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A Martyr of Science
Ervin Bauer (1890 - 1938)

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What is life? This remains a perennial question which has received and receives hundreds of different answers. These depend on the developmental state of science at any given time and on the beliefs of the person giving it. Ervin Bauer raised this question in the first third of the last century and tried not only to give a convincing answer but also to develop from first principles a consistent theoretical framework that would account for all known manifestations of life. A friend of his, Boris Petrovich Tokin, who did so much later to keep Bauer's name alive, said that

Bauer's dream of theoretical biology was similar to Einstein's goal in physics to create a single equation that encompasses the "Essence of Nature," from which all physical phenomena can be derived.¹

The sentiment is topical in this Year of Physics, when we celebrate the centennial of the publication of Einstein's seminal papers that changed our view of the World. As we know, neither Einstein himself, nor modern physics have reached this Holy Grail yet. Biology was much less likely to

do so in those remote years. Even today, however, Bauer is often presented in the Russian and Hungarian literature as an outstanding scientist, who was much ahead of his time and is often regarded as one of the key founders of theoretical biology. His fundamental "principle of the permanent inequilibrium of living matter", dubbed "Bauer's principle", is often quoted. What follows is an attempt to retell his complicated and tragic life and the curious afterlife of his work. Details of his elaborate theory and of its significance for contemporary biology, however, cannot be discussed in this brief note.

Ervin Bauer, or Ervin Simonovich Bauer, as he was known in his final years, was born in 1890 and died in 1938. His life was that of a typical Hungarian intellectual of the beginning of the 20th century, framed by the First World War, the Spanish flu pandemic of 1918, the short-lived Hungarian Soviet Republic of 1919, followed by a search for a new home, where he could live quietly and fulfill his scientific dreams. The *Wanderjahre* took him, together with his

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*Ervin Bauer and Margit Kaffka in Fiume.
Summer 1914, MTA Archives, MS 5616-81.*

second wife, Stefánia (Stefi) Szilárd, to Göttingen, Prague, Berlin and finally in 1925 to the Soviet Union, to Moscow and Lenin-grad, where, after receiving much scientific recognition, the Stalinist terror swallowed up both of them.² Today he is remembered both in his native and in his adopted country, the Soviet Union and its successor states, although for a long time he was a "non-person" and his name was not to be mentioned. Elsewhere in the world he is essentially unknown.

Ervin Bauer was born into an educated family. His father taught in a *gimnázium*, he was a linguist who translated German classics into Hungarian and also published papers on linguistics. His mother was also highly gifted. Ervin was the youngest of three. His older brother, Herbert, became a well known literary figure and film theoretician under the name Béla Balázs.

(See Nicholas Vázsonyi's article, pp. 141-153) His sister, Hilda, also older than Ervin, studied languages. Living in such an environment, Ervin moved in literary circles. Among his many friends was the young Georg Lukács, the philosopher. Ervin wanted to study mathematics, but at the request of his mother, he studied medicine in Budapest and Göttingen. Already as a student he was engaged in research and had his first original paper published before obtaining his medical degree. He passed his accelerated final examinations in the fall of 1914, to be drafted immediately into the Austro-Hungarian army.

In the spring of 1914, the medical student Ervin fell in love with a well-known writer and poet, Margit Kaffka, who was 11 years his senior. His feelings were ardently reciprocated. While travelling in Italy in August, they learned in Venice that war had broken out, returned quickly to Hungary and got married. Their marriage was happy although it was difficult for them to spend time together. Ervin was soon posted to the eastern front and served later in a military hospital in Temesvár (Timișoara in Romania) far from Budapest. Letters expressing their love and longing for each other make poignant reading. In Temesvár Ervin was able to do some research and published several papers. He became interested in general problems of the living world and began formulating his concepts of theoretical biology at that time. From a letter to his wife dated October 28, 1918:

...I am deep in work... If we just could be together in Pest... It is true that I am handicapped, because I constantly keep thinking about biology [...] I accumulated many ideas and would like to work on all of them at the same time.³

From the memoirs of Bauer's sister, Hilda:

Ervin read his paper to Margit and when I visited them... Margit opened the door. I immediately noticed that something extraordinary happened. Her eyes were shining and instead of greeting me, she blurted out; "Hilda, I married a great man." She was so taken by what she has heard.⁴

Their happiness did not last long. The Spanish flu swept through Europe and Margit died on December 1, 1918. Margit's last hours are described by her attending physician. Margit asked her to

"tell my husband, whom I adored and who made me so happy... that he should not mourn me... He should marry soon again, but only to a woman... who will guide him to great heights, just as I did..."⁵

The year 1919 was as difficult for Bauer, as it was for most Hungarians. After the fall of the Hungarian Soviet Republic, he had to find a new country to live in. He married Stefánia Szilárd, who fulfilled all that Margit prophesied. She was a loving companion and a gifted mathematician, who contributed decisively to the development of Bauer's theoretical concepts, in the difficult years of their exile they tried to settle somewhere in a tolerant environment. They lived briefly in Göttingen, then some years in Prague, where Ervin worked in the medical faculty. Their life was far from luxurious. As their Prague friend, the Hungarian poet and physician Imre Forbáth describes,

their poverty and modesty were proverbial. Bauer had a single worn suit, two shirts and a few books. But we were often together in



*Ervin Bauer in his Leningrad years.
Courtesy Svetlana Bauer.*

their friendly home, a single room in the building of the Institute, where we helped to prepare a simple supper and discussed politics and science."⁶

This period was, however, scientifically productive. In addition to several shorter papers, the first version of Bauer's theoretical work appeared in Germany during this time, with the telling title of *Fundamentals of a Pure Scientific Biology*.⁷ This was an amazing achievement for someone who had practically no time to do his work.

After Prague, they moved to Berlin in search of a better post. It remains unknown whether they wished to settle there permanently or, as Forbáth implies, they regarded Berlin as a temporary home, until they obtained permission to move to the Soviet Union. At any rate, Bauer found no long term position and worked first in a

cancer research institute and subsequently for a pharmaceutical company looking for a treatment for cancer.

Eventually, in 1925, invited by Semashko, the Peoples' Commissar for Health, the Bauers moved to the Soviet Union, the country of their dreams. This was not an unusual choice for a Communist scientist in the mid 20s. Bauer probably became committed to communism during the Hungarian Soviet Republic. His correspondence with Margit reveals him as a pacifist but not a politically engaged man, while Forbáth describes his Prague years already as those of a person who faithfully fulfilled all tasks set by the leadership of the party in exile.

His biographer, Tokin, sketches an idyllic life for the Bauers in the Soviet Union, which is probably not entirely true. Certainly they found employment in leading institutions, and his work seems to have progressed well, as shown by the numerous experimental papers he wrote in these years. Yet Bauer spent even his relatively short time in the Soviet Union in three different institutions and in two different towns. Until 1931 he worked in the Obukh Institute of Work Hygiene as head of the Department of Experimental Pathology and General Biology. Published papers from this period describe mundane improvements in routine blood tests, but Bauer also achieved here the publication of the second version of his magnum opus, *The Physical Principles in Biology*.⁷

Soviet science, and biology in particular, saw some immense battles in the late 20s and early 30s among scientists interpreting differently the role of dialectic materialism in biology. The end of the New Economic Policy and the beginning of the Great Breakthrough, (in simpler terms, the establishment of Stalin's absolute authority in all areas of life, including science) pushed much of the old guard into the

background (or into something worse) and a young generation took over.

We do not know what role, if any, Bauer played in these changes. His early acceptance of dialectic materialism as a guiding principle in scientific research is clear from a number of his general papers. Just as an example, a 1928 paper of his bears the title, "Dialectics and Natural Sciences".⁸ I would not dwell on this topic, were it not for an interesting coincidence. One of the "Young Turks" was the already mentioned Tokin, who was an active leader of the new trend. He was named the new director of the Timiryazev institute of Biology of the Communist Academy, with the task of introducing a new regime into biological research. In retrospect, this institute, and Tokin himself, played a positive role in the development of experimental biology in the Soviet Union. One of Tokin's first actions in 1931 was to invite Bauer to organise a team for general biology. Bauer moved from the Obukh Institute and successfully established a productive research team. This new place also provided him with the environment needed for intense work on his great monograph. Motivations for the invitation and its acceptance remain hidden.

In 1933 Bauer moved to Leningrad to head the Department of Cancer Research and subsequently the Department of General Biology of the Leningrad Division of the All-Union Institute of Experimental Medicine, the most prestigious medical research institute of the Soviet Union. The names linked to it, such as I. P. Pavlov, LA. Orbeli, K.M. Bykov, S.J. London, A.S. Speransky bear witness to its importance. Bauer organised an active team and it was at this new, stimulating place that he finished and published his major monograph. Their son describes a harmonious, busy but friendly family environment, so tragically shattered in 1937.

Bauer was highly respected and was regarded as a major authority by his colleagues in the Soviet Union. He was asked to contribute, in collaboration with two young scientists, the entry "Life" to the *Large Soviet Encyclopedia*, intended to be the definitive summary of knowledge for the Soviet Union.⁹ The text was also pre-published in a major ideological journal to solicit comments, but it seems that no major objections were raised. A further testimony to his authority was the commission to edit a textbook of *General Biology for Teachers' Colleges*.¹⁰

This period was the high point of his life as a scientist. In 1935 the third version of his major work, *Theoretical Biology* was published in Leningrad in 5200 copies, and quickly sold out. This volume represents a detailed development of his "principle of the permanent inequilibrium of living matter." Starting from this principle, he derives the characteristics of various phenomena of life, e.g. metabolism and assimilation, multiplication, adaptability, excitability and even evolution. His theses were by no means uncontroversial. An article announcing the publication of this book and briefly outlining its content was published in the journal *Socialist Reconstruction and Science*.¹¹ The editors preceded it by a commentary that is worth quoting:

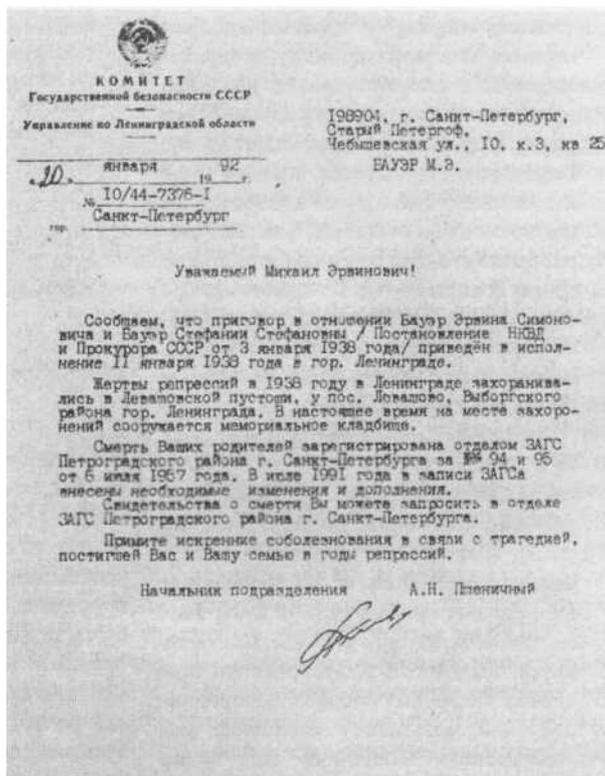
Prof. E.S. Bauer developed his ideas over 15 years, beginning with the publication of the *Grundprinzipien der rein naturwissenschaftlichen Biologie* in 1920. These ideas are to be presented in detail in his *Theoretical Biology*, which will leave the press this summer [...] These ideas are of great theoretical interest, providing a completely new and original concept of living substance, based on the principle of permanent inequilibrium [...] [The author's] views are often in contradiction with those generally accepted. Suffice it to mention the paradox, well argued by Prof. Bauer, that the raw

material for the evolutionary process is provided by the losers and not by the victors in the struggle for life. These views deviate from the accepted ones, they are bold and unexpected [...] Many ideas of Prof. Bauer will provoke opposition, many will require experimental verification, but what is the most important in this work is the consistent application of a dialectic approach to solving the main problem of biology, the problem of living matter,

Bauer's monograph clearly represented an outstanding contribution to the biological sciences of his time. The systematic development of a self-consistent theory of living matter and life in general, however controversial it might have been, should have stimulated extensive further work and extensive discussion. That it did not enter the pool of widely known scientific ideas and did not exert its deserved major impact on biology was due to two circumstances, its publication in Russian certainly kept it out of the hand of most biologists. This problem still persists and even today the book is accessible only to those who read Russian or Hungarian. It looked likely that after its appearance a translation into English or German would have been published soon. The political situation in the Soviet Union and the tragic fate of the author resulted, however, in the complete disappearance of the book from circulation and no reprint or translation could be considered for a long time.

The Bauers were arrested by the KGB on August 4, 1937, during their summer vacation, accused of spying for a foreign country and condemned to death. This was the time of the great purge when trumped up charges were used against just about everybody who had migrated to the Soviet Union from the West, with only few surviving. The Bauers were shot on January 11, 1938 by Senior Lieutenant A.R. Polikarpov of the Leningrad NKVD and interred in a mass

*Letter to Bauer's son,
Mikhail, from the
Leningrad Division
of the State Security
Commission (KGB).
Courtesy of Mikhail and
Svetlana Bauer.*



Translation of the letter:

[Seal of the SOVIET UNION]
State Security Commission of the SOVIET UNION
Leningrad Division
January 20, 1992
No. 10/44-7376-1
City of St Petersburg
198904, St Petersburg
Stary Petergof
10 Chebyshevskaya street, block 3, apartment 25
BAUER M.E.

Dear Mikhail Ervinovich,

We inform you that the judgment against Bauer Ervin Simonovich and Bauer Stefaniya Stefanovna (Decision of the NKVD and the public attorney of the Soviet Union of January 8, 1938) was carried out in Leningrad city on January 11, 1938,

The victims of the 1938 repressions from Leningrad were interred in a neglected, vacant area near the settlement Levashevo, Vyborg district of Leningrad. A memorial cemetery is being erected over the site of interment.

The deaths of your parents were entered in the municipal registry of the Petrograd District, city of St Petersburg under numbers 94 and 95 on July 6, 1957. Necessary corrections and additions were entered in the registry in July 1991.

You may obtain death certificates from the municipal registry of the Petrograd District, city of St Petersburg.

Please accept our sincere condolences for the tragedy experienced by you and your family in the years of repression.

Subdivision Head
A.N. Pshenichnyi

grave. Until recently all references implied that the Bauers were sent to the Gulag and that Ervin died in 1942, sometime during the war. In 1954 both were rehabilitated with all charges withdrawn. In spite of their innocence being officially declared, the fact and date of the execution was kept secret. The family learned the truth only in early 1992.

Ervin Bauer's sons were only children when the parents were taken away, Mikhail twelve and Karl only two. Mikhail was old enough to retain memories of the arrest. Both children were raised in orphanages run by the NKVD, were eventually separated and Karl was given a different family name. The two brothers found each other only after many years and both now live in St. Petersburg. Their tragic and adventurous fate deserve retelling but this is beyond the scope of this article.

Bauer's Russian books shared the fate of their author. Like other books by "enemies of the people," the copies were removed from all libraries and pulped. Only a few copies were kept in special collections of selected libraries and in the personal collections of a few brave souls. I quote from a book by S. E. Shnol:

I heard the name of Ervin Bauer from my teacher, Sergey E. Severin. We were discussing some central questions of biology. I was curious whether the basic facts of biology could be deduced from a few fundamental principles. [My teacher] kept quiet for a while and then said in a low voice—we were alone in his office—"You know, it seems as if I heard somebody else [...] It was a long time ago and people hardly understood his thinking. Please do not mention my name but try to get Ervin Bauer's *Theoretical Biology* from somebody." I found the book... at a friend of ours and I was much impressed.¹²

Shnol became a champion of Bauer when it was still forbidden to utter this name.

Bauer's name reappeared in Hungary in the 1960s. Tokin, a friend and superior of Bauer in the 1930s and later a professor at the Leningrad State University, regarded it as his duty to revive the memory of a scientist cut down in the most promising and productive period of his life. Tokin visited Hungary repeatedly and used his visits to reacquaint the Hungarians with Bauer. He collected documents and interviewed family members, friends and colleagues of Bauer, both in the Soviet Union and in Hungary, and wrote a small biography with an overview and evaluation of Bauer's scientific achievements.

In Hungary Bauer, first an exile, then persecuted in the Soviet Union, was remembered only as a mythical figure by a few people but certainly not known as a scientist. In the autumn of 1962 Tokin gave a talk on Bauer and his work at the Hungarian Academy of Sciences.¹³ This was the beginning of the renaissance of Bauer in his native country, soon to be followed by the publication of a biography by Tokin in Hungarian in 1965.¹⁴ These events were reported in the periodical press and the name of Ervin Bauer slowly emerged from obscurity. Even the head of the Party, János Kádár, thanked Tokin in a personal note, as mentioned in a brief report in the newspaper of Leningrad University.

The Hungarian Academy of Sciences decided to publish a Hungarian translation of *Theoretical Biology* soon after the publication of Tokin's book. The translation appeared in 1967. Indicating the rarity of the original edition, the translator had to work from a photocopy and never even saw the original. The Hungarian press published some comments on the appearance of the book. The published Hungarian version was more a homage to Bauer than an attempt to contribute to scientific discourse. Scientists in Hungary welcomed the book, however.

Shnol regarded *Theoretical Biology* as so important that for years he kept doing everything possible to have the book reprinted in the Soviet Union, without success, however. Finally he sought the help of the Hungarian Academy of Sciences and enlisted a small team of Soviet and Hungarian Scientists for this project. It took many years, but finally these efforts were crowned with success. In 1982, quite a few years after the publication of the Hungarian translation, a book appeared that contained the facsimile of the Russian original but only an extended summary in English. Curiously this edition does not even mention the existence of the previous Hungarian version and contains a bibliography that ignores the significant amendments made in the Hungarian version of Tokin's biography.

A few copies reached scientists in the Soviet Union. A former colleague of Bauer's, G.G. Vinberg gave a warm welcome to this volume in the largest Russian popular science magazine.¹⁵ Tokin devoted his 1988 book to it, (see note 1) in which he analysed Bauer's views in detail and challenged Shnol's interpretation of Bauer's theory. Both reviews address a Russian readership and do not even presume that the book will reach its intended target. Another mishap happened in the fate of this work. The central foreign trade company, Mezhdunarodnaya Kniga (International Book) did not distribute the book in the Soviet Union, and essentially all copies remained in Hungary. It will remain a mystery whether the book was simply not ordered by Mezhdunarodnaya Kniga or, as Shnol assumes, the company exerted excess vigilance. Whatever happened, in contrast to their Hungarian colleagues, Russian scientists had still no access to the work of this outstanding scientist, rehabilitated years earlier by the Supreme Court of the Soviet Union.

Shnol and others did everything possible to keep Bauer's work alive in the Soviet Union. They organised a symposium in Pushchino on the centenary of his birth. Among the guests of honour were both of Bauer's sons and his granddaughter, Svetlana. Bauer's work was discussed and commented on in a number of lectures. The published proceedings contain 22 papers. A special feature of this volume is the publication of a stenographic transcript of a lecture Bauer gave in May 1935 the material of which was recently discovered in the archives of the Academy of Medical Sciences of the Soviet Union.¹⁶

The adventurous fate of this book came to a full circle in 2002, almost three quarters of a century after its original publication, when a reprint of Bauer's chef d'oeuvre was published in the town now again named St. Petersburg. The volume was edited by Yurii Pavlovich Golikov, head of the Museum of the Institute of Experimental Medicine, Ervin Bauer's last place of work. Historical justice was thus served and the book finally reached its originally intended readership. The world scientific community, however, still has no easy access to this historical work. The 1982 reprint with its extended summary in English has remained essentially unknown. I am aware of only one review in an East German journal and none in English.

Since Bauer's time the face of biology has undergone a sea change. Our current understanding of living matter has made obsolete most specific aspects of Bauer's theoretical constructions. It would be futile to try to imagine how Bauer himself would have accommodated the new paradigms. The historical and linguistic barriers to the dissemination of his ideas when they were developed were tragic, as was his personal fate. None of this should, however, obscure the memory of a great original thinker.

NOTES

- 1 • Tokin, B.P. (1988) "Teoreticheskaia biologii i biofizika (Zametki v svyazi s tvorchestvom E.S. Bauera)" (Theoretical Biology and Biophysics [Notes on the work of E.S. Bauer]). Trudy Leningradskogo obshchestva estestvoispytatelei, 88 (1), 8-50. (All translations of quotes and references are from the originals by the author.)
- 2 • Documentary evidence on Bauer's life is scanty for the period after his emigration. The short biography of Ervin Bauer by B.P. Tokin was published in three languages: in English in the 1982 reprint of the (*Theoretical Biology* (see footnote 14); in Russian in Tokin, B.P. (First edition 1963 and second amended edition 1965) *Teoreticheskaia Biologiya i Tvorchestvo E.S. Bauera*, Izd. Leningradskogo Gosudarstvennogo Universiteta, Leningrad; and in Hungarian Tokin, B.P. (1964) *Elméleti Biológia és E.Sz. Bauer Munkássága*. Theoretical Biology and the Work of E.Sz. Bauer Budapest, Akadémiai Kiadó. A brief, amended biography is included in the 2002 reprint of the *Theoretical Biology* (see note 14). Bauer's son, Mikhail Bauer tells much about his childhood in his recently published memoirs: Bauer, M. (2003) *Vospominaniia Obbykovennoego Cheloveka*, ASSPIN, Petergof.
- 3 • Bauer's letters to Kafka, OSzK manuscript div.
- 4 • Bauer, Hilda (1985) *Emlékeim. Levelek Lukács-hoz*. (My Memories. Letters to Lukács) MTA Filozófiai Intézete, Budapest.
- 5 • Dr. J.B. (Jaulusz Borbála) (1949) "Kaffka Margit utolsó napjai" (The Last Days of Margit Kaffka). *Válasz*, January issue, p. 40-41.
- 6 • Forbáth's letter to Tokin (In German). MTA Archives M5375/53.
- 7 • The three successive versions of Bauer's monograph are Erwin Bauer (1920) *Grundprinzipien der rein naturwissenschaftlichen Biologie* (Fundamentals of a Pure Scientific Biology), Springer Verlag, Berlin; E.S. Bauer (1930) *Fizicheskie Osnovy v Biologii* (Physical Principles in Biology), Izd. Mosoblsipolkoma, Moskva, E.S. Bauer (1935) *Teoreticheskaia Biologia* (Theoretical Biology), Izd. Vsesoiuznogo Instituta Eksperimentalnoi Mediciny (VIEM), Moskva-Leningrad.
- 8 • Bauer, E. (1928) "Dialektika i estestvoznaniia" (Dialectics and the Natural Sciences). *Moskovskii medicinskii zhurnal*, (10-11), 17-28.
- 9 • Bauer, E., Brandgendl, V., Grinberg, G. (1932) *Zhizn' (Life)*, *Bol'shaia Sovetskaiia Enciklopediia*, 25, 404-425; Bauer, E., Brandgendl, V., Grinberg, G. (1932) *Zhizn' (Life)*. *Pod znamenem marksizma*, (7-8), 179-195.
- 10 • Vinberg, G., Dorfman, V., Morozov, B., Paramonov, A., Eskin, I. (1935) *Obshchaia Biologia. Uchebnik dlia vysshikh pedagogicheskikh zavedenii*. Bauer, E.S. red. (General Biology. Textbook for Teachers' Colleges, Bauer, E.S., editor). Uchpedgiz, Moskva.
- 11 • Bauer, E.S. (1935) "Principy teoreticheskoi biologii" (Fundamentals of Theoretical Biology). *Socialisticheskaia rekonstrukciia i nauka* (9), 7-13. (Ot redakcii, p. 7)
- 12 • Shnol', S.E. (2001) *Geroi, Zlodei i Konformisty Rossiiskoi Nauki* (Heroes, Villains and Conformists of Russian Science). Second edition. Kron-press, Moskva.
- 13 • Tokin B.P. (1963) Az elméleti biológia és Bauer Ervin magyar és szovjet biológus munkássága. (Theoretical Biology and the Work of a Soviet Biologist) *Magyar Tudományos Akadémia Biológiai Osztályának Közleményei*. 6 (3-4), 18-35.
- 14 • Posthumous editions of Bauer's 1935 monograph: In Hungarian: Bauer Ervin (1967) *Elméleti Biológia*. Akadémiai Kiadó. This edition contains also the *Grundprinzipien*. In Russian with an extended summary in English: Bauer, E.S. (1982) *Theoretical Biology*. Reprint of the 1935 edition with a preface, a biographical and critical essay. Bauer, E.S. (1982) *Teoreticheskaia Biologia*. Perepchatka izdania 1935 g. dopolnennaiia predisloviem, biograficheskomo ocherkom i kriticheskoi statei. Edited by G.M. Frank, J. Tigyi, S. E. Shnol and A.A. Yamyatsin. Akadémiai Kiadó, Budapest. This volume also includes in Russian and in English an article by Shnol' on Bauer's principle of "permanent inaequilibrium," the biography chapter of Tokin's book and a bibliography of Bauer's works. The title page lists as sponsors the Academies of Sciences of both the USSR and Hungary. In Russian: Bauer, E.S. (1982) *Teoreticheskaia Biologia*, Edited by Iu. P. Golikov. Rostok, Sankt-Peterburg. Includes a biography of Bauer by his son and Golikov and three essays discussing various aspects of Bauer's work.
- 15 • Vinberg, G.G. (1984) "Recenziia na budapeshtskoe izdanie knigi E.S. Bauera" (Review of the Budapest edition of E.S. Bauer's Book). *Priroda* (2), 120-122.
- 16 • Shnol', S.E. (Editor) (1993) *Ervin Bauer i Teoreticheskaia Biologia (K 100-letiiu so Dnia Rozhdeniia)* (Ervin Bauer and his Theoretical Biology (To the Centenary of his Birth)). Pushchinskii Nauchnyi Centr Rossiiskoi Akademii Nauk, Pushchino,

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