological inventions, and, as editor, devoted considerable space to the telegraph (Weinert 1862 issue 17, p. 69]; 1862, issue 19, p. 74; 1862 issue 21, p. 82), which he presented as the pinnacle of human achievements:

How wonderous are God’s works! The human spirit is too small to comprehend them, because they are exalted above his understanding. However, the human soul comes from God above, and he will seek the secrets of in nature and bring them to the light of the world [...] In our time, the most sublime among the many things that man has achieved through the depth of his intellect, is the telegraph (Weinert 1862, issue 17, p. 69).

Weinert’s focus on the telegraph is not coincidental, as it had become a dominant symbol of the technological revolution (Sofer 2007, pp. 56–61, see also Chapter 1). In several Hebrew texts for Jewish children, the telegraph was used as a metaphor to explain other phenomena, such human anatomy. For example, a story by Haim Bradovsky, published in *Kerem L’beni Yisrael,* compared the body’s response to stimuli via the nervous system to telegraph lines. In this story, a farmer named Amnon takes a nap during the day and is jolted awake by a fly biting him. “The leg delivers its message to the king, the brain, who sits hidden in the north of his palace of the skull, via telegraph lines stretched throughout its dwelling to all the body parts. These fine nerves are woven throughout our body, like a network,” (Reisberg 1890, p. 55). This image appeared again in a later article with the hands explaining how they were sacrificed for the sake of saving the body: “At the command of our king, as it came to the reed through the telegraph lines, we will pull our strings, they are our muscles,” (Reisberg 1890, p. 56).

Similarly, machines were used as analogies to explain how the body works in *Toldot Pat Lehem (Stories of a Loaf of Bread),* an educational text for adults and youth, published in French in Warsaw (Masse 1882) and translated into Hebrew by Abraham Ticktin (1866–1943). This text compared the synchronization between the stomach and bile to a network of telegraph lines (Masse 1882, p. 79). In this didactic text aimed at both adults and young people (Ma’aseh 1882, 11), mechanical metaphors are used to explain the functioning of the body, and the circulation of blood is likened, for example, to the water pipe delivery system in Paris (Masse 1882, p. 76). Using such technological metaphors had become commonplace in European literature during this time, albeit with an underlying ambivalence towards machines. On the one hand, the machine was perceived as a reflection of human subjugation to the mechanics of the laws of nature, but on the other hand, they also reflected human’s ability to control and utilize for their needs (Ezrahi 1990, pp. 149–166). The fact that these images appeared in Hebrew texts for children indicate an assumption that Jewish youth were familiar with these technological devices and would be able to understand the scientific phenomena they were being used to describe.

The aspiration of the editor of *HaTzir* to present an up-to-date discussion on the technological developments that appeared in his time is very evident. In the journal’s final issue, Weinert wrote about the transition from steam power to electricity for operating telegraphs. He presented electricity as a new rising force, about which no one could be certain where it would lead in the future:

Who among the great philosophers or enlightened artists can solve this riddle? Which of these two great and lofty inventions, the knowledge of steam or the ability to use the power of lightning (electricity) will bring people greater happiness and success? (Weinert 1862, issue 22, p. 86).

Weinert described the debate that raged among scientists of his generation regarding whether these two forces could be harnessed together or whether steam power should be replaced by electricity. This was accompanied by his description of an invention by Isham Baggs, an Englishman who three years earlier++ had registered a patent for a device that combined steam energy and electricity, thereby improving the operation of the telegraph (Weinert 1862, issue 22, pp. 86–88).[[51]](#footnote-51) Weinert thought that technologies using either type of power would improve humans’ welfare.

Also characteristic of children’s literature of the time was the effort to use illustrations along with accounts of technological innovation. These illustrations were not only intended to demonstrate scientific principles, but they also contributed to the construction of the narrative framework. Again, a comparison to *Michonat HaKitur*, which was not intended for children, is enlightening. Most of the illustrations in this book were simple diagrams, aside from a beautiful and detailed picture of a steamship on the cover. In contrast, the illustrations in *HaTzir* are distinguished precisely by their artistic value and were designed to inspire readers. For example, in the illustration accompanying the explanation of diving equipment, there is a richly detailed picture of pearl divers busy pearl diving. This illustration is intended not only to teach the principles of this device’s technology, but primarily to demonstrate to young readers the dramatic experience of diving in the sea depths. Weinert included this illustration in two issues (Weinert 1861, issue 9, p. 35; Weinert 1861 issue 10, p. 39), indicating that he thought that it had more than just practical value. Similarly, illustrations of hot air balloons appeared in multiple issues, not only to teach about how they worked, but mainly to fuel readers’ imagination (Weinert 1861, issue 3, p. 11; 1861, issue 4, p. 14; 1861 “Amri Noam,” issue 4, p. 15; 1861 “Amri Noam,” issue 5, p. 19).

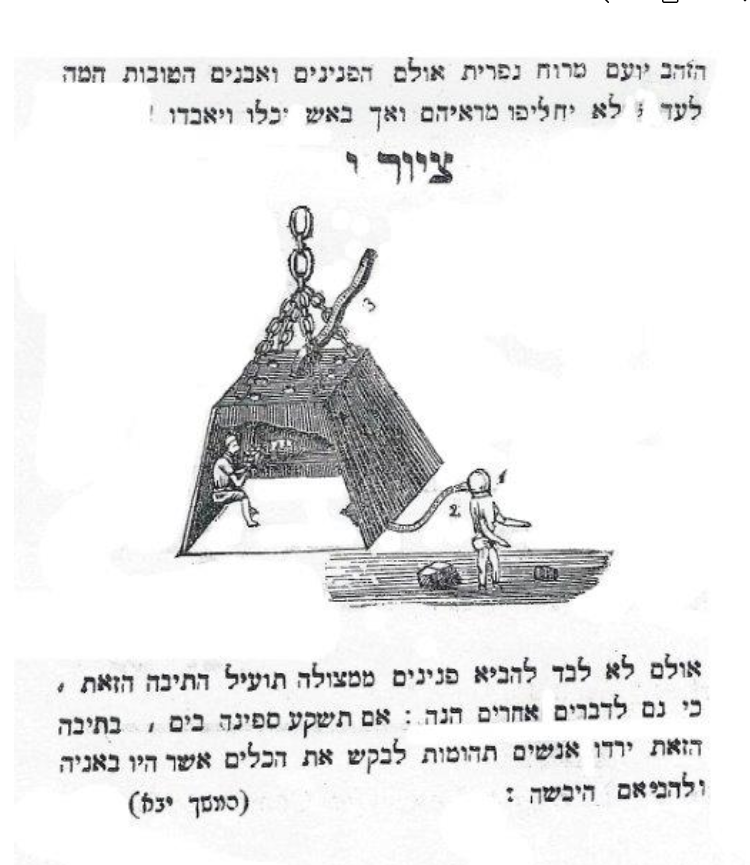


Figure 9: Illustration of deep sea diving using innovative diving equipment in *HaTzir*

The weaving of technological knowledge into a narrative framework, the use of emotive language and of eye-catching illustrations were all meant to ignite the imaginations of young readers. In addition to sharing technical knowledge, *HaTzir* aimed to conveythe idea that technology offered Jews opportunities for change and self-development. For example, describing the mechanical plow, Weinert expressed his hope that Jews in the Kingdom of Austria, which had recently adopted a new constitution, would begin to use the new device and join the circle of agricultural workers (Weinert 1861, issue 13, p. 54; 1861, issue 15, p. 59). The value of productivity advocated by modern Jewish educators appears here again, this time linked to technological progress.

**Science, Technology, and Literary Discussion**

The recognition that children and youth should be taught scientific and technological knowledge in a way compatible with their needs gradually became widely accepted in modern Europe. In the 1860s, renowned English publisher John Newbery published a highly successful series of science books for children called *Tom Telescope*, in which common toys in a child’s room were transformed into scientific tools for learning about the laws of nature (Secord 1985, p. 133). In 19th century France, theaters put on entertaining plays for children that incorporated content about physics, mechanics, and astronomy. A new toy industry emerged that produced educational game for children to use in learning about physics, optics, and chemistry, as well as mechanical toys that reflected the latest technological innovations, such as trains, steamships, trolley cars, and electric telegraphs (Lachapelle 2015, pp. 48, 53–55). A similar trend emerged in popular Russian children’s literature beginning in the 1860s, with texts explaining scientific phenomena that children encountered in their daily lives (Hellman 2013, p. 82).

The French writer Jules Verne (1828–1905) made a significant contribution to this trend through his *Voyages extraordinaires* series of adventure books, which intertwined scientific and technological information into exciting and captivating stories. A close and fruitful collaboration with publisher Pierre-Jules Hetzel quickly made Verne’s books bestsellers, with translations published around the world, from Russia to America (Evans 2005; Hellman 2013, pp. 164–165).

Verne’s writing bridged the literary realms of the real and the imaginary. He took recent inventions and discoveries of his time, which aroused wonder and ignited the imagination, and wove fascinating narratives around them (Unwin 2000). The scientific and technological knowledge incorporated in his books well-founded, and he was well-versed in the contemporary research (Butcher 2006, p. 146; Evans 2000, pp. 11–14; Yitzhak 2005). For example, his first book, *Cinq semaines en ballon* (*Five Weeks in a Balloon*), published in 1863, was dedicated to a puzzle that preoccupied many natural researchers at that very time – the sources of the Nile. The protagonist, Dr. Ferguson, an archetypical brave scientist character, embarks on a balloon journey over the African continent with his two companions to solve this mystery. Thus, the story simultaneously addressed a current scientific issue and featured a recently-developed technology, the hot air balloon (Andreev 579, pp. 67, 74).

Verne’s scientific knowledge was quite up-to-date. He described the race that developed between researchers and explorers to discover the sources of the Nile, which they documented in the form of travel books. This genre of travel literature, which had become very popular since the 18th century (Batten 1978; Smethurst 2012, p. 5), was adopted by Verne in his book, but was also interwoven with a robust fictional element. An example of this is the way in which Verne shaped the revelation of the source of the Nile in his book. In July 1862, the Englishman John Hanning Speke published that the source of the Nile was Lake Victoria (AlSayyad 2019, pp. 19–22; Warburg 2007, pp. 479–483). In a climactic scene, one of Verne’s three heroes flies over Lake Victoria and confirms that it is indeed the source of the Nile. Verne first attributed this discovery to his fictional characters, noting that the event occurred in April 1862, (Verne [1863] 2015, pp. 117–123), several months before Speke published his findings, thus deliberately blurring fact and fiction.

This blurring of fact and fiction confused the first translator of Jules Verne’s works into Hebrew literature. The year that Verne published *Cinq semaines en ballon*, the publisher and founder of the Hebrew journal *HaMagid*, Eliezer Lipman Zilberman (1819–1882) serialized the book, describing the journey undertaken by Dr. Ferguson and his companions as if it had actually taken place (Zilberman 2.9.1863; 9.9.1863; 17.9.1863; 24.9.1863). This was part of a series about travelers who explored Africa, including a previous article by Zilberman about the trek across Africa by Scottish missionary David Livingstone (1813–1873) (Warburg 2007, p. 483; Zilberman 9.3.1857). Six years later, Zilberman published another tale in the series on travels in Africa, in which he aimed to report the essence of the description of another traveler’s journey: “Now a well-known traveler, the wise Dr. Samuel Fergusson, attempted to cross the interior of Africa, and was more successful in achieving his goal than all those who went before him. In a most wonderful way, and the record of his journey was published in a book,” (Zilberman 2.9.1863, p. 276). Verne’s hero was thus transformed by Zilberman into a real figure of a traveler, and crossing Africa by means of a hot air balloon, a mode of transportation that attracted much attention from scientists and inventors of technological devices at this time, was presented as an achievement that occurred in reality.

Zilberman’s pieces, which gave readers of Jewish literature their first taste of Verne’s work, were soon followed by numerous translations into Hebrew and Yiddish of Verne’s books that began appearing in Eastern Europee (Wolpe 2012, pp. 17–18).[[52]](#footnote-52) Mendele Mocher Sforim translated *Cinq semaines en ballon* into Yiddish in 1868 and published it under the title *Der Luftballon*. In the last decade of the 19th century, more translations of Warren appeared in Hebrew, and some were published by U.S. publishing houses: *Around the World in Eighty Days* (1892); *The Adventures of Captain Hatteras* (1893); *Doctor Ox* (Warsaw, 1896), *Off on a Comet* (1900), and more. These translations reflect the efforts of Jewish authors to expand the genre of secular-scientific literature in Yiddish, and these books were very successful among the Jewish audience (Cohen 2020, pp. 124, 303, 350). The translations of Verne’s books into Yiddish were not specifically aimed at a young audience as the genre of children’s literature in Yiddish had not yet been established, as mentioned previously.

In contrast, the Hebrew translations of Verne’s books, published in the 1870s, did appeal to a young audience. A little-known translator, Israel Ze’ev Sperling,[[53]](#footnote-53) published a Hebrew version of Verne’s *Twenty Thousand Leagues Under the Sea* as *B’mitzilot yam* in 1876, only six years after the French original was published, and two years later, he translated *Journey to the Center of the Earth* as *B’beten ha’adama* (In the Belly of the Earth). Unlike the Yiddish translations of Verne’s books or Zilberman’s abridgement in *HaMagid*, Sperling explicitly addressed a young Jewish audience, on both the book cover and in the preface: “For the benefit of the youth among our people, who seek enlightenment.” Sperling wanted these translations to be additions to the new Hebrew bookcase, especially the shelf that appealed to a young audience. He pointed out the uniqueness of Jules Verne’s literature and its adaptation to this audience – the blend made in it between the scientific and the imaginary. Unlike the translator of the *HaMagid* version, Sperling was well aware that Verne’s works were fictional. For him, the combination of scientific and technological knowledge with a story’s plot was an excellent way to spread this knowledge among the younger generation. In the introduction to *B’mitzilot yam (Twenty Thousand Leagues Under the Sea)*, he explained that Verne’s book touched on the fields of zoology and geography: sea life, from single-celled organisms through the largest creatures, which he called *taninim* (Hebrew for crocodiles); the poles and axes of the earth, islands and the populations living there, and volcanoes. Sperling did not distinguish between science and technology – in one breath he presented scientific knowledge together with technological innovations, such as electric-powered devices, diving equipment, and the submarine. In the introduction, Sperling emphasized the role of narrative in disseminating this knowledge:

More than once or twice, the reader’s heart will be touched and his soul will rejoice and his eyes will be opened to new things and secrets which have been hidden until now, and never before crossed his mind. And all of these are founded on the true ways of nature: His pleasant and delightful book tells of enjoyable and exciting journeys circling the earth, under the surface of the ocean and beneath the frozen sea of ice [...] they are beautifully edited and highly recommended; they will entertain the reader’s soul (Verne [1870] 1876, “To the Readers,” p. 3).

The importance of the engaging and entertaining narrative, which is at the core of science fiction and characterizes the work of Jules Verne, was emphasized by the translator, who perceived the young Jews as “thirsting for knowledge about the ways of nature” (Verne [1870] 1876, “To the Readers,” p. 4). Sperling even mentioned that he had written books on astronomy and natural history, but since they were apparently never published, it is difficult to know whether Sperling presented in them a similar combination of the scientific and the fictional model. Verne’s books enjoyed great popularity among young Jewish readers (for example, Yechezkel Kotik recalled reading these books in Russian when he was a child, as noted in Chapter 1) and served as a starting point for discussions on scientific and technological innovations even at the beginning of the 20th century. For example, the 1901 issue of a Jewish children’s magazine published in Warsaw, *Olam Ketan* (discussed in more detail below) included a news article about a pair of explorers, one French and one Canadian, who successfully circumnavigated the Earth in sixty-four days, using various technological innovations. The editors noted that these explorers’ achievements surpassed the imaginary journey undertaken by the heroes of Verne’s novel *Around the World in Eighty Days*, published three decades previously (Ben-Avigdor and Gordon 1901, p. 963).

**Science, Technology, and Literary Discussion in Hebrew Children’s Literature**

In 1875, an unusual children’s book was published in Hebrew, which integrated scientific and technological information with a literary story. *Siporei Elyashiv* (*Elyashiv’s* *Stories*) was written by Yitzhak ben-Dober Anders (1854–1920), a merchant and teacher from Grodno in Belarus. Anders showed great interest in the burning educational issues of the time, and published several articles on the subject in the Hebrew journal *Ivri Anochi.* He reported sympathetically on changes in education, and on a Jewish orphanage in Grodno that offered vocational training to children who had not been successful in religious studies (Anders 29.3.1872, p. 104; 14.6.1872, p. 144). Anders translated books from Russian and German into Hebrew, always giving credit and additional details about the original texts (Kressel 1965, p. 126; Ofek 1985, 49).[[54]](#footnote-54) Since he did not indicate that *Siporei Elyashiv* was a translation, it can be assumed that he wrote it himself. It was in this book that Anders realized his vision of imparting scientific and technological knowledge to the younger generation in ways that suited them. In the introduction, he urged parents and teachers to give his book to their children and students, “to give them resources and knowledge, entertainment, and amusement, all at the same time,” (Anders 1875, “To the reader!” pp. 3–4). Clearly, then Anders was aware of the new trend spreading in European literature at that time of incorporating science and technology into captivating and well-written stories, as exemplified in Verne’s work. *Siporei Elyashiv* was probably the first Hebrew book that combined the scientific discussion with a well-constructed fictional story that centers around adolescent youth. The main character, Elyashiv, is a knowledgeable and science-loving boy who often taught his family and friends about natural phenomena around them, such as air and wind, water and steam, sound and echoes, light and darkness, cold and heat. While this composition is indeed the work of Anders, it is clear that he based it on popular models in modern Western children’s literature, such as the *Tom Telescope* series published by Newberry in the 18th century, already mentioned here, which presents the science lectures of the youth, Tom. Tom introduced physical principles using props and toys, such as balls and wheels, to show that every child can observe and understand the laws of nature (Secord 1985, p. 133). This model was also used in other children’s books that were popular in Britain, such as *Harry and Lucy* (1801), written by inventor Richard Lovell Edgeworth (1744–1817) and a book based on a conversation between a brother and sister exploring their immediate environment (Myers 1989, pp. 177–179). Similar to other children and youth science books published during the 19th century in Western culture, the process of children’s learning and exploration became the main purpose and theme. This shift of research authority from the older to the younger is intended to create a new space of joint and enjoyable and activity for both children and adults (Pandora 2009, pp. 89–90).

Anders’ book is based on the idea that children are curious about the natural phenomena and technological devices that they encounter in their daily lives, and, therefore, these should be the starting point for science education. Elyashiv, intended as an agent to spread science to those in his environment, takes advantage of every opportunity to teach his family members and friends about scientific phenomena. To prove that his explanations are correct, he conducts impromptu experiments, or describes experiments he had done at school. For example, Elyashiv and his brothers use straws to drink, leading to a discussion on the physical properties of air, and an explanation of how tools such as a bellows, water pipes, balloons, and submarine operate based on these principles (Anders 1875, pp. 7–20). A kettle boiling on the stove leads to an in-depth explanation about the steam train and the water cycle in nature (Anders 1875, pp. 21–32).

The character of Elyashiv embodies a prototype of a science popularizer trying to bring the sciences to the Jewish world (see more in Chapter 6). His scientific explanations hit a wall of ignorance, and provoke ridicule and mockery. He repeatedly must try to convince those around him that his explanations are correct. His relationship with his brother, Shamgar, shaped as his polar opposite, a wild boy who did not like to study, emphasizes Elyashiv’s positions. Shamgar argues with Elyashiv, unable to understand his teachings. In contrast, their sister Rebecca trusts and supports Elyashiv. The criticism voiced by Elyashiv is an opportunity for the author to express his criticism of Jewish youth who show little interest in studies and are swept away by their love for games and socializing with with non-Jews. In Elyashiv’s words:

Because their [Jewish children’s] thoughts are far from Shabbat and learning, they prefer Gentile children, and spend their days in vain [...] They think that instead of spending the entire day at home on the Sabbath, it is better for them to go out to the forest, to dance and play games and collect nuts, and return home only in the evening. But when the spirit of understanding rests upon them, then they will turn from their ways and turn their faces towards wisdom (Anders 1875, pp. 22–23).

In *Siporei Elyashiv***,** scientific knowledge is seasoned with great humor. Its scenes take place in a home environment, and they provide an authentic expression of children’s behavior. The relationships between parents and children, as well as the relationships among siblings themselves, are presented authentically. Of particular interest to our discussion is the contrast between the character of the boy, the agent of science and his father. The first story deals with air properties, and Elyashiv teaches his family that air is essentially matter, or a physical substance. The story opens with a description of the brothers trying to drink from a jar with straws. The humorous design of the conversation between the brothers stands out: Elyashiv asserts that the weight of the air in the basement is weighed about five liters, while the air in the straw weighed about a quarter of a pound, but Shamgar refuses to believe that air has weight. Shamgar mockingly asks Elyashiv how much his ideas and delusions weigh, to which Elyashiv replies: “more than your empty head” (Anders 1875, p. 9). The argument between them becomes heated, and they decide to appeal to their father. The father is sceptical about Elyashiv’s claim, and asks him if he learned this at school. Elyashiv responds by conducting experiments to show that air is a substance: holding a glass to his lips by sucking in the air and burning paper inside a glass and sticking the glass to the palm of his hand. But the father is not interested in Elyashiv’s experiments and fails to understand their significance: ‘“You may be right,’ the old man says calmly [...] ‘but how does it help me to know this? What does it give you, how does it help you? Your days at school are being spent in vanity and foolishness,’” (Anders 1875, p. 13).

The indifference displayed by the father and his aversion to the scientific and technological knowledge taught in school sharpen the intergenerational distinction. As I demonstrated in the first chapter, this distinction between the elder and the young based on the mastery of knowledge about these subjects spread throughout the Jewish world. Elyashiv does not give in, and describes to his father the importance of air pressure for the operation of vital devices such as a water wells, a fire extinguishing device, and more. He goes on to contradict “old wives’ tales” that stormy winds are caused by struggles between demons (Anders 1875, p. 14). Continuing, Elyashiv teaches his father that the flying ball relies on the power of air for flight. The astonished father struggles to believe his son’s words and even threatens to hit him: “Stop talking foolishness, and piling lie upon lie, lest I smash your head with this wine jug in my hand,” (Anders 1875, p. 16). Still Elyashiv is not daunted and tells his father in detail about an experiment they conducted at his school, in which they made a hot air balloon and flew a rat flew in it.

Because a ball or a large bag made of thin silk fabric will burst, (and to show us at school they made a ball from thin paper) [...] Under the ball they tied a basket or net [...] They did not put a person in the basket, because the ball was made of thin paper and danger lurked at its foot, therefore putting his weight on it could cause a disaster, and they did not want to risk anyone’s life, so they put a rat in it [...] And in order for all this to be seen and considered by the masses, they sent police officers and public officials to encourage people to come and witness this [...] and before the ball descended on the village, they informed the village head so he would know about this [...] because the farmers and their wives and children and infants came out armed with swords and spears [...] to destroy and demolish what seemed to them to be a monster (Anders 1875, pp. 17–19).

When Elyashiv finishes telling his story, his father is stunned and silent. The mother scolds the family for wasting their time idly instead of helping her with the housework. The difference between youth and adults is stark here: the parents are referred to as “old people” and they do not attribute any importance to scientific and technological knowledge. Their attitude towards Elyashiv is patronizing and even violent. This is in contrast to the society of youth and the institution of the modern school, which enriches their knowledge in a pleasant way without the threats of corporeal punishment (Anders 1875, p. 46). These attitudes are linked to the harsh criticism voiced by intellectuals, since the 18th century and throughout the 19th century, that the Jewish *cheder* schools were backwards and oppressive educational institutions where children constantly suffered from abuse (Holtzman 2010; Kogman 2013b, p. 22; Zelkin 2008a, pp. 26–33).

In most scenes in the book, no adults are present, and Elyashiv devotes his best efforts to impart scientific and technological knowledge to his brother, sister, and peers. This knowledge is not reserved only for boys, and Elisha convinces his sister that it is also relevant for girls. He teaches his sister Rebecca what the power of evaporation is, using the hot steam escaping from the home kettle to demonstrate this to her. Rebecca listens attentively to his explanations, but remains sceptical about its usefulness for Jewish girls. Eliyashiv insists that scientific knowledge is relevant for girls as well as boys:

Even when a girl comes of age and becomes a wife to the hero of her youth, she will oversee the ways of her household, and be a compassionate mother for the fruit of her womb. And if she has found wisdom and knowledge, she can educate her children with wisdom and knowledge. She can read them good books, and impress upon them the lessons of the mind, to make them understand the ways of the world and how the earth works [...] Then she will no longer wish to send them away to a school far from home [...] Look to your neighbors and see, in every house and family they are teaching and learning [...] They read books, they have wisdom, and who is it that enables this and guides them? Behold, these are the women, the mistresses of the house (Anders 1875, pp. 23–24).

In this section, Anders expressed his conventional, bourgeois view that women would not use scientific knowledge to conduct research or acquire a profession. However, this knowledge was essential for them, as they could eventually become their children’s teachers and educators. This idea appeared in the writings of many 19th century scholars (Feiner 1992, p. 464–467; Kogman 2019, p. 371; Proosh 2001, pp. 87–88).

The importance that Anders attributed to girls’ education was also evident in his serialized novella *Acharit Gaon*, published in the Hebrew magazine *Ivri Anochi* between March and June of 1875 (issues 25–38), the same year that Anders published the *Siporei Elyashiv*. In this novella, Anders criticizes Jewish youth for being fascinated by non-Jewish culture and longing for foreign fashions and leisure activities. The novella tells the story of a nobleman who lost his fortune and wished to marry his daughter Hannah to a rich but foolish and superficial young man. Anders expresses his sharp criticism of the Jewish youth of his time, who followed foreign trends, of the leisure patterns of Jewish boys and girls, and their participation in non-Jewish culture (Anders 9.4.1875; 16.4.1874). Hannah, who is studying in high school, refuses to marry the boy chosen by her father. She is in love with Abraham, an educated but poor young man who, through his hard work and diligence, has become a bookkeeper in her father’s business. The central message of the story is the superiority of modern studies, which triumph over the power of money, status, and devotion to frivolities. This story ends well: when Abraham accidentally wins a large sum of money, he ransoms the gentleman from debtors’ prison, who then finally consents to the young man’s marriage to his daughter (Anders 25.6.1875). The moral of the story is that modern education is superior to money, status, or frivolous entertainment.

Contrary to traditional Jewish perception, learning, and knowledge are presented here as vital not only for boys, but also as essential for young women. This message is directed at the young readers of the work, with the aim of changing traditional gender perceptions and making science a legitimate subject for young women as well. As I mentioned earlier, many Jewish girls’ poor knowledge of Hebrew naturally prevented them from reading these books. This exacerbated the situation caused by the traditional views that steered them away from these subjects (Kogman 2019, p. 364).

In addition to trying to persuade his sister to study science and technology, Elyashiv works equally hard to convince the delinquent Jewish boys who waste their time on games and fighting. In the chapter dealing with the properties of light, Shamgar and his friends argue about what is the fastest thing in the world, until this argument almost turns into a brawl. The humorous model appears here again, with one of the suggested answers being that the fastest thing is a child running from his mother who wants to beat him with a stick (at the same time, there is again a hint of criticism against violence towards children). Shamgar suggests that they ask his knowledgeable brother, and, indeed, Elyashiv gives them a comprehensive explanation of the properties of light (Anders 1875, pp. 42–53). Thus, Elyashiv has an important role in enriching the knowledge of the teenagers around him, and in pushing them to acquire scientific knowledge. In the last chapter, he conducts an experiment to prove that black absorbs light by placing pieces of white and black cloth on the snow. When the snow under the dark piece melts first, Elyashiv manages to prove to his brother that the color black absorbs light. Shmagar regrets his past behavior and promises that from then on, he will stick to his studies, and they hug and kiss each other excitedly. Elyashiv’s words of encouragement to his brother at the end of the book, express the fundamental message of this work to its young readers:

Acquire wisdom, acquire understanding, because they are your life! Always turn your ear towards the words of wisdom and understanding [...] I will continue to tell you many more wonderful things about the works of nature that you have not heard before in all your days [...] unlike the fabricated stories that our old nursemaid will tell you, which will bring upon you vain terror, fear and dread [...] My k stories will come from reliable sources [...] for everything that I tell you, I will show you a true sign and wonder, because all these words were written in books with the wisdom of the last generation [...] Wisdom is a gift from God above, which He sent us so we can help others, and bring salvation to the land. So let us persevere and not give up [...] because only then will we succeed and be a wonder to many (Anders 1875, p. 69).

Anders encouraged his young readers to adhere to the truths of scientific knowledge that appear in up-to-date books, those based on experiments and research and not fables and superstitions. He created the character Elyashiv as a new Jewish educational ideal: a boy committed to studying science and technology. For Anders, scientific studies provide a path that will lead Jewish youth to success, a path with the potential to make Jewish youth a “role model for many.” In this way, Anders proposed a new model of Jewish identity for the young generation, in which science and technology occupy a central place.

**Admiration of Science and Technology and Longing for the Old World**

The rapid changes in daily life caused by technological developments in the second half of the 19th century in Europe sparked intense public interest and led to the creation of numerous popular texts about those such as steam power, trains, and telegraphs (Noakes 2016, p. 153). A similar phenomenon occurred in the Jewish sphere. Jews also witnessed firsthand the enormous impact of these inventions, and Hebrew literature and journalism began fulfilling the Jewish community’s desire to read and learn about them (Bartel 2007, pp. 287–290; Cohen 2007, p. 184; Elroy 2008, pp. 29–46; Garrett 2003, 90–91; Shavit and Reinhertz 2011, pp. 62–69). For example, as noted, Abraham Simcha Katzenlenbogen published *Michonat Hakitur* in 1845 to explain to a Jewish readership how steam power works, and Zvi Hacohen Rabinowitz published a four-volume series *Otzer Hachachma vihameda* (*The Treasure of Wisdom and Science*) (published in Vilna, 1867–1876). This series on science and technology described how natural chemical and mechanical phenomena were used to develop modern technologies such as steam power and magnetism.

During this period, Hebrew journals also increasingly dealt with technological inventions. For example, *HaMagid* and *HaMelitz* described hot air balloon flights (Rabinowitz 3.11.1887; Rabinowitz 4.11.1887; Zilberman 3.17.1857). Most notable was the journal *HaTzerifa*, which became a leader in the discussion of science and technology, with many articles on magnets, electricity, steam, trains, the telegraph, the camera, the hot air balloon, stethoscopes, telephones, and more. Even its news section, which covered various events occurring around the world, noted innovations in science and technology, such as an article about a prosthetic hand invented in London (1862, issue 16, p. 122. See more about this magazine and its editor in Chapter 6).

The new attention to technological developments also characterizes the texts of children and youth published then. This literature aimed to describe and explain these innovations, with the goal of cultivating admiration for science and technology among youth. At the beginning of the textbook *Melamed Lihoil* (*Useful Teachings*) published in Odessa in 1885, author Haim Liv Katz wrote:

We live in houses with roofs and wear beautiful clothes [...] We are experts in working the land and we have wise doctors and medicinal drugs [...] all these, and myriad others like them, are human inventions [...] and we have become so accustomed to them until they have become second nature and we cannot live without them [...] Instead of horses, the steam engine runs, drawing countless wagons as big as houses [...] factories do the work of manufacturing with machines [...] Today we can talk to each other from the ends of the earth, one calls and the other answers, one asks and one answers, by telegraph and telephone. [...]

Who can recount and explain all the novelties of the world and the brilliant inventions and wonderful machines that have been revealed to us by wise men over the past generations and centuries [...] Every old man among us remembers the world as it was in his youth, and wherever he stands today, he is amazed and astonished at this new world, which he can hardly recognize (Katz 1885, “Pitchon Peh” [“A Chance to Speak”], p. 2).

Katz’s book provides a wealth of information from the fields of science and technology, including the source of the coal used for steam power, the electricity vital for the operation of the telegraph and telephone, and the telescope, microscope, and hot air balloon (Katz 1885, pp. 6–16). In the introduction to the book, he explains that he had taught students for many years, and after retirement, devoted himself to writing this book about nature to help teachers who had been widely criticized for their lack of knowledge in these fields (Katz 1885, “Pitchon Peh,” pp. 2–3). He noted that technological and scientific knowledge had become part of the desired curriculum that must be taught and taught to the young Jewish generation. For him, the technological revolution of his time was a positive force that benefitted mankind.

Similar sentiments appeared in a variety of Hebrew texts at the turn of the century. For example, in *Tal Shacharot*, written by educator Yitzhak Berkman (1870–1940), the chapter “The Works of Man” described technological developments such as mining minerals, and the development of the steamship, steam train, and hot air balloon. Berkman presents them as exceptional achievements, which operate solely for humanity’s benefit and well-being. Barkman praised the locomotive with particular enthusiasm:

What a wonderful invention the locomotive is! How many people and how many loads it carries in one journey! How far it runs in a short time! A trip that used to take days, now lasts only a few hours. And how pleasant the journey is: neither does the rain get you wet, nor does the wind blow on you. You sit in a carriage and look out the window, as if you were at home, and travel at the speed of lightning, and this was invented by man in his wisdom! (Berkman 1908, pp. 109–110).

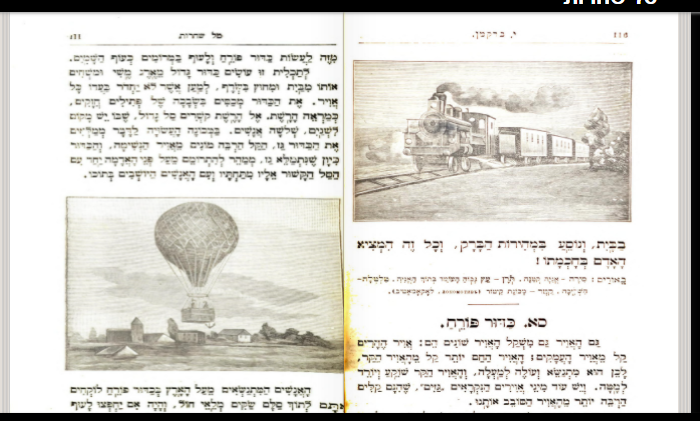


Figure 10: From *Tal Shacharot*: Illustrated for the Children of Israel, 1908

Texts for Jewish children continued to express enthusiasm for new technology through the early 20th century. Mordechai Manos Monosovitz (1857–1928), an educator and author born in Lithuania wrote *Mareh Einayim* *(Eyesight)*, in which a ten-year-old boy excitedly and at great length describes his first visit to a train station (Monosovitz 1919, pp. 115–118). The technology was presented not only as advancing humanity, but as also having special importance for the Jewish people and the Zionist movement. In the popular book *Eden Hayeladim* (*Children’s Paradise*)*,* of which more than ten editions were published in the last decade of the 19th century and the beginning of the 20th century, author Israel Haim Taviov (1858–1920) presented modern transportation as the key to Jewish settlement in the Land of Israel. According to Taviov, before the invention of ships and steam trains, many people were deterred by the difficult journey to the Land of Israel, and these new modes of modern transportation paved the way for mass immigration of Jews to their homeland:

There were those who had to give up their honored positions and all their cherished possessions, leave their homes, and take their lives in their hands to “go up” [make Aliyah] to dwell in the Holy Land. For in those days there were still no steamships or railroads to the Land, and travelers from distant places suffered many trials and tribulations [...] However, once people gained wisdom and knowledge in the craft of transportation, and steamships and railroads reached the Land, the Jews began to make Aliyah in droves, to live in the land of their ancestors (Taviov 1896, pp. 446–447).

Taviov saw modern technology as creating the necessary conditions for the realization of the Jews’ national vision. Other Zionist leaders, among them Theodore Herzl, shared Taviov’s view of technology as a positive force shaping Jewish society. Herzl attributed to modern technology not only an instrumental role, as can be seen in Taviov’s words, but also a potential for cultural transformation and the construction of the modern Jewish society in Israel on the foundations of science and technology (Shamis 2020). However, not all Jewish thinkers shared this view. According to Aharon David Gordon (1856–1922), it is not the institution that will bring about national correction, but rather the indirect contact with nature (Govani and Margolin 2020).

As noted, texts for Jewish youth generally presented modern technology in a positive light, and rarely expressed objections or doubts about them. Author and educator Yehuda Leib (1846–1917) was an exception, offering a romantic view that questioned the positive influence of science and technology. Born in Chernigov, Russia Katznelson was known by the pen name Buki-ben-Jogli.[[55]](#footnote-55) In his youth, Buki-ben-Jogli was passionate about the sciences, and in time he became an important popularizer of science in the Jewish world, often directing his work toward youth. Like other authors discussed in Chapter 3, Buki-ben-Jogli devoted much of his efforts to bridging Jewish tradition and scientific knowledge, with the aim of shaping a modern Jewish culture deeply rooted in tradition (Katz 1947; Keshet 1968).

Buki-ben-Jogli studied medicine at the University of St. Petersburg (Katz 1947, pp. 171, 174–175, 180) and his writings reflect his interest in this field. In the 1880s, he served as chief assistant to the editor of the Hebrew journal *Hayom*, in which he published a series of articles on human anatomy entitled “Ramach Avirim” (“248 Organs”). In 1887, these articles were compiled into a book with the same title (Buki-ben-Jogli 1887). He also expressed his love of science in editing an encyclopedia on Jewish culture written in Russian, which he saw as a preliminary step towards compiling an encyclopedia on Jewish culture written in Hebrew (Katz 1947, pp. 257–259). He tried to establish a company to fund the translation of science books into Hebrew, and began translating a physics book from Russian to Hebrew as the first project (Feldstein March 18, 1927). However, this book was apparently never published.[[56]](#footnote-56)

In his books, feuilletons, and other texts, Buki-ben-Jogli expressed his deep attachment to the traditional canon, as well as his modern perceptions and expectations about the future of Jewish society. In his writings, he expressed a desire to bridge the extremes – the world of Torah and the contemporary world of scientific knowledge and technology. In his book *HaTalmud v’Chochmat Refuah* (*The Talmud and the Wisdom of Medicine*)*,* (published posthumously in 1928), Buki-ben-Jogli examined the laws of hunting, and claimed that they testify to the in-depth knowledge of ancient Jewish doctors in anatomy. In this book, he provided comprehensive descriptions of human and animal anatomy, and, at the end, he added a detailed list of professional terms in Hebrew, Latin, Russian, and German, along with many anatomical diagrams.[[57]](#footnote-57) He attributed great importance to Torah, but not at the expense of scientific truth (see Cohen 1942, p. 371). When one of the rabbis argued that the structure of the internal organs that Buki-ben-Jogli described was contrary to what is described in a traditional Jewish book, Buki-ben-Jogli dismissed his criticism and sent him to examine the human body himself (Atlas 5.3.1897).

In his youth, Buki-ben-Jogli was actively engaged in education, a subject close to his heart. He believed that it was necessary to financially support Jewish students in higher education so they could integrate into the world of European science, and even tried to establish a prize for authors of Talmudic texts aimed at a young audience (Cohen 1942, p. 373; Katz 1947, pp. 171, 223–225, 240). His writings were widely read by Jewish youth, especially his book *Shirat HaZamir* (*Song of the Nightingale*), published in Warsaw in 1894. At the beginning of *HaTalmud v’Chochmat Refuah*, the author lamented that many Jewish youth were raised with a traditional education and showed little interest in popular science texts in Hebrew.

We cannot refrain from expressing our complaint about the young people among us who are lovers and connoisseurs of the Hebrew language, who delight in reading love stories in this language and at most matters of criticismand chronicles, but who keep their distance from any scientific book about the wonders of nature. These young people, who were ravenous for Gemara and Tosafot in their childhoods [...] have essentially turned away from the new literature, seeking only the pleasant and easy, and shy away from any scientific book […] In all the libraries of the other nations are many popular books on this subject in their languages, written by experts for the common people […] At the beginning of the Enlightenment period, we had Haim Selig Slonimsky, S. J. Abramowitch, Shalom Rabinowitz and D. Frischmann and others to write and translate science books on the wisdom of nature. Now nobody asks t for them (Buki-ben-Jogli 1928, p. 10).

As mentioned earlier, Buki-ben-Jogli said that reading Slonimsky’s scientific writings was a formative experience for him (see Chapter 1). He described his first encounter with the Hebrew language scientific journal *Hatzifira*, when he was a young man studying in the Beit Midrash in Broyska, as an ecstatic experience, bordering on losing his mind: “It seemed to me [...] that behind my shoulders wings were growing [...] I was rising and sailing in the air […] I was like a madman,” (Buki-ben-Jogli 1912, p. 75). Buki-ben-Jogli’s thirst for scientific knowledge and devotion to his studies also emerges from the testimony of the historian and journalist Ben-Zion Katz (1875–1958). Katz wrote that Buki-Ben-Yogli revealed to him that for three days after first receiving *Hatzifira*, he ate almost nothing, until he thoroughly learned the secrets of the telegraph (Katz 1983, p. 15).

However, Buki-ben-Jogli knew that, while at the end of the 19th century Jewish youth had a growing interest in science and technology writings in Hebrew, by the beginning of the 20th century, this was no longer the case. He saw Haskalah literature as essential for the development of a modern Jewish identity, but was aware of the challenges of bringing scientific knowledge to them, not only due to declining knowledge of Hebrew. In his memoirs, Buki-ben-Jogli referred to the noticeable generational change in attitudes among Jewish youth towards learning about science and technology:

You, young readers, who heard these words from your teachers when you were ten years old, were not shocked or shaken. It was all the same to you, whether the sun revolves around the earth or the earth revolves around the sun. But you cannot imagine my state of mind after I read Slonimsky’s book [...] Like the rest of my people, I was accustomed from my youth to regard all the words of the ancient sages as absolute truth. The sages did not make mistakes, never made a mistake [...] you, my young readers [...] will not understand what a war the pioneers of the Haskalah fought within their souls. So, my dear young friends, please do not mock us, please do not see us as Don Quixotes tilting at windmills. Please remember that we, the first Enlightened ones, paved the way for you and removed all stumbling blocks from your path. So go forth, and remember us for the good. Do you imagine, my young friends, that I am jealous of you? God forbid. You did not know war before your time, but you did not know victory either. You did not know the sweetness of that pain that accompanies a philosophical crisis (Buki-ben-Jogli 1912, pp. 73–76).

His words indicate that by the beginning of the 20th century, it had become commonplace for Jewish children to be exposed to science and technology, and it no longer had the sting of being subversive. On, on the occasion of the jubilee the anniversary of the founding of *HaTzerifa*, in the second decade of the twentieth century, Buki-ben-Jogli appealed to: “my young brothers and sisters [...] born into a cold-hearted culture” (Buki-ben-Jogli, 1912, p. 70), and sadly concluded that they could not understand what Jewish youth had experienced firsthand a few decades earlier, when they were first exposed to the wonders of technology and science. He admitted that after the passage of time, he could no longer recall why the telegraph stirred up his generation to such a great extent. Later, he hinted that the answer was rooted in generational changes:

It is good and right, in my opinion, that you should know what the youth among our people were doing fifty years ago, and what they were interested in, so that you can appreciate the enormous changes in our lives over the course of the last fifty years. The young people of this generation, when they are not in school, engage in physical activities, slide on ice, and in the gusts of desire, they want to parties where boys and girls dance together. They are not like the young people fifty years ago, who were modest in their leisure activities, and even when they were not studying, they were engaged in holy matters (Buki-ben-Jogli 1912, p. 71).

His words evoke nostalgia for the old Jewish world before it was swept away by the waves of modernization. He noted the profound changes that science and technology had on Jewish society and especially on Jewish youth. Many people in the Haskalah shared this nostalgia for the traditional Jewish world, as seen in Hebrew and Yiddish literature published at the beginning of the 20th century that romanticized traditional Jewish institutions such as the Jewish school (*cheder*) or Jewish village (*shtetl*) (Assaf 2010, pp. 122–125; Grossman 2016; Holzman 2010, pp. 89–90; Schachter 2006). Later, Buki-ben-Jogli even pointed an accusing finger at the sciences and technology for distancing Jewish youth from the traditional Jewish framework:

I, your humble servant, was not the only one who was first pushed by *HaTzefira* from the table near the stove in the Beit Midrash out into the great world, the world of science. An entire generation is reflected in these memories of mine [...] But one sorrowful thought clouds these pleasant memories: sometimes the push was too strong, and people went further and further outside the borders of their people [...] until they forgot the table by the stove with *HaTzefira,* and forgot its language as well (Buki-ben-Jogli 1912, p. 76).

He contrasted the warmth of sitting by the stove in the Beit Midrash with the cold and alienation outside, in the world of science. Buki-ben-Jogli claimed that science and technology were not wholly positive forces, but also posed a risk of Jewish identity becoming lost.

Buki-ben-Jogli expressed similarly romantic ideas in his most successful work, *Shirat HaZamir*, which was read by many young people involved in the first and second waves of Aliyah (immigration) to Israel (Keshet 1967, p. 397; Ofek 1985, p. 570). In contrast to his early enthusiasm for the promises inherent in science and technology, he now praised the simple life and being close to nature. The protagonist, the boy Shlomo, renounces his life as a scholar and learns agriculture in the hope of reaching the Land of Israel and working its soil. This book highlights the value of working the land and was part of a trend towards rejecting technology and automation and a preference for being close to nature (Buki-ben-Jogli 1894, pp. 24–31).

In the story “M’hezhiyanot Avizohar” (“From the Visions of Avizohar”) which appeared in his collection of stories for children *Heziyonot v’harhorim (Visions and Reflections)* (Buki-ben-Jogli 1905),[[58]](#footnote-58) he openly criticized science and technology and warned of their potential to destroy Jewish society. One of the stories in the collection, “From the Visions of Avizohar” is a didactic parable about state of the Jewish people. The story describes the wanderings of the protagonist, Abizohar, who cannot find his place in the world. In the chapter “The Olive and the Electricity,” Avizohar and two friends wander on a snowy night through a large city with electric street lights, looking for a Jewish home in which to stay (Buki-ben-Jogli 1905, pp. 218–224). Through a window, they see an old man lighting olive oil in a Hanukkah menorah, much to his children’s delight. The Jewish man welcomes them into his home, saying that he longs for the company of his people. He complains that the light of the candles is dim. Avizohar said that the problem was not with his oil, but with the strong electric street lights that overpowered the candlelight.

In this allegorical story, candlelight represents the old Jewish world with its beliefs and traditions, while the electric light, which was becoming widespread at the time, symbolizes the new and modern world of scientific knowledge. Again, as in the previous quote, light and warmth symbolize the old Jewish world, with cold and darkness associated with science and technology. Abizohar characterizes the relationship between electric light and candlelight as a struggle: “The quarrel between the olive and the electricity is the quarrel between faith and knowledge” (Buki-ben-Jogli 1905, p. 221). In the ensuing dialogue between electricity and the olive tree, the electricity boasts of its abilities and tells the olive tree that it will eventually be swallowed in its currents and disappear. But the olive tree answered that cold electric light is not enough, and that the Jewish soul longs for the abundant warmth flowing from faith:

So as the northern light spills over snowy fields, so shall your light shine but not warm; So, alas, knowledge is also like this for a man; it enlightens his eyes, it is true, but does not restore the soul […] And he turned upwards towards the electric lights, and his eyes are temporarily blinded; He raises his eyes to knowledge and his heart will be filled with desolation. If he seeks refuge, he will find it in the halls of faith; In the semi-darkness a candle will shine there, and in my dim and gentle light sent comfort and pleasure will seep into his heart; and even the smoke from my kindling has a fragrant scent […] The small menorah and its eight candles bear witness that there was an ancient nation in the past that was strong in faith on earth, a nation that almost died out, but through its faith, it rose and lived. Therefore, please, oh electricity, do not humiliate me with your brilliance. For I am a symbol of faith, a symbol of faith and resurrection! (Buki-ben-Jogli 1905, pp. 223–224).

These words show that Buki-ben-Jogli’s attitude towards science and technology had changed. He nostalgically yearns to return to the old world, and portrays science and technology as a threat to Jewish identity. His writings therefore, reveal a dualistic relationship of attraction and repulsion towards science and technology. During his lifelong efforts to bridge Jewish and non-Jewish knowledge, Buki-ben-Jogli recognized the threat posed to the next generation of Jewish youth if they were raised with science and technology as their only spiritual content. In contrast to most Hebrew texts for Jewish children and youth, which presented a harmonious relationship between science, technology and Jewish knowledge, Buki-ben-Jogli’s writings revealed an inherent tension between them, and warned against over-reliance on the sciences in constructing the new Jewish educational ideal.

**Chapter 6: Haim Zelig Slonimsky: A Prototype for Promoting Science and Technology Agents among Jewish Youth**

On May 30, 1904, the Krakow-based illustrated weekly magazine for Jewish children, *Olam Katan* dedicated an issue to the recently deceased Rabbi Haim Zelig Slonimsky (1810–1904). The editors, Abraham Leib Shalkowitz (pen name Ben-Avigdor, 1866-1921) and Shmuel Leib Gordon (1867–1933), chose to dedicate the issue in honor of Slonimsky, who had gained much recognition in Eastern Europe for his involvement in science and praised Slonimsky’s work in bringing the sciences to the Jewish community of Eastern Europe, including founding and managing the influential journal *Hatzifira*.[[59]](#footnote-59)

Ben-Avigdor and Gordon emphasized to their young respondents the significant contribution of Slonimsky to the dissemination of science among Jews, and the great respect he earned not only from his own people but also from Jewish and non-Jewish scientists and leaders alike. They presented Slonimsky as the “elder of the scribes of Israel and its wise men,” and as someone whose writing had a tremendous influence on the young Jewish generation. The Hebrew science books he published were for the “benefit of the youth of the sons of Israel, who do not understand another language” (Ben-Avigdor and Gordon 30/5/1904, 832).

Why did the editors of *Olam Katan* choose to publish this article? One of the goals of this journal was to inform its readers about major news events. The death of Slonimsky was a massive event in the Jewish community, and his funeral was attended by Jews from various social and ideological groups who filled the city streets of Warsaw ([Anonymous] 18/5/1904; Akavia 1972, 387). But more than that, Slonimsky, who embodied a combination of scientific research with Jewish knowledge, was probably perceived by the editors as a positive role model to be emulated by the young Jewish audience to which *Olam Katan* appealed.

Slonimsky was one of the most important Jewish popularizers of science in the 19th century, if not the most important, his work, arguably, having transformed perceptions of science and technology in the Jewish educational world of the 19th century. Slonimsky (also known by the acronym of his initials, HaZaS,) was born in Bialystok, and grew up in a traditional Jewish environment. After marrying at a young age, he became deeply interested in the sciences, learned German, and read books on mathematics and astronomy. Gradually, science became the central interest in his life, and from the 1830s onwards, he began writing and publishing science books in Hebrew. In 1862, he founded *HaTzefira*, and for many years he managed the journal and charted its course. Under his leadership, this Hebrew-language journal was devoted to bringing news and information about science and technology to young Jewish readers.[[60]](#footnote-60) Slonimsky was also involved in founding a public library in Warsaw with the goal of improving science education among the public (Bauer 2015, p. 86).

Slonimsky was reknowned in his time as the greatest Jewish expert and undisputed authority in science and mathematics. He became a focal point for pilgrimage and an undisputed scientific authority, and his name was associated with everything related to science and modernization in the Jewish world. Author and translator David Frischmann (1859–1922) recounted that, because he was a contemplative child, his family sometimes called he “a kind of Slonimsky.” Frischmann added, “I do not know of any other name that is as widely accepted and well-known on the Jewish streets as Slonimsky” (Frischmann 1914, pp. 22–23). In a Shalom Aleichem story from the early 20th century, “Motl, Peysi the Cantor’s Son,” the characters (who were immigrating to America) spoke about Slonimsky as a symbol of innovation and progress (Shalom Aleichem [1911] 1999, p. 100; see also Trachtenberg 2019, pp. 23, 29).[[61]](#footnote-61)

Slonimsky was also an enthusiastic inventor, and developed the technology of the calculating machine and the telegraph. His inventions earned him prizes and prestige, and brought him out of the confines of the Jewish world and enabled him to make professional connections with non-Jews (Goldberg 1970, pp. 253–254; Monnier, Szrek and Zalewski 2013, pp. 113–122). Beginning in the 1840s, he established contacts with important German astronomers and mathematicians, such as Christian Ludwig Ideler (1766–1846), August Leopold Crelle (1780–1855), and Friedrich Wilhelm Bessel (1784–1846), as well as with the leading scientist and geographer Alexander von Humboldt, who arranged for him to meet Friedrich Wilhelm IV, King of Prussia (Bauer 2011, pp. 52–54; Goldberg 1970, p. 254; Shavit and Reinhertz 2011, pp. 10–13).

**From Traditional Scholar to Modern Researcher: Changes in Slonimsky’s Discourse**

At the beginning of his career, Slonimsky linked science with Jewish tradition, reflecting the traditional perspective, dating back to the Rambam, that studying the sciences was legitimate only if its goal was to support and promote religious learning. Slonimsky first studied branches of science that were accepted in Jewish tradition: engineering, astronomy, and mathematics, which were used for calculating the Hebrew calendar. Gradually, his interests shifted towards fields that were of central interest in the Western world, such as zoology, chemistry, optics, and mechanics (see Chapter 2). Slonimsky’ grandson, the Polish-Jewish poet Antonio Slonimsky (1895–1976) recounted that when a delegation of astronomers from Berlin arrived in their hometown, the elder Slonimsky showed great interest in their astronomical observations and the telescope – the first he had ever seen. He accompanied the delegation, amazing them with his knowledge.[[62]](#footnote-62)

At the age of 24, Slonimsky published his first book on mathematics and engineering, *Mosdai Chochma* (*Foundations of Wisdom*) (published in Vilna and Grodno, 1834). Slonimsky applied the physico-theological model (explained in Chapter 3) to astronomy and, like previous Jewish authors, praised the divine creation and asserted that the goal of scientific investigation was to know God’s world:

Who could this wonderful creation not exist without? Who would investigate its greatness? Who will be wise of the glory of its building? Who will understand its mysteries of mysteries and the secrets of its wonders, if not Man, using the wisdom given to him by God, to strive to know His glory and greatness, to understand His majesty and the power of His strength. Because wherever his discerning eye roams in his investigations, from rolling prairies to the circumference of the earth, he will envision the spectacle of the Almighty, and thus he will behold the image of God! (Slonimsky 1834, “Introduction.” p. 1, my numbering).

Here, Slonimsky expressed the conventional perspective that scientific research strengthened religious faith. He included rabbinic endorsements in the front of the book, reinforcing its traditional tone. Rabbi Yeruham Altschuler said that Slonimsky’s book contributed to “investigating the hidden places in the words of the Sages [...] A sapphire light will shine forth from their judgments, and the depth of the sages’ wisdom will be seen,” (Slonimsky 1834, “Endorsements from Great Rabbis, May Their Light Shine”). These endorsements indicated that the rabbis had begun to accept the sciences, although it can be assumed that Slonimsky’s focus on scientific subjects already accepted in the Jewish traditional world facilitated their acceptance of his works by the rabbis (Atlas 9.5.1897).

Slonimsky’s second book, *Kochva Dashvit* (published in Vilna in 1835) is dedicated to a description of celestial bodies, particularly the appearance of comets. He presented support for the heliocentric theory, which, at the time, still faced opposition in traditional Jewish circles (see Chapter 2). Slonimsky opened the book with a long introduction designed to soften the expected resistance to modern astronomical concepts. He criticized those who opposed the pursuit of knowledge: “One day, a verdict of heresy will be decided against them.” For him, there was no contradiction between religious faith and the truths they perceived through the physical senses. To bolster this claim, he quoted Joseph Albo, an important 14th-century Sephardic rabbi: “The Torah will not force you to believe anything that is against your primary intelligences,” (Slonimsky 1835, “Author’s Preface,” p. 3, my numbering). Like many previous Haskalah authors, he gave contemporary scientific knowledge a traditional Jewish hue, especially in his early works that dealt with scientific fields and issues that were already accepted by the rabbis. This style did not completely disappear in his later writings, which addressed issues that were still controversial in the Jewish world (see more on this below).

Slonimsky’s engagement with the Hebrew calendar and the theory of intercalation also teaches about the traditional context in which his interest in science first developed. However, his next book, *Sefer Toldot Hashemayim,* published in Warsaw in 1838, a few years after he released *Kochva Dashvit*, was dedicated to contemporary ideas in astronomy, especially the heliocentric model, which had not yet been fully accepted in the Jewish world. He thus integrated traditional knowledge with modern knowledge, and sought to update the traditional discourse in the fields of science in which Jews were involved.

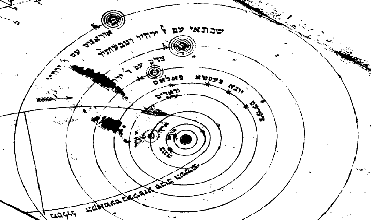
****

Figure 11: The heliocentric model in Slonimsky’s *Kochva Dashvit,* Vilna edition 1835 (last page)

Slonimsky also showed great interest in the calculations of the Hebrew calendar. His book *Yisodei Ha’ibur* (Warsaw 1852) which appeared in several editions during the 19th century and was updated by him (Slonimsky 1865 and 1889) was dedicated to this subject. Slonimsky advocated using more advanced mathematical and scientific methods for calculating the calendar and rejected the inconsistency and mystery that surrounded this subject. According to him, despite claims that the Hebrew calendar was calculated using the traditional method of witnesses seeing the new moon, in fact, the non-Jewish solar calendar, based on mathematical calculations, had long ago been adopted to determine when the Jewish holidays occurred and coordinate them with the annual seasonal cycle. However, this was not openly admitted, and the ancient tradition was still invoked to justify how the holidays were determined (Lewinger 1985, p. 38). Slonimsky saw himself as pulling the mask off the mysterious methods used for calculating the calendar and ascertaining the “pregnant year”:

Even if in the early generations they sanctified [the new month] based on witnesses [...] here, in recent generations [...] they did not seek witnesses, established [the new month] based on calculation [...] However, in their calculation process, they tried each time asking seeing the new moon, so that the masses would not notice (Slonimsky 1865, pp. 35–36).

Instead of the old method for calculating the calendar, Slonimsky proposed a clear calculation method, which he simplified in short tables. His departure from the traditional method of calculating the calendar sparked opposition, and a debate between him and his opponents lasted for many years in Hebrew books and journals (see in Nissenbaum 1912, p. 3; Goldberg 1970, p. 251; Slonimsky 1884, pp. 11–16).

Fifty-three years after the publication of *Sefer Toldot Hashemayim*, Slonimsky explained what first caused him to delve into the issue of the Hebrew calendar. During his visit to Warsaw for the purpose of printing his book, he met with Polish astronomers, who praised his knowledge. One of them told him that the compiler of the Jewish calendar living in Warsaw had approached him with a request to receive tablets documenting solar eclipses. During their conversation, the Polish astronomer heard about the complex and non-scientific method the Jews use to calculate the Jewish calendar, which astonished and amused him. Slonimsky reported that the matter surprised him and aroused his curiosity, and he began to look deeper into the subject (Slonimsky 6.3.1891, pp. 181–182). One must suspect that there is more than a hint of apologetics in this story, recounted many years after the beginning of the controversy, and which emphasizes the anachronistic nature of the Jewish methods for calculating the “pregnant year.” In fact, traditional calculations of the Hebrew calendar were linked to astronomical observations, and many texts dealing with it incorporated detailed information about celestial bodies (Philippowski 1868, pp. VII–IX).

Another example of Slonimsky’s tendency to engage with questions related to Jewish tradition and to update the Jewish discourse in the process can be found in his book *Mitzuiyut Hanefesh v’Kiyuma l’Chutz Haguf* (*The Reality of the Soul and Its Existence Outside the Body*), published in 1912. Here, he discussed the distinctions between the physical and the spiritual, and as was his way, he elaborated on electricity, heat, magnetism, and more. The purpose of this book, explicitly stated in the introduction, was to strengthen belief in the eternal existence of the soul. But he did not base his arguments on “books of *musar* [ethics] and awe that are abundant among us, but which are adequate only for pure-hearted believers, who trust in the teachings of the Torah and the faith of their youth,” but through “evidence from nature” (Slonimsky 1852, “Introduction,” p. 6, numbering mine. See also Shavit and Reinhertz 2011, pp. 153–154).

As a young man, Slonimsky was intrigued by Torah discussions that involved mathematics, engineering, and astronomy. Over time, he became drawn to fields of science that were seldom discussed in the Jewish world but had become the focus of Western scientific culture of the time. Presumably, his life in the vibrant cultural center of Warsaw, along with his new family connections, led to this turning point. In 1842, after divorcing his first wife, he remarried Sarah Stern, daughter of Avraham Stern (1762?–1842), a central figure in Jewish life in Warsaw, who shared Slonimsky’s interest in science and technological developments (Bauer 2015, pp. 73–74; 77–78; Nissenbaum 1972, p. 3).

As someone drawn to technological innovation, Solonimsky wanted to leverage the new media channel of journalism to disseminate his views. Already in 1857, he first tried to found a Hebrew-Polish newspaper (Goldberg 1970, p. 255). He headed a rabbinic Beit Midrash in Zhytomyr, which closed in 1883. He then turned his attention to popularizing the sciences and founded the journal *Hatzifira*. It seems that the replacement of the literary media with the journalistic one entailed fundamental change, converting the traditional book into the modern periodical. A substantial change is also evident in Solonimsky’s areas of interest and the topics covered in the journal, which moved ever farther from traditional Jewish discussions of science (Sofer 2007, pp. 51–50; 181–180). This is not to say that he refrained from shaping scientific and technological knowledge in familiar traditional formats in order to make it easier for readers to digest (Akavya 1972, pp. 395–390). He continued to be involved in scientific-halachic discussions until the end of his life, such as in the debate over the “pregnant year” and a controversy over the miracle of the vessel of olive oil (as told in the Hanukkah story) (Slonimsky 29.12.1891, p. 1123).[[63]](#footnote-63) Even in some of his writings in *Hatzifira,* he tended to mediate between innovative scientific information and traditional Jewish discourse, for example, in the discussion about dinosaurs and the theory of evolution (Blutinger 2010; Sofer 2007, 84; Shavit and Reinhertz 2011, pp. 79–80; Robinson 1983, pp. 56–60). But most of his articles in the journal dealt with innovative technologies that had developed at the time, such as the telegraph, camera, trains and aircraft, and the natural forces these technologies used, such as light and electricity.[[64]](#footnote-64) Slonimsky saw this information as essential for his readers, given the rapid spread of these technologies and the changes they brought about in their lives (see Chapter 5).

The shift in Slonimsky’s interests was likely also influenced by his second wife, Sarah. She did not know Hebrew (as was common among Jewish women at the time, see Parush 2004) but she had mastered several other languages and was a dominant and intelligent woman.[[65]](#footnote-65) In addition to helping manage the journal, she was responsible for locating appropriate sources about popular science. Joseph Haim Zagorodsky (1864–1931), who assisted Nachum Sokolow in editing *Hatzifira* (Kersel 1965, pp. 716–717*,* described how Slonimsky and his wife worked together on the science articles:

Besides managing *Hatzifira*, the account books, signatory approvals, and so on, she also helped her husband locate articles worthy of editing and reprinting. Hazas [Slonimsky] did not know any living languages, but his wife had thorough knowledge of Polish, German, and French (she understood Russian but read it with a Polish accent) and was well versed in their literature [...] All her life, she never stopped reading and studying books and newspapers. When she came across a good scientific article in one of the newspapers, she would tell her husband about it, and he would translate it into Hebrew, adding his own touch and distinctive style, sometimes including an illustration, and print it in *Hatzifira* in the “News of the World and Nature” section (Zagorodsky 1912, p. 47).

Sarah Slonimsky, therefore, played an important role in selecting topics for the scientific and technological issues that her husband chose to cover. Her lack of Hebrew and her inclination towards sciences, and her interest in reading about science in foreign newspapers, which characterized many Jewish women at that time (Parush 2004), likely provided Slonimsky with an important bridge in his transition from subjects accepted in the traditional world to subjects on the agenda of the scientific and cultural world in Europe at the time (Zagorodsky 1912, p. 47).

**Science and Technology as Channels of Modernization**

Like many intellectuals before him, Slonimsky proposed science and technology as a path towards modernization for the Jews, and a solid foundation upon which the new modern Jewish identity would be built. He successfully integrated traditional knowledge and rational thinking, and established a new profile of an enlightened Jew, who combined Talmudic discussions with a deep and active engagement in contemporary scientific and technological knowledge (Sokolow 5/19/1904, p. 296). Unlike many other modern Jews, Slonimsky never left the religious world and never stopped writing in Hebrew (Akavya 1972, p. 392).

Nahum Sokolow (1859–1936), who assisted Slonimsky for many years and eventually replaced him as editor of *HaTzefira*, thought that Slonimsky drew his inspiration for engaging in science from a small set of classic and contemporary science books in Hebrew. Among the old books, he mentioned two that were composed in the pre-modern era: *Sefer Nechmad v’Naim* (*A Nice and Pleasant Book*) by David Ben Shlomo Ganz (1541–1613), and *Sefer Ilem* by Joseph Solomon Delmadigo (1591–1655). The reason that Slonimsky preferred these books, according to Sokolow, was that they were “completely liberated from the authority of Talmudic passages, questions, and interpretations, and taught words of wisdom on their own, according to the situation in their day” (Sokolow 5/19/1904, p. 296). Another book from the modern period that Sokolow said influenced Slonimsky was Baruch Lindau’s *Rešit Limmudim*, which excelled in its scientific style and minimum connection to Jewish tradition (see Chapter 4 of this book and Kogman 2013b, pp. 68–69).

In his journalistic writing, Slonimsky adopted the style of the “modern-scientific discourse in the Hebrew language,” which relies on current scientific concepts and bodies of knowledge and adopts characteristics of modern scientific writing by non-Jews (Kogman 2017, p. 260). His articles are outstanding for presenting, with clear definitions of scientific terms, descriptions of scientific tools and experiments, diagrams and illustrations (Sofer 2007, pp. 54–69; 78–84).

Slonimsky preferred scientific writing style over a poetic one and believed that Hebrew literary writing did not constitute a channel for modernity (Sofer 2007, pp. 73–84; Bauer 2015, p. 80). Slominsky’s avoidance of literature and poetry was well known. As David Frischmann quipped: “Slonimsky and poetry: two greater opposites cannot be imagined.”[[66]](#footnote-66) Dr. Shimon Gershon Bernstein (1884–1962), a researcher of Hebrew literature and Zionist businessman, claimed that Slonimsky represented a trend in Eastern Europe in the second half of the 19th century among the educated favoring utilitarian and practical knowledge:

The aspiration to disseminate “useful” knowledge about nature, and the belief in the value of this knowledge in the 1860s was so prevalent and strong among the Jewish Haskalah, that almost all spiritual aspirations in the life of Israel were pushed aside by this priority. Only “useful knowledge,” that is, knowledge about nature, was capable of shaping a new form in the life of Israel and introducing major changes into the course of Israeli thought. Pisarev’s spirit[[67]](#footnote-67) ruled the Jewish streets [...] This was an incomprehensible historical vision, like Pisarev’s well-known saying, “A pair of shoes is more useful than Shakespeare.” This spiritually dead proverb was received with special enthusiasm and recognition precisely by the Jewish Haskalah [...] any overview of Hebrew literature from that period gives a true idea of the whole fierce war that raging within the Jewish camp, a war of the physical versus the spiritual [...] One of the most dedicated fighters for the this “nature method,” Rabbi Haim Zelig Slonimsky, was devoted to the rightness and importance of including the natural sciences in Hebrew writings (Bernstein 1912, p. 77).

The appreciation for material needs and for everything that has utility is associated with the positivism then sweeping Russia and Poland, and these concepts entered the ideology of the Eastern European Haskalah (Bauer 2015, p. 77; Goldberg 1970, p. 247; Sofer 2007, pp. 48–49). Jews and non-Jews alike recognized Slonimsky’s hallmark style of emphasizing the practical and utilitarian in his writings about the sciences (Shavit and Reinhertz 2011, pp. 26–27). Sokolow claimed that the censor had dubbed *HaTzefira*, especially its “News of the World and Nature” section “a paradise for censorship,” arguing that even the strictest censors would not be able to find any flaws in it (Sokolow 1912, p. 8). Even the enlightened individuals of the era recognized *HaTzefira’s* effort to create a neutral discourse, completely detached from Jewish connections. An editor of *HaTzefira*, Samuel Tschernowitz (pen name Sfog) (1879–1929) said that the journal’s goals were to spread the sciences and to help those who would benefit from such knowledge, and that this superseded any Jewish subject (Tschernowitz 1912, p. 58).[[68]](#footnote-68)

Among the Hebrew periodicals flourishing at the time, *HaTzefira* was notable for its complete lack of religious content, and for offering a universal discourse linked to current, practical needs and a utilitarian life. According to Shimon Bernstein, Slonimsky, dissatisfied with the spiritual content of material included in existing journals such as *HaMelitz* and *Hacarmel*, decided to found his own journal, dedicated exclusively to the purity of the scientific approach. When he served as the editor of the Nature News section of *HaMelitz*, Slonimsky had a disagreement with editor Alexander Halevi Tsderboim (1816–1893) over what content to provide their readers. Slonimsky wanted to publish articles about topics such as comets, the geographer Alexander von Humboldt, and the metal industry, but Tsderboim chose to publish an article on the polemics between Jews and Karaites (Bernstein 1982, 81–83).

This fundamental disagreement about the proper path towards modernization was expressed by Haim Bialik, when he compared *HaTzefira* to *HaMelitz*:

*HaMelitz* and *HaTzefira* were, in my opinion, two worlds, two different kingdoms. It was if they had divided the world between them, one ruling one hemisphere, the other ruling the other hemisphere. The main interest of the rulers at *HaMelitz* was the innermost Judaism, the interior of the interior: education, the rabbinate, religious reforms, the resettlement of the Land of Israel [...] “words of heaven” [...] for *HaTzefira*, on the other hand, “words of heaven” meant science, politics and the like (Bialik 1972, pp. 42–43).[[69]](#footnote-69)

Slonimsky aspired to create a Jewish scientific discourse focused on the areas and topics on the agenda of contemporary European culture, using Hebrew as the linguistic medium (Bauer 2015, p. 87). He saw scientific and technological knowledge as having a universal value, and as such, relevant for the Jews, especially their practical and professional lives. Of course, he was aware that some scientific knowledge had the potential to subvert or contradict concepts deeply rooted in the Jewish world. As described above, he himself was sometimes involved in such debates. In these cases, he would try to offer a compromise between science and tradition, while trying to update the perspectives and knowledge of the Jewish world. In his journal, he usually chose to deal with scientific and technological issues that did not conflict with traditional ideas, thus avoiding tension between science and Jewish tradition.

**“Torah will Come Forth from Edison’s Factory in America, and the Word of God from the College of France” – Slonimsky’s Pedagogic Perspective**

Slonimsky’s interest in education was sparked, apparently, when he served as the head of the rabbinic Beit Midrash in Zhytomyr (see Chapter 1). The renewed attention the Russian authorities had recently begun devoting attention to education for Jewish youth may have encouraged him to delve deeper into this subject (Shavit and Reinhertz 2011, p. 44). After his Beit Midrash closed, he returned to Warsaw and published several articles on education outlining his educational doctrine. (Slonimsky 8.11.1876; 4.6.1878; 25.11.1879, 2.12.1879). Here, I will deal only with two articles only, which were directly related to science education and the acquisition of technical skills.[[70]](#footnote-70)

Slonimsky’s pedagogic approach was derived from his view about the appropriate path to modernization for the Jewish community. In his opinion, Jewish education should focus on scientific and practical issues, to prepare youth for professions in the modern world. The first article in the series dealt with the inherent value of vocational education, because it could enable Jewish youth to earn a decent living. He criticized those who considered themselves superior and looked down on artisans and craftsmen, as: “There is no craft or art these days that does not also need education and knowledge about nature” (Slonimsky 8.11.1876, p. 333).

In an article he published two years later, “On the Subject of Schools and Education,” he presents an even more cohesive educational vision. He comments on the initiative to open Jewish high schools in Warsaw and described the failures of Jewish education, especially rabbinic seminaries. He claims that the Jews’ success in Central and Western Europe was attributable primarily to the educational model there. He supports the initiative to establish Jewish high schools in Warsaw (equivalent to the gymnasiums for the non-Jews) but insists that the failure of education for Eastern European Jews was rooted in their elementary education:

If we look at the elementary schools in our city [...] as is well known, there are very few [...] Six schools in our city cannot serve more than a thousand students. What can they contribute, in a city where more than ninety thousand Jews reside? What will they gain and what will be added to them by adding another gymnasium, if they have no place to give their boys elementary education, to make them competent and ready for the gymnasium? And what about the many people who can’t afford to send their sons to the gymnasium, and only aspire to an elementary education? In my opinion, elementary schools bear much more fruit for educating the people than high schools do. – The educational foundation for any group of people is literacy. Every person who speaks the language of his nation and knows how to read its books, holds the key to the gates of enlightenment [...] And we know from experience that almost every Jews has taught himself or been taught by others, to understand and speak the language of the local people and nation, he can read and comprehend books and journals, know the news of the countries, know matters of commerce, so these are accessible to him [...] and he can be a useful person in the political society as a citizen of the country, without being hindered by his religion and belief [...] Education will bear fruits for the masses of our people only if we establish schools that meet their needs, because in such an educational system, everyone will find what he wants in whatever he path he chooses in life, to be a merchant, a grocer, an artisan or a craftsman [...] and boys with natural talent can ascend and go on to university (Slonimsky 4.6.1878, p. 166).

According to Slonimsky, modern educational settings should ensure that students acquire the local language in the early stage of their studies, as this is the key to integration into trades and occupations. The vast majority of students in traditional Jewish *cheder* schools were denied the opportunity to learn the state language. It may be assumed that Slonimsky’s statements referred to the ongoing debate regarding the influence of the rabbinic seminaries and the accusations that they were helping to spread foreign languages, which distanced the Jewish youth from their heritage. The Hebrew author Abraham Uri Kovner (1842–1909) wrote an article refuting these accusations. Like Slonimsky, he said that studying in these rabbinic seminaries allowed young Jews in Russia to be integrated into the scientific world (Kovner 2.2.1866, pp. 40–42). Contrary to statements in his first books, published many years previously, Slonimsky came to believe that reading about science from Hebrew texts was not sufficient for Jewish youth. The function of Hebrew scientific literature was to be a bridge for Jewish readers to scientific literature in other languages:

I have directed all my efforts solely towards wisdom and knowledge, towards planting them in the hearts of my people, like the values, like those at the Beit Midrash who did not know anything except the ways of our ancestors (*Derech Avot* 9.9) of Halacha [...] and I did not set out to teach them wisdom and sciences in Hebrew, but rather I presented them with various flavors of worldly and natural knowledge, things that expand a person's mind and attract the heart, to open their eyes to see that the light of knowledge is good, **and so they can go on, of their own accord, to draw from sources of wisdom written in the languages of the nations** (Slonimsky 9.3.1880, 71, emphasis added).

These perceptions of Solonimski brought attacks upon him from the traditional public. In 1896, Yitzhak Teplitsky (1873–1903), who was known for his opposition to modern education (Carsel 1967, pp. 30–31), published an indictment against Slonimsky for having a negative influence on Jewish youth and for alienating them from their heritage. Teplitsky claimed that Hebrew popular science literature contributed to and accelerated secularization, and created a negative culture for Jewish youth. Teplitsky claimed one “elder scribe,” meaning Slonimsky, was responsible for this:

**An elder scribe wrote, with enthusiasm, in the journal *Hatzifira*** things that no one would have dared to say several years ago with such blatant ferocity in front of the entire community of Israel, everyone who understands Hebrew. He told us about the glory of this new, educated generation [...] and about devices and machines invented in our days, the hot air balloon, telephone, phonograph, electric lamps. He went on, with soul-felt admiration, a passionate heart, and twisted judgment [...] **according to the author, from the American Edison workshop will come Torah and the word of God from College-de-France** [...] He spoke of the wonders of the new generation (a generation of revolutions) to whom the splendor of the glory of nature will be revealed [...] eating and drinking in cafes, eating the pastries of a baker who uses butter and cheese from a Gentile and milk from a foreigner, going for walks on Shabbat in parks outside the city [...] they dance at parties [...] Dear readers, have you ever heard such straight logic in all your days? [...] What do those who have such customs – that cast darkness on the people and burn inside the nation, among those who pursue such an education – have to do with wisdom? Will the telephone and the hot air balloon, and more force one to turn from the Torah and mitzvot? Why do they have a monopoly on wisdom? [...] Humboldt went exploring to study geography, Edison studied how the phonograph works, Hegel and Kant were researchers and philosophers; why because of this, should youth be allowed everything that is prohibited, and to completely abolish Judaism? (Teplitsky 1896, 30–34, emphasis added).

Teplitsky accused Slonimsky of erroneously linking modern science and technology with secularization and distancing youth from religion. According to him, this undermined the Jewish framework and religious authority. It offered factories and universities as substitutes for religious institutions, corrupting Jewish youth. His view perpetuated the ideas of 18th-century rabbis who saw the technologies developed by non-Jews as a sign of spiritual decline (Kahana 2021, pp. 147–151).

Slonimsky was aware of these claims, but did not allow himself to be silenced by his accusers. In 1892, during the debate over the Hanukkah miracle of the oil vessel (described above), Slonimsky published a response in *HaTzefira* to a rabbi of the Mohelib community. The rabbi asked why Slonimsky did not allow traditional Jews to retain their faith, as he had done in previous controversies in which he had been involved. He responded that the changing times forced him to reconsider the place of the sciences in Jewish education:

The state of education among our people today is not like it was in previous times, forty years ago [...] Here, before us, is a new generation. Our sons and daughters are raised knowing the language of the state and go to the comprehensive schools. Once they leave the Torah study halls, they will no longer return to study Gemara, Rashi, and Tosefot [commentaries] or *musar* books on matters of faith, like their fathers still do. Therefore, in past times, my intention was to spread the light of wisdom among our people and to bring scientific knowledge close to the Torah. Not so in our time. Now we are obliged to bring the Torah and simple faith close to science. We must return the hearts of the sons to their fathers, and the hearts of the fathers to sons, so that they [the fathers] do not despair that they [the sons] have left the covenant of their ancestors because they abandoned some superstitions and religious practices that are not among the foundations of the religion and seem strange to people who are educated (Slonimsky 28.11. 1892, p. 1069).

Slonimsky claimed that times had changed, and it was no longer possible for the Jews and their beliefs to remain estranged from the standards of reason and logic. Jewish boys and girls studying in public schools were increasingly learning the state languages, and through that, they were able to learn the sciences, and looked critically at anything that was irrational. In Slonimsky’s opinion, Jewish traditions based on legends would only alienate the young generation from the Jewish world and create a rift between them, and therefore should be abandoned.

**Slonimsky’s Connections with Jewish Youth**

When Slonimsky turned 70, he received many blessings. He reported that many of those who honored him were professionals from many fields who expressed their gratitude to him for opening the door to education and science for them.

And thanks to God, in my old age I have seen that the seeds I sowed in past years have borne much fruit [...] Now, many people in our nation who have surpassed me in their achievements, have become engineers, doctors, lawyers, and so on, and even today they give me their blessings, because my hand first led them along their path, and in their youth, the messages in my books spoke to their hearts (Slonimsky 9.3.1880, p. 71).

Through his science books, his informal contact with the students of the Beit Midrash in Zhytomyr, and of course through *HaTzefira*, Slonimsky was able to directly and indirectly influence many young Jews who later specialized in science and modern professions. He was perceived as someone able to help anyone, young or old, with an interest in science and mathematics.[[71]](#footnote-71) His main influence, however, was on Jewish youth, many of whom admired him (Bauer 2015, pp. 71–90). Beginning in the 1880s, his birthdays became public celebrations.[[72]](#footnote-72) Many young Jews participated, and the experience of meeting their hero was overwhelming, as described by David Frischmann:

I stood, trembling with awe and gazed at him in amazed reverence, and almost did not dare to approach him. I was a sixteen- or eighteen-year-old boy with my bundle of wild dreams and thousands of poems and hopes, and he was seventy-five years old: an engineer, astronomer, chemist, naturalist, inventor, and so on. What was this man not? A complete encyclopedia. At least we thought so. (Fischmann 1914, p. 22).[[73]](#footnote-73)

Various evidence suggests that Slonimsky’s books reached many young people and influenced their spiritual and professional development. As mentioned, Ahad Ha’am used the Slonimsky’s book *Yesodei Chochmat Hashiur* to learn basic mathematical concepts, and Eliezer Ben-Yehuda studied his books (see above). Buki-ben-Jogli described his first exposure to Slonimsky’s book *Kochva Dashvit* and *HaTzefira* magazine, when he was 15-years-old, as an event that shook his world and changed his perceptions (see above). When he was 19, Buki-ben-Jogli left the Beit Midrash where he had been studying and moved to the Beit Midrash in Zhytomyr headed by Slonimsky (Buki-ben-Jogli 2017, pp. 92, 102–105).

However, Buk-ben-Jogli continued his education and secretly read Hebrew grammar and rhetoric books during the night hours. He was very drawn to the fields of accounting and engineering. Some young Jews turned to Slonimsky personally for a sympathetic ear and comforting words in the face of difficulties they faced in their social environment. One example was Elimelekh Wechsler-Besredka (also known as Ish Na’ami, 1842–1919), from the Balta district of Russia and a descendant of the family of the Baal Shem Tov. In his memoirs, he recounted hardships that befell him in his childhood. When he was 11-years-old, his father died and he and was sent to live with his uncle in Uman. He received a strict traditional education from his uncle, and was expected to become a great rabbi. But he was drawn to Haskalah ideas, and at night, in secret, he would read books of Hebrew grammar and rhetoric. He was very interested in mathematics and engineering, and his encounter with popular science texts, when he was about twenty-years-old, changed the course of his life. After reading David Friesenhausen’s algebra and engineering text *Sefer Clil Heshbon* (published in Berlin, 1796), Wechsler became aware of Slonimsky’s books and developed great admiration for him: “His name was always on my lips, because the source of wisdom is found only with him, and all day I am talking about the wisdom of algebra,” (Sokolov and Zagorodsky 1889, p. 143). In this way, he aroused the envy of his Hasidic peers. He abandoned his plan to become a rabbi and divorced his wife. At the age of 23, Wechsler went to Zhytomyr to study at Slonimsky’s Beit Midrash, which combined sacred studies with secular subjects. Wechsler described his moving meeting with Slonimsky, during which he poured out his heart and described the price paid for his interested in knowledge from the outside world. Slonimsky reassured him that his fate was no different from that of many Jews, including himself:

Be silent, pleasant young man [...] because before your words were on your tongue, I already knew everything that happened in your short and difficult life. I foretell that I will give support to you and your companions of your generation. There have always been and still are many young men who are helpless in the face of their persecutors. My history and the history of people like you will rise on the scales and remain together. In my memoirs, I could put your name instead of my name and the name of your city instead of the name of my city, and here, all your stories have already written by me (Sokolov and Zagorodsky 1889, p. 142).

Wechsler received emotional support and true help from Slonimsky. But due to pressure from his mother, he was eventually forced to part from Slonimsky and leave Zhytomyr. He had to uproot himself to Odessa, where he lived for many years in poverty, devoting his time to learning foreign languages and sciences on his own. Yet all the time, he yearned to return to Zhytomyr. He was not a writer, unlike others in the Haskalah, but when he heard that Slonimsky had re-established *HaTzefira* in Berlin, he decided to write for the journal:

The time has come that I can repay the wise Slonimsky one thousandth of all he has given me, for all his wise books that guided me along the path of knowledge, which I loved. I will do this, then, and I will be his city of refuge. I tried my best, and sent him articles about my great city and the many people and animals living in it, and this wise man was pleased with my words, and he did not reject them as worthless. I was happy because I found a way to return something to my teacher and hero, and repay the blessings that he gave me. From then on, I began to speak in public and not be ashamed [...] Now, if something of value can be found in my article [...] give thanks not to me, not to me, but to Slonimsky, because he is the wise one who gives voice the mute. This is the proof, because many of my articles were written for *HaTzefira* (contemporary letter) and far, far away my name will be denigrated in another journal (Sokolov and Zagorodsky 1889, p. 146).

Wechsler considered Slonimsky a central figure in his life remained loyal to him even many years after they parted ways. Wechsler’s words indicate that Slonimsky and his writings were a bridge to the world of modern knowledge for many, especially adolescents and young adults. Wechsler was not his only admirer. As he himself implied in his words to Wechsler, Slonimsky influenced the path of many of from that generation.

Another example of Slonimsky’s influence on young Jews is Yom Tov Lipman Lipkin (1846–1876). Lipkin was the son of Rabbi Israel Maslant (1810–1883), founder of the *musar* movement in Lithuania. As a youth, Lipkin was drawn to the sciences, but like many of his peers, he could only learn about these subjects by reading Hebrew science texts in secret. At some point, reading these books was not enough for him. He left home and went to Germany to specialize professionally in these disciplines. He studied at the Universities of Königsberg and Berlin, and received a Doctorate in Philosophy from the University of Jena and a Doctorate in Mathematics from the University of St. Petersburg. He later specialized in mechanics, and in 1868 invented a device that could convert rotary motion into straight-line motion, solving a major challenge for developers of the steam engine (Anonymous 1885, pp. 259–260).

Lipkin’s life circumstances and scientific work were similar to those of Slonimsky; both came from a traditional background, dedicated their energies to the sciences, and gained the respect of non-Jews for important inventions. It can be assumed that among the Hebrew science books he read in his youth were those of Solonimsky, which then enjoyed a widespread readership. When he was about 18-years-old, he recounted that he sent letters to Warsaw and Zhytomyr, but the latter did not respond to him ([Anonymous] 1885, 262). In the 1870s, the two men finally established a correspondence, and Lipkin even published an engineering puzzle in *HaTzefira* (Lipkin 9.12.1874, p. 168. See more on this below).

Slonimsky’s role as the head of the Beit Midrash for rabbis in Zhytomyr enabled him to establish direct contact with modern young Jews, thereby imparting to them his perception of the desirable modernization model. Another example was Avraham Jacob Paperna (1840–1919), one of Slonimsky’s students at the Beit Midrash, who wrote an article for *HaMelitz* about the calculator that his teacher invented, and which was praised by scientists in Berlin and St. Petersburg. Paperna described Slonimsky as an exemplary figure of an Eastern European Jewish scientist and as a role model for the younger generation:

Indeed, all the people of our nation who have had the honor to come in secret to visit these hallowed halls, will not be ashamed to speak in public with all the wise men of Europe. To prove the truth of our words, it is enough to recall the name Slonimsky – the Jewish Humboldt – just that! The leader of our Beit Midrash is a man whose extensive knowledge of natural history and science has earned him respect and prestige [...]And whoever has come to study the secrets of the wise men of our time and does not know the name Slonimsky? They studied his beautiful and profound books, read his valuable essays in journals for Jewish children, especially in the journal *HaTzefira* [...]And in you, virtuous *HaMelitz*! Please inscribe these words on a tablet and announce this good news at the gates of my people. For why are these Hebrew journals, recent journals in this wonderous work, only for us, born on the knees of our people? Why do the youth among the Children of Israel not all know about the works of this researcher-rabbi and his powerful and heroic deeds in the scientific world? (Paperna 22.1.1863, pp. 191–192).

Paperna is known for his criticism of poetic Hebrew literature, which he did not think successfully described the realities of the Jewish world (Prush 1993, pp. 212–216). Paperna was undoubtedly influenced by radical criticism of poetic literature in Russia (Zunser 2005). It is difficult not to be impressed by the similarities between Paperna’s perspective and that of Slonimsky, who, as mentioned, avoided a poetic writing style. It is likely that Paperna was inspired by Slonimsky’s scientific writing style, which emphasized linguistic clarity.

Slonimsky’s journal *HaTzefira* became a major channel for disseminating scientific knowledge and ideas among Jewish youth, and for modelling the scientific-modern writing style. As noted by Yom Tov Lipman Lipkin, who published an engineering puzzle in Slonimsky’s journal, the goal was to pique the interest of Jewish youth and lead them to the world of science:

I want to expand here upon the questions about engineering that *HaTzefira* readers propose. Because I think that the purpose of these questions is other than to search for the young people of Israel who possess spirit, ingenuity and the solutions for whom the rest of the spirit and the solutions of their own to awaken those to open the doors of your questions and proceed calmly forward on the path of wisdom [...] so that the young Bnei Israel in Russia and Poland will also join the community of builders and workers in the field of wisdom. Indeed, some youth among our faith have a special talent and understanding for studying nature and mathematics. […] but without a teacher and manager of their talents, they will grope in the darkness to find the door of wisdom, they will knock on the door of *HaTzefira* and *HaMelitz*. But although they wave the banner of wisdom, they have not yet entered the gates of wisdom. (Lipkin 9.12.1874, p. 168).

In “Teacher and Manager,” Lipkin argued that only young Jews who have given up hope of entering practical professions turn to poetry and literature. Soon after, in an article in *HaTzefira*, Moshe Leib Lilienblum (see Chapter 1) supported this argument, saying that modern literature was harmful and to Jewish youth and would lead to their destruction, but learning about nature, which he called “the mother of all wisdom” would guide them on a path towards being beneficial to themselves and their society:

The truth is that it is not possible for everyone to become scientists who study nature; but any youth who wastes his days in vanity, with songs and rhetoric and so on [...] it would better for him to fill his belly with words of wisdom that endure over time and for generations, that have true benefit for people, and that fill the soul even in old age. Therefore, **every young person who has permission** to devote his energies to education, that is: who is confident that he will find a decent livelihood when he grows up [...] he needs to abandon poems and rhetoric and empty books, and turn to science, and especially to the study of nature, and then he will be truly enlightened. (Lilienblum 6.1.1875, p. 8, emphasis in the original).[[74]](#footnote-74)

Many members of the younger generation were not satisfied with passively reading *HaTzefira* but internalized the model it offered and produced their own scientific texts in Hebrew. Slonimsky became an address for young Jews who composed Hebrew texts on science. They sent him their articles to be published in his journal, or to get his opinion regarding their publication in another context. Slonimsky’s approach to these young people was one of respect. Ben-Tzion Katz described his astonishment when he discovered that Slonimsky published excerpts from the essays he wrote and sent to him at the age of 16, to which Slonimsky added his own commentary (Katz 1983, p. 15).

This experience of publishing science articles in *HaTzefira* allowed some of the young authors to perfect their writing style, and eventually to write entire Hebrew books on science. Slonimsky often gave them letters of recommendation, a kind of substitute for rabbinical endorsements, which they proudly displayed at the beginning of their books. For example, Yitzchak Isaac Atkin (1859–1879) published articles in *HaTzefira* on solar energy (in 1878) and on magnetism (in 1879), and later published a zoology book called *Torat Hachaim v’Hezyonotehem* (*The Theory of Life and its Visions*)(St. Petersburg, 1880).

S. J. Abramowitch (a.k.a. Mendele Mocher Sforim) wrote essays on natural sciences for *Hatzifira* (Mendele Mocher Sforim 13.3.1862, p. 44), and used the journal to promote the three-volume book of zoology that he translated into Hebrew, *Toldot Hateva* (*Natural History*) (1862, 1866, 1873).[[75]](#footnote-75) Slonimsky gave Abramowitch a recommendation, which he published at the beginning of the book. Moshe Feldstein, who also published in *HaTzefira*, also received a recommendation from Slonimsky for a book he published on animal physiology (Feldstein 1895). In 1880, Slonimsky wrote a recommendation for a book titled *Miflaot Hamayim* (*The Wonders of Water*) by Frenkel, apparently Jacob Frenkel (1848–1916) who had published scientific articles in his journal.[[76]](#footnote-76) Slonimsky praised the book and wished Frenkel success in overcoming the challenges of publishing, but this book was never published (Frenkel 1972, p. 462). Nachum Sokolov, also included a letter of recommendation from Slonimsky for a geography text he translated into Hebrew, *Mitsuki Eretz* (Murray 1878). At the beginning of the young Nehemiah Dov Hoffmann’s book, *Ma’aseh Chuchamim* (*Acts of the Wise*)*,* a scholar who has already been mentioned here, there were three endorsements, including one by Slonimsky, who noted that Hoffmann presented his book to him before publication to get his opinion on it: “And behold, today I read the valuable book *Ma’aseh Chuchamim*, the whole of it is beautiful and pleasant and will attract the readers’ hearts, as I have always appreciated your many essays in *HaTzefira* and *HaMagid*,” (Hoffman 1897, p. V).[[77]](#footnote-77)

Israel Ze’ev Sperling, who translated Jules Verne’s book and published it under the name *B’mitzilot Yam* (see Chapter 5), said that he also wrote scientific books in Hebrew on astronomy and natural history, and was proud that they had already received Slonimsky’s recommendation: “Approved as being good and beneficial by the well-known astronomer and scientist, Rabbi Haim Zelig Slonimsky, may God preserve and protect him!” (Verne [1870] 1876, “To the Readers,” p. 4).

Slonimsky, therefore, epitomized the changes that occurred in the perceptions about science and technology in the Jewish world in his time. His extensive prolonged literary activity throughout the 19th century reveals that the early tendency to establish Jewish connections had more recently been replaced by a “neutral” scientific discourse aimed at preparing the younger generation for the world of work in the modern world. Slonimsky is an example of the ways in which Jewish popularizers of science would disseminate scientific and technological knowledge, whether through formal education, by publishing Hebrew books and journals, or by cultivating personal relationships. All of these had an immense impact on the attitudes towards science and technology among Jewish youth at the beginning of the 20th century.

**Epilogue**

In this book, I set out to help the young among my people by revealing to their conscientious eyes the wonders of nature’s works in a simple way, which was not possible for many writers before me. From children’s amusements and their talk, the Torah will emerge, established in strength by the Hebrew youth who will no longer hear the attack on the praise of nature. The Jewish child who has not yet learned of the might and glory of nature [...] will be astonished in his heart this spectacle [...] of wonderful words that are lofty and elevated [...] to which he has not opened the gates of his soul, and he will long to further explore the wonderous and lofty secrets that had previously been hidden from him [...] And so he will go from strength to strength, and ascend the rungs of the ladder of wisdom and knowledge, until he will be praised and honored for all his days (Anders 1875, “To the Reader!” [3]).

These words by Yitzhak Anders in the introduction to his book *Siporei Elyashiv* summarized the traits of popular Hebrew science literature written in the18th and 19th centuries for European (Ashkenazi) Jewish children and youth. Scientific and technological knowledge came to be seen as a path to modernization and a o rise on the social ladder, for the members of the younger generation, and this is so that they will be able to reach “many days to fame and glory,” enabling them to achieve a life of success and honor. No less than that, the recognition spread that Hebrew science literature should be accessible, easily readable, practical, enjoyable, and age-appropriate. The authors of the scientific texts for children wanted to design them to convey information in a pleasant and entertaining manner in order to make it easier for Jewish children to acquire this knowledge, and to develop their curiosity and an attraction to the fields of science and technology. The development of Hebrew popular science literature progressed, following trends that characterized children’s writing, including science texts, in the modern era.

This analysis of popular science literature for children and youth that appeared in Europe in the 18th and 19th centuries shows the transformations that took place in the perception of science and technology in the modern Jewish educational space. Science literature for non-Jewish children and youth, both textbooks used in formal educational settings and leisure reading material, expressed the new prestige given to these subjects in Western society. This new concept of science and technology also conquered many circles in the Jewish world and modern Jewish educational settings. Authors and educators began to write in Hebrew about science and technology issues for Jewish children and youth, while translating, processing, and borrowing content and models from textbooks and leisure reading books for non-Jewish children and youth. In composing these texts, the Jewish educators combined traditional Jewish knowledge with modern bodies of knowledge, thus creating bridges creating bridges between the Jewish world and its surroundings. They pointed out the importance of scientific knowledge for strengthening Jewish faith and morality according to the physico-theological model. Their focus was on topics that related to Jewish tradition and roots, with the aim of strengthening their readers’ Jewish identity. Like the non-Jewish authors and educators of their time, they saw science and technology as fertile ground on which the next generation would thrive, and incorporated various ideological, social and national concepts into Hebrew popular science literature.

Looking at Hebrew texts during this period shows the sharpening of the boundary line between literature for children and adults. The early texts examined here often addressed a general Jewish audience, from old to young. Gradually, the authors adopted and integrated educational principles and literary styles from non-Jewish modern children literature of the time. Elements that characterize modern children’s literature began to appear more and more, such as directly appealing to young readers, focusing on topics perceived as particularly appealing to children, including illustrations and diagrams, and adding fictional stories integrated into discussions of science and technology. Particularly notable was the representation of animals in children’s texts. Given that in the past, writings about zoology and animals had been on the fringe of Jewish culture and literature, Jewish educators had to develop modern textual patterns and scientific terminology in Hebrew. While this change was innovative, conservative attitudes towards human-animal relations were still evident. Although expressing empathy for animals in order to cultivate children’s moral character had become common in Western children’s literature, this attitude began to appear in Hebrew texts for children and youth only at the beginning of the 20th century.

At the same time, science and technology were prominently adopted by the authors, almost without reservation. The Jewish authors did not challenge the prevalent concept that spread during this period in Western culture that scientific and technological knowledge would propel humanity forward, and therein lay hope and happiness for the Jews as well. However, at the turn of the 19th and 20th centuries, some people began to express nostalgia and longing for the past, and warned that this unabashed admiration for science and technology posed an inherent threat to Jewish youth’s religious and cultural identity.

The fact that so many Jewish authors wrote about science and technology for children and youth indicates the importance that became attributed to these subjects. Haim Zelig Slonimsky was a prototype for these agents of science and technology, and served as a conduit for the dissemination of this knowledge to the younger generation. His approach to education and his relationship to the sciences underwent transformations over the years, and the educational concept he developed reflect deep processes of change in the role that science and technology played in the lives of the Jewish youth during the 19th century.

The sciences and technology, which began to be accessible to young Jews also through other channels outside the Jewish world, gradually became identified with the world of the younger generation and distinguished them from. This situation had an impact the topics addressed and methods of presenting information in science literature written in Hebrew. The educational-scientific ethos that originated in the Haskalah movement at the end of the 18th century was integrated into the ideology of the national revival movement a century later. The great successes of the Jewish scientists born in Central Europe at the beginning of the 20th century reinforced this trend, and encouraged Zionist leaders to establish institutes for science education in Israel.[[78]](#footnote-78)

Reconstructing a portrait of the Hebrew science literature that appealed to children and youth, as well as analyzing the contexts in which it was created, this book has shed light on the novel and special role science and technology played in modern Jewish culture. Its creators worked to strengthen, assimilate and weave the issues of science and technology into creators of these modern Jewish culture, thus contributing to the establishment of science and technology as a fundamental component in the emerging Jewish and Zionist national identity.

1. On the “Jewish mind” see Cochran and Harpending 2006; Katz 2002. For more on the development of this myth in the modern era, and the lack of an adequate explanation for the meteoric success of Jewish scientists at the turn of the 19th and 20th centuries, see Kogman 2013b, pp. 2­–3. For an extended discussion of this, see Efron 2014, pp. 1­–11. [↑](#footnote-ref-1)
2. While in modern times, the link between science and technology is widely accepted, there has been research and debate regarding the nature of their relationship and the extent of their collaborative and mutual contributions. See more on this in Chapter 5. [↑](#footnote-ref-2)
3. Although there were calls to reform Jewish educational teaching methods beginning in the 16th century with the Maharal of Prague, Jewish education in the Ashkenazi community remained fundamentally unchanged (Kleinberger 1962; Toriansky 2010). More significant reforms took place in the Sephardi Jewish education system, such as in Amsterdam. Alongside religious studies, the Sephardi schools also taught Hebrew, the state languages, and general secular subjects (see?? WHAT IS בס ת"ם). The Sephardi educational model influenced Ashkenazi scholars, such as Naphtali Hirz Wessely (Feiner 2011, p. 103; Klausner 1930 vol. 1, pp. 110­–111). [↑](#footnote-ref-3)
4. Efron (2021, pp. 8­–11) described the complex and varied ways in which Jewish scientists entered and were integrated into the scientific world in the 20th century. [↑](#footnote-ref-4)
5. As mentioned earlier, the extraordinary success of Jewish scientists in the 20th century have not yet been adequately explained, but many researchers see the Jewish Talmudic tradition as one of the factors that led to it. [↑](#footnote-ref-5)
6. See more on Aaron David Bernstein and his books in Shavit and Reinherz 2011, pp. 136­–138. [↑](#footnote-ref-6)
7. On this subject, see the memoirs of Chaim Ze’ev Margaliot (1840­–1911), a student at the Beit Midrash in Zhitomir, who compared his experiences of studying science with a teacher who understood the relevant teaching materials and methods, in contrast to a teacher who did not (Margaliot 1895, pp. 36­–38). for a source on the rabbinic Beit Midrash study halls as a route to modernization and the acquisition of sciences see Ibn Notzetz 22.9.1864. [↑](#footnote-ref-7)
8. Many people affiliated with the Haskalah read secular Hebrew texts aloud in the same way they read sacred texts; see Veidlinger 2009, pp. 70­–73. [↑](#footnote-ref-8)
9. According to Eliyahu HaCohen, Weizmann recounted this memory in a speech to an assembly in Kharkiv in October 1902 (Weizmann 1986, pp. 402­–405), but I was not able to locate the text of this speech. HaCohen noted that Rabinowitz's books opened a window to science for many residents in this region. Hebrew writer Reuven Brainin (1862­–1939) also attested to the importance of Rabinowitz's works in spreading the sciences among Jewish youth at that time (Brainin 1999, p. 30). WHAT IS THE REFERENCE FOR HACOHEN? [↑](#footnote-ref-9)
10. See the analysis of the profile of the founders of the Jewish Culture and Science Association, which was established in the second decade of the 19th century (Livna-Freudenthal 2018, pp. 70­–78). [↑](#footnote-ref-10)
11. See the description by Meïr Halevi Letteris (1868, p. 84) of how young Jews were persecuted for reading modern literature in German. He mentioned, for example, a friend who was reprimanded by his father for this. [↑](#footnote-ref-11)
12. Mendel Barslev (1761–1827) was one of the founders of *Hame’asef* and the author of Hebrew textbooks. [↑](#footnote-ref-12)
13. Moshe Mendelssohn (1729­–1786), one of the leaders of the German-Jewish Haskalah movement. [↑](#footnote-ref-13)
14. The serialized stories appeared in *Ivri Anochi* from April to June 1890 (issues 14­–19). [↑](#footnote-ref-14)
15. Written by Yosef Yehuda Leib ben Yehiel Michal Zusnitz (1837­–1910), see Shavit and Reinherz 2011, pp. 84­–85. [↑](#footnote-ref-15)
16. See more on the traditional Ashkenazi education system below. Research on childhood in European Jewish society is still in its infancy and further research is needed to clarify its characteristics (Baumgarten 2005; Brenner 2018; Goldin 1998; Zelkin 2008b.) [↑](#footnote-ref-16)
17. See, for example, a letter dated 1822 by Shmuel David Luzzato (1800­–1865), who described the opposition of Jews at that time to the heliocentric theory (Luzzato 1882, p. 112). [↑](#footnote-ref-17)
18. An exception was the German-Jewish zoologist Marcus Eliezer Bloch, described in more detail later. [↑](#footnote-ref-18)
19. There is extensive research literature on Jewish education and its role in modernizing the Jewish world: see Etkes 1993; Feiner 2011; Feiner, Shavit, Neimark-Goldberg and Kogman 2014; Gerber, Hakka and Katz 2017; Pelli 1988; Zalkin 2000, among many others. [↑](#footnote-ref-19)
20. This disagreement between traditionalists and Haskalah supporters was strongly expressed in the Haskalah manifesto by Naftali Hertz Wiesel (1725­–1805) *Divrei Shalom v’Emet (Words of Peace and Truth).* See Feiner 2011, pp. 91­–95). [↑](#footnote-ref-20)
21. Many studies have been written about the Haskalah attitude towards Hebrew (Alder 2016; Schatz 2009; Zwiep 2003). For a discussion of the difficulties in using Hebrew as the writing language of scientific essays, see Kogman 2013b, pp. 28­–37. [↑](#footnote-ref-21)
22. Barash’s main success was in disseminating scientific knowledge in the Romanian language (Klausner 1930, vol. pp. 134­–136. [↑](#footnote-ref-22)
23. Even before arriving in Berlin, Satanow published a book on Kabbalah by Haim ben Yosef Vital Etz Haim (Kurtz, 1922) and wrote several illustrated pamphlets (Kugman 2014, pp. 93–101). [↑](#footnote-ref-23)
24. Satanow was also described as a frivolous imposter in Pelli 1988, pp. 84–85; Werses [1963] 2000, pp. 163, 170–171. [↑](#footnote-ref-24)
25. For comprehensive analyses of Satanow’s books and the distinctive characteristics of his writing, see Altmann 1973, pp. 351–352; Benji 2017; Feiner 2014, pp. 32–33; Pelli 1988, pp. 114–115; Rezler-Bersohn 1980; Shavit 2014, pp. 47–48; Werses [1963] 2000. [↑](#footnote-ref-25)
26. [↑](#footnote-ref-26)
27. See more about Satanow’s use of metaphors based on optics in Benavji 2017, pp. 32–33. [↑](#footnote-ref-27)
28. See more on the use of this model in Satanow’s work in Klausner 1930, first part, 170; Flay 1988, 122. [↑](#footnote-ref-28)
29. The author dedicated the third chapter of the book to the sciences (Bock, 1811, pp. 132–173; Bock 1812, pp. 88–148). See more about this text below. [↑](#footnote-ref-29)
30. This refers to the fourth chapter on religious education and the importance of faith and morality (See Bock 1812, pp. 139–154; Bock, 1811, pp. 132–136). [↑](#footnote-ref-30)
31. Although Perl did not write them, he was responsible for their publication. He compiled these issues in collaboration with other Haskalah authors and teachers (Haberman 1978, p. 331; Mahler, 1961, pp. 203–204). [↑](#footnote-ref-31)
32. In the National Library of Israel, a handwritten draft of the issue of *Tzir Ne’eman* for 1819 has been preserved, but no discussion of the sciences appears in it. [↑](#footnote-ref-32)
33. Although the Hebrew phrase for staircase is used in the original, it is known that this refers to a watch because Luria put in parentheses the transliteration into Hebrew letters of a German phrase “(Oher).” [↑](#footnote-ref-33)
34. After Bloch’s death, two more books in the series were published: *Zahav S.B.H* (his initials) (published in Lemberg, in 1355), dealt with Portugal and Spain and was based on Bloch’s notes, and another volume of *Shvilei Olam* (published in Lemberg in 1856) dedicated to England, the Scandinavian countries, Holland, and Belgium. These books were compiled and edited by Avraham Mandel Maher (1815–1868). The discussion here will focus only on the first two volumes of *Shvilei Olam*. [↑](#footnote-ref-34)
35. Other Haskalah writers also translated or adapted this German text. See more on the original and its adaptation by Lindau in Kogman 2013b, 49–86; Kogman 2009. [↑](#footnote-ref-35)
36. The reasons for Lindau’s choice of this term to describe the fracture can be found in Talshir 2012, 25. [↑](#footnote-ref-36)
37. Soldin presented his book as the first part of a planned series called *Bechinat Kol HaPeilim*, but it seems this is the only volume he ultimately published. See more on this author in Feiner 2010, pp. 192–193; Jansson 2008. [↑](#footnote-ref-37)
38. A porcupine was also called a “thorny pig” in Lindau’s *Rešit Limmudim* (Talshir 2012, p. 118). On the difficulties in choosing a Hebrew scientific-zoological nomenclature, see Kogman 2013b, pp. 33–34. [↑](#footnote-ref-38)
39. Soldin used the terms “tiger” and “leopard” interchangeably, and it is possible he was unaware of the distinction between them, perhaps due to the lack of clarity in the Hebrew zoological nomenclature during this period. [↑](#footnote-ref-39)
40. 40 Wolfsohn’s article was based on various sources, including the German *Natural History for Children*, also used by Lindau (Kogman 2013b, p. 60). [↑](#footnote-ref-40)
41. See the perspective method developed by Pastelotzi as discussed in Mesquida et al 2017, 1092, 1097. [↑](#footnote-ref-41)
42. See, for example, animal parables in sources such as *Avtalyon* (Wolfsohn 1790b, pp. 45–52); *Moda l’bnei Yisrael* (Bock, 1812, pp. 83–87); *Limudei Hamesharim* (Ben-Ze’ev 1806, pp. 41–49); *Maslul Halimud* (Bondi 1851, pp. 42–48), and even an entire book dedicated to this: *Mishlei Igor* (HaCohen 1799). [↑](#footnote-ref-42)
43. See, for example, his description of the human ape in *Rešit Limmudim* (Lindau 1788, pp. 22–27). For more on human descriptions of apes in Hebrew texts during this period, see Idelson-Shein 2010, pp. 81–85; Idelson-Shein 2014, pp. 75–77). [↑](#footnote-ref-43)
44. See an extensive discussion on technology in the fifth chapter. [↑](#footnote-ref-44)
45. In the continuation of this text, Bock argued that humans, unlike animals, are endowed with the ability to create abstract concepts and exercise moral judgment, echoing the ideas of the German philosopher Immanuel Kant (Bock 1812, pp. 134–137). [↑](#footnote-ref-45)
46. Emden was not the first to do so. Already in the Babylonian Talmud, widows were prohibited from keeping a pet dog due to concerns of impropriety (Shemesh 2007, pp. 132–133). [↑](#footnote-ref-46)
47. Lindau also presented the cat in his book in a similar laconic vein (Lindau 1788, p. 31). [↑](#footnote-ref-47)
48. During the turn of the 19th and 20th centuries, as part of the literary and cultural activity of the revival movement, a wide corpus of Hebrew texts for children appeared: textbooks, series of pamphlets, children's newspapers, and children’s supplements in Hebrew newspapers. Warsaw and Odessa were the centers of this literary activity, but these publications also appeared in other places such as Vilna, Berdichev, Piotrków, Lugansk, and more. The research on this corpus is still in its early stages, and the discussion of the many animal representations appearing in it requires special attention that is beyond the scope of this book. On the child-animal relationship portrayed in these texts, see Ferger and Wagner 2020. [↑](#footnote-ref-48)
49. See more on the attraction to the exotic in Hebrew literature of the period in Idelson-Shein 2014, p. 10. [↑](#footnote-ref-49)
50. In 1862 (7th of Shevat 5622), the editor of *HaTzir* enthusiastically announced the upcoming publication of a journal by “the greatest rabbi on this subject in all the world,” by which he meant *Hatzifira* founded by Haim Selig Slonimsky (see Chapter 6). Weinert said the *Hatzifira* and *HaTzir* had similar goals and he urged his readers to support Slonimsky and buy *Hatzifira* as well (Weinert 1772, issue 19, p. 76). [↑](#footnote-ref-50)
51. On innovations in the field of electromagnetics and the telegraph see, Schiffer 2008, and on Baggs’s patent, see Schiffer 2008, p. 390: footnote 39. Many people tried to develop this telegraphic device, including Haim Zelig Slonimsky, who had some success in this endeavor (see Chapter 6). [↑](#footnote-ref-51)
52. Generally, the same works by Verne were not translated into both Hebrew and Yiddish, perhaps because at the time, the target audience for Hebrew and Yiddish literature was largely the same. Exceptions were Verne’s short story *A Voyage in a Balloon*, which was translated into both Hebrew and Yiddish in 1851. Translations of his works into Hebrew and Yiddish appeared almost simultaneously: *A Drama in the Air* (translated by Meir Ze’ev Singer into Hebrew and published in Berdychiv in 1895), and *Der Mazioner in Zibentin Himmel* (translated by Moshe Zuckermanen into Yiddish and published in Paris in 1896). [↑](#footnote-ref-52)
53. Ofek (1979, p. 177) noted that Sperling was born in the Sowalk region of Poland and used Russian translations of Verne’s books as source texts. [↑](#footnote-ref-53)
54. Two years after the publication of *Siporei Elyashiv*, in 1877, Anders translated a book by Grigory Burgov from Russian to Hebrew, *Sifro hanilkad b’sichitot anshei resha: Sefer yisudato b’safa Russi.* In 1886, he published a translation a German book by Franz Hoffmann titled *Ekev anava: Hu hasipur hamihalel Moishele asher haber b’safa Ashkenaz*. In both cases, Anders explicitly stated that he had translated, not written, these works. [↑](#footnote-ref-54)
55. Buki-ben-Jogli was the name of the head of the tribe of Dan who appears in the Bible in *Bamidbar* 9 (Numbers). On the reason for Katznelson’s choice of this pen name Buki-ben-Jogli see Katz 1947, p. 178. [↑](#footnote-ref-55)
56. Ze’ev Gris noted that Buki-ben-Jogli did not enjoy great success in expanding scientific and theoretical literature in Hebrew, despite many years of effort (Gris 2002, pp. 122–123). [↑](#footnote-ref-56)
57. Buki-ben-Jogli’s son published this book after his father's death, and claimed that his father worked on it for some thirty years (Buki-ben-Jogli 1928, p. 4). [↑](#footnote-ref-57)
58. The collection *Heziyonot v’harhorim (Visions and Reflections)* included some works previously published in Hebrew journals (Katz 1947, pp. 229, 252). In a letter to David Frischmann 12 Tevet 5661 (winter 1901), Buki-ben-Jogli said that he intended for the stories in his collection, including “Adonei Hasadeh” (“Lords of the Field”) to be read by a young audience (Buki-ben-Jogli 1931, pp. 13–14), as seen in his use of vowel markings for the Hebrew letters, and the didactic tone. Buki-ben-Jogli said that the vowel markings were essential for young readers who were learning Hebrew, and insisted on it, through his work with the *Hovevei Safat Ivri* (Society of Lovers of the Hebrew Language) (Katz 1947, pp. 254–255). He expressed strong interest in methods for teaching Hebrew in the introduction to another children’s book, *Sichot L’timunot (Conversations with Pictures)* published in 1907 in St. Petersburg, funded by the Mirabei HaHaskalah society, of which he was a member. [↑](#footnote-ref-58)
59. The article in *Olam Katan* included eulogies for Slonimsky (Anonymous 17.5.1904), and a description of his funeral (Anonymous 18.5.1904), which had been published in two previous issues of *Hatzifira*. [↑](#footnote-ref-59)
60. *HaTzefira* was published for a few months in 1862, ceased publication, then was renewed in 1874 in Berlin. In between, Slonimsky served as the head of a rabbinic Beit Midrash in Zhytomyr. *HaTzefira* was published in Warsaw, continuously from 1875 until the mid-1880s, still under Slonimsky’s leadership. On *HaTzefira’s* development and editorial policy see Sofer 2007. [↑](#footnote-ref-60)
61. For more on Slonimsky’s revered place in the Jewish world, see Shavit and Reinhertz 2011, pp. 11–12. He was also respected by traditional Jews (Akavya 1972, p. 391; Bauer 2015, pp. 72–73; Robinson 1983, p. 61). Shmuel Alexandrov (1865–1941), a member of the Zionist Mizrahi organization, dedicated his book *Aggadat Aish Min Hashamayim (A legend of fire from heaven)* to Slonimsky on his 83rd birthday, and cited Slonimsky in his Talmudic discussions (Alexandrov 1895, p. 28). [↑](#footnote-ref-61)
62. Antony Slonimsky heard this story from his uncle. He stated that one of these scientists later published an article in a German journal in which he claimed that the rabbis of Lithuania had mastered knowledge of mathematics and astronomy that originated in the ancient world (Slonimsky 1961, p. 16). [↑](#footnote-ref-62)
63. Slonimsky relied on the words of the Rambam when he determined that no miracle occurred during Hanukkah and that it is a legend. His words against the existence of the miracle of the oil jug sparked great controversy, and he continued to publish lists in the following years, lists in which he grappled with those who argued against him. Books were published both in favor and against Salomonski’s claim, such as, *Agadat Pach Hashemen* (*The Legend of the Oil Vessel*, published in Warsaw, 1892), and *Emunat Hachamim (Faith of the Sages*, published in Vilna, 1752). WHO WROTE THESE which was for, which against? He was even attacked personally, due to his position on this issue. Posters denigrating him were hung in synagogues and seminaries, and there was a campaign to boycott his journal, as Slonimsky documented in his book *Milashni Biseter v’Agudat Michtavim* (*Speaking in Secret and Legends of the Writings*) *(*1894, pp. 5–13). [↑](#footnote-ref-63)
64. An overview of the articles published in *HaTzefira* in 1887 illustrated his emphasis on the technological innovations of his time (Slonimsky 6.5.1887). [↑](#footnote-ref-64)
65. On Sarah Slonimsky’s cultural activities alongside her husband see Bauer 2015, p. 81. [↑](#footnote-ref-65)
66. Frischmann described how he had composed a poem in honor of Slonimsky’s birthday, but when he read it to him, Slonimsky was unable to understand or appreciate it (Frischmann 1944, pp. 26–27; see also Sofer 2007, pp. 66–67–66, 73–74). [↑](#footnote-ref-66)
67. Dmitry Ivanovich Pisarev (1840–1868) was a Russian nihilist radical. [↑](#footnote-ref-67)
68. On Tschernowitz, see Karsel 1965, pp. 43–44. On the author’s pen name “Sfog” see Hayut 1933, p. 232. [↑](#footnote-ref-68)
69. On the tensions between the editors of these two Hebrew journals, see Bernstein's 1912, pp. 79–86. [↑](#footnote-ref-69)
70. The other two articles dealt with education for the blind and the use of the senses as a means of learning (Slonimsky 25.11.1879; Slonimsky 2.12.1879). [↑](#footnote-ref-70)
71. For example, Chemerinsky recalled a 30-year-old bookseller from his hometown, named David-Michel, with a natural talent for mathematics, who was sent to Slonimsky to assess his abilities and guide him in how to utilize them (Chemerinsky 2002, pp. 136–138). [↑](#footnote-ref-71)
72. On his 70th birthday celebration see Bauer 2011, p. 60; Bauer 2015, p. 89; Goldberg 1970, p. 259; Slonimsky 9.3.1880; Slonimsky 16.3.1880;), and at age of 75 see Frischmann 1914, p. 26). It was celebrated not only in his hometown of Warsaw, but also by Haskalah groups in other places Eastern Europe, such as in Lvov (N. 15.3.1894). [↑](#footnote-ref-72)
73. Hebrew author Avraham Aryeh Ekbia (1882–1964) gave a similar description of an encounter with Slonimsky when he was 17 years old (Ekbia 1942). [↑](#footnote-ref-73)
74. See more about Lilienblum’s pedagogic perspective in Sofer 2007, pp. 73–74; Shavit and Reinhertz 2011, pp. 18, 57. [↑](#footnote-ref-74)
75. On Abramowitch’s work, especially in the field of scientific dissemination, see Shavit and Reinhertz 2011, pp. 126–131. [↑](#footnote-ref-75)
76. See more about Abramowitch in Shavit and Reinhertz 2011, pp. 139–142. [↑](#footnote-ref-76)
77. In his youth, Hoffmann read about Humboldt in the Slonimsky’s book, which had a great impact on him. See Shavit and Reinhertz 2011, p. 133. [↑](#footnote-ref-77)
78. An example of this was Haim Weizmann’s ambition to establish science institutions in Israel (Kedar 2015). [↑](#footnote-ref-78)