
I.P. SKVORTZOV AND IMPERIAL KAZAN UNIVERSITY

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Abstract

Irinarkh Polikhronievich Skvortzov was a famous Russian scientist. He was born on 5 August, 1847. I.P. Skvortzov graduated from Imperial Kazan University with MD degree. All his life was connected with medical and educational activities. Scientific interests mainly concerned hygiene and microbiology. He was the author of some original microbiological hypothesis. I.P. Skvortzov made a great input to Russian and international science in the end of XIX century. This historical review opens for the first time I.P. Skvortzov for Western readers.

Keywords: hygiene, microbiology, microbiosis, cholera, plague

*As God is not the God of the dead, but of the living,
so science should not serve death, but life.*
(I.P. Skvortzov)

1. Introduction

The XVIII century was marked in the Russian history by active measures aimed at the organization of sanitary service and prevention of various epidemics. As V.N. Shkunov writes in his review article [1], Peter's reforms contributed to the formation of the sanitary service; 1725-1755 were marked by the expansion of quarantine border outposts, and in 1755-1775 quarantine houses with hospitals at customs were opened. 1775-1800 was a time of reorganization of specialized institutions and drawing up the Charter of border and port quarantines. It can be said that the sanitary medicine and hygiene began to develop at the Imperial Kazan University almost from the moment of its establishment by Alexander I. Fedor Dmitrievich Kalajdovich (1742-1819). Shortly before his death he published the manual 'On the preservation of health, or Short rules of hygiene' [2]. Ivan Kallinikovitch Erohov taught hygiene in 1824-1825, and Ivan Stepanovich Dmitrievskij was engaged in the prevention of cholera, often rampant in the Kazan province. Many other professors of Kazan University paid attention to the issues of hygiene at their classes (V. Tile, A.A.

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Sokolovskij). In 1865 an independent Department of hygiene was opened, headed by Arkady Ivanovich Jacoby. The merits of A.I. Jacoby are huge [3]. One of the most famous of his followers was Irinarkh Polikhronievich Skvortzov, who is the object of this study.

2. Childhood and youth of I.P. Skvortzov

I.P. Skvortzov was born on 5 August, 1847, in Shentala village of Bugulminsky district of the Ufa province (since 1852, the village was included in the Samara province). It is important to note that in the documents (in particular — dedicated to the 200th anniversary of the Medical faculty of Kazan University) there is another place of birth and another day, namely - August 7, the village of Romashkino of Buzulukskiy district [4]. His parents were the priest Polihronij Timofeevich and the mother - Maria Vasilevna (born Lavrova). Through the father, the grandfather, the great-grandfather, and ancestors – they all were priests. His maternal ancestors were also members of the clergy.

Irinarkh was the first child in the family. The grandmother on his father's side was of a noble family, born in the family of Romanovskikh. Polihronij Timofeevich was an educated man; at his home there was a publication of 'World history' by Friedrich Christoph Schlosser. There were also books on natural history. Irinarkh's father used to write correctly, mostly in the style of Church sermons. To the family survived four children - two sons (Irinarkh and Nicholai) and two daughters (Claudia and Alexandra). Both sons became doctors. The daughters completed courses at the Diocesan school, after which they married: one with a people's teacher, the other - with a priest.

Until the age of 6, Irinarkh lived in the village, playing with rural boys. His favourite summer activity was fishing in the company of his father. He felt drawn to his Volga, on which floated a boat-kosoushki, rosshiffs and sometimes the steam vessels, and on the shore there was a constant market with the so-called 'glutton row' where the Irinarkh loved to eat dumplings. Due to the circumstances, the family often had to change their place of residence, which diversified the impressions of Irinarkh. Skvortzov had a great memory - in 1913 he recalled how they often were visited by grey aristocratic gardener Firsykh supplying family products from the property of the estate of Gluminskikh in the village of Yakovlevo from the Bugulminsky district. He recalled the commotion caused by the fire and how they carried their belongings to the Church square. Since the age of six Skvortzovs' family lived in the village Lipovka Buzulukskiy district of Samara province (now - Orenburg region). In 1852-1853, cholera was raging in the area at that time, causing the death of one of his younger brothers. Irinarkh frequently pursued his father at the many funeral ceremonies resulting from the number of people dying of cholera. In 1854-1855, the family lived in the village of Bolshaya Malyshevka (which was mostly inhabited by state peasants) of the same county. He heard about the events of the Sevastopol war, they were mostly oral stories (only landlords read the newspapers) [I.P. Skvortzov, *Autobiography*, Manuscript Department of the Pushkin house, Fund

377, Inventory 7, Case 3280 (June 9, 1892 - April 27, 1913), <http://irli.altsoft.spb.ru:80/object/64451779>].

School life of I.P. Skvortzov was connected with the Samara spiritual school, which was opened in 1852 in connection with the changes of the city's rank of provincial. The school was located in a small two-storey house, where there was no bursa. Pupils lived in private apartments. Till 8 years old he became able to read and was fascinated by the lives of the saints, which he read from the Great Lives of the Saints one by one forming his moral order, in line with notions of heroism and compassion to the suffering and hatred to violence. Languages (Russian, Church Slavonic, Latin and Greek) in school were studied strictly grammatically and therefore were given hardly to pupils. Writing and singing lessons were a time of rest. Arithmetic as a whole was given to pupils without effort. Skvortzov was one of the best students of the school, so he did not have any bad memories of the time of training there. In school he tried to write poems and stories. He was visited by the idea that there is no need to make a special clergy caste - in his opinion properly spiritual service can be performed only by those people who have this desire and attraction. In his spare time, pupils played lapta, towns, leapfrog, read books of Dumas (especially popular were 'Count Montecristo', 'Countess of Monsoro', 'Three Musketeers'), and Pushkin, Lermontov, Gogol, Turgenyev and Ostrovsky [<http://irli.altsoft.spb.ru:80/object/64451779>].

In 1862, I.P. Skvortzov moved to Samara Seminary. He was also without bursa. From the beginning, the Seminary was liberal, but after a while a new leadership was appointed. I.P. Skvortzov spent a lot of time in the city public library. The seminarians liked to read Shchedrin, Dobrolyubov, as well as natural history articles in the magazines 'Contemporary' and 'Russian word'. As he recalled, the first two years passed in a kind of fog, until he decided to go to university and started preparing for this, that is, for the final high school exam in the company with some of his comrades. All doubts about the need to enter the university disappeared after the criticism from the administration of the seminary for the essay published in the 'Provincial Gazette' on the state of hunger in the villages of the Samara province. The provincial administration reported at that time only about the lack of bread, but generally described the situation as satisfactory. Such an act led to the departure from the seminary after 3 years after admission. I.P. Skvortzov called this time the 'early spring of his life' [<http://irli.altsoft.spb.ru:80/object/64451779>]. By the way, in these years the first literary works of Irinarkh were published - in the newspaper 'Volga' from Astrakhan. His story 'From the Samara merchant life' was published under the pseudonym Valerian Nimkin in 1864 [5].

3. The student period at Imperial Kazan University

In September 1865, Skvortzov entered the Imperial Kazan University as a volunteer. Two years later, he takes exams in the Imperial First Gymnasium in Kazan and becomes a student of the Medical faculty. In addition to classroom

training, Skvortzov spent a lot of time in laboratories and clinic. Anatomy was taught by the famous P.F. Lesgaft. In the second year the main subject was Physiology. In the fall of 1866, returned from abroad N.O. Kovalevskiy - his first lecture impressed the student Irinarkh very much, and he applied for permission to visit the laboratory of the young professor: his scientific views on life were formed there. Special respect was paid to the professors of the university clinic N.A. Vinogradov and A.I. Jacoby. Lectures on Chemistry were read by outstanding chemists - A.M. Butlerov and N.N. Zinin. Lectures, according to the students, were a holiday for them and nobody voluntarily missed them. I.P. Skvortzov with great enthusiasm began to visit the laboratory of physiological chemistry, headed by A.Y. Danilevskiy. Physics, Mineralogy, Botany and Zoology were not favorite subjects for Irinarkh. He remembered another teacher of anatomy E.F. Aristov, a small, slender, grey-haired, with thick curly hair - he made a magical effect on the students. Having come to the audience, he rarely began to lecture at once. First, he started a conversation on a variety of issues that attracted the attention of students [<http://irli.altsoft.spb.ru:80/object/64451779>].

4. First steps in medical practice and science

Training at the Medical faculty ended in May 1871. I.P. Skvortzov returned to the Samara province - to the Sergievskie mineral waters — the state resort, opened by order of Nicholai I [6]. The aim was to get acquainted with the action of sulphur waters on patients in the military infirmary. His parents lived at that time in the village Pokrovskoye-Plemyannikovo of Buzulukskiy district, and in July Irinarkh goes to them. A few days later on arrival, I.P. Skvortzov was urgently summoned to the Buzulukskiy district Zemstvo Council for temporary local government service because the local doctor was ill. At that time, the movement of military units to Turkestan went along the Samara-Orenburg tract and rapidly spread cholera — both in the city and in the district. Within two months Skvortzov together with the recovered other doctor took part in fight against cholera; then he took the place of the district doctor of the Samara district [<http://irli.altsoft.spb.ru:80/object/64451779>].

In September 1872, I.P. Skvortzov moved to Kazan to prepare for the professorship in the departments of Physiology and Hygiene. By this time, the Department of hygiene was left without leadership - A.I. Jacoby filed a petition for dismissal, together with seven other professors in solidarity after the dismissal of Professor P.F. Lesgaft. In addition, as noted above, I.P. Skvortzov worked in the laboratories of A.Y. Danilevskiy and N.O. Kovalevskiy. This predetermined his return for further service. In October 17, 1872, in the Council of the Medical faculty received the following submission from the ordinary Professor N.O. Kovalevskiy: “I have the honour to recommend to the faculty as a candidate for the vacant scholarship intended for further improvement, doctor Irinarkh Skvortzov, who graduated the courses of Medical Sciences in 1871. I am guided in my view only by the belief in the talent of this young man and in

his deep interest in science. The year spent by Skvortzov in service in the Samara Zemstvo was not in vain for him. Part of the results of his observations was presented at the Congress of Zemstvo doctors in the city Samara, printed notes of Mr. Skvortzov are as follows: 1. 'What is and what should be a hospital', 2. 'On specific provincial health officer', 3. 'On the state of public health in the second medical section of the Samara Zemstvo'. Having seconded Mr. Skvortzov to the University, we will give him the opportunity to specialize in one of the subjects of his chosen group: Hygiene, Physiological chemistry and Physiology." [*O pomeshhenii lekarya Skvorczova na stipendiyu dlya prigotovleniya k professorskomu zvaniyu*, NA of RT Fund 977, Inventory Medfak, Case 1200]

In November 25, 1872, there was a meeting of the Council of the University, which ran I.P. Skvortzov to leaving the University to prepare for professorship. With 22 votes 'agree' and 10 votes 'against' it was decided to allocate a scholarship to the healer Skvortzov to prepare for the professorship. The scholarship was awarded on March 15 of the same year [*O pomeshhenii lekarya Skvorczova na stipendiyu dlya prigotovleniya k professorskomu zvaniyu*].

Soon, I.P. Skvortzov was sent to the laboratory of A.P. Dobroslavin in St. Petersburg Military Medical Academy. In 1873-1874 I.P. Skvortzov worked in the chemical laboratory of A.P. Borodin (a famous Russian doctor, chemist and composer), in whose apartment he lived for some time. About this period of his life, Alexander Porfirievich recalled: "Temporarily, I now have another roommate - someone Irinarkh Polikhronievich Skvortzov. This is my Kazan friend... He's a very good gentleman; he had a very good hygiene speech at the Convention... This Skvortzov is very soft, but a few strange person; very smart, even clever, very simple, from 'free-thinking', but not the nihilist, very decent, working and knowing." [7]

In the spring of 1874, I.P. Skvortzov married to Iraida Alexandrovna Syuteeva (1856-1919), who was the sister of Evgeny Fedorovich Fedorov. A.P. Borodin wrote after a certain time: "Our pet Iraida, who got married and stayed in the winter, gave me a hefty grandson, at the birth of which I performed the post of midwife." The first son of Irinarkh was baptized by his grandfather — Polikhronij Timofeevich (who died alone in the village of Kamenka in the summer of 1883 during another cholera epidemic). However, the first-born died, and did not live up to a year. A couple of years later, in 1879, was born the second son - Vladislav - the future famous doctor, scientist and organizer in the USSR [8]. Vladislav's Godfather was Nikolai Osipovich Kovalevskiy - professor and future Rector of the Imperial Kazan University.

In St. Petersburg, together with I.P. Skvortzov, only 16 people were trained, so each of them was familiar to professors and everyone could clarify all the incomprehensible questions from any professor. He remembered the first lecture on Physiology, combined with experiments on animals. During two years of his scholarship I.P. Skvortzov passed his doctoral exam in Kazan, and defended his thesis for the degree of Doctor of medicine titled 'Materials for

anatomy and physiology of the heart and its tunics' at the Military Medical Academy [9]. The dissertation is presented on 36 pages; on pages 18-20, 29 there are original drawings - in total 7 pieces; 12 provisions (pages 35, 36) were defended.

In September 1874, I.P. Skvortzov was presented to the Department of hygiene in the rank of associate professor, but the election took place only in 1875, and on March 29 he was approved in this rank. Since September 1875, he began his teaching career. Some articles had been written a few years earlier. In the article 'What is and what should be a hospital' he develops the idea that the hospital should be deprived of the shortcomings of life. In parallel, several reports were made - 'Hygiene and civilization', 'On the issue of endemic diseases and in general on the state of public health in Russia'. In 1873-1874, in 'Kama-Volga Newspaper' was published his article 'The value of crop failure in people's life and actions against them', 'The full stomach doesn't understand the empty one', 'Life of the Samara peasant'. In the laboratory A.P. Dobroslavin, I.P. Skvortzov has mastered the methods of hygienic studies and participated in the work of Russia's first hygienic journal 'Health'. In numbers 13 to 18, there were placed his articles on the themes of water, removal of sewage, water analysis, coal gas, and sanitation of Kazan [<http://irli.altsoft.spb.ru:80/object/64451779>].

In September 1875, I.P. Skvortzov gave his first lecture to students of Kazan University - it was titled 'Hygiene - subject, purpose and objectives'. The main idea of the lecture was that the hygienist should know not only the anatomy, physiology and pathology of man, but also the whole Biology and all other sciences about the structure of the world. In 1876, I.P. Skvortzov continued to write for the journal 'Health' (in issues 20-24). His article 'On morbidity and mortality of children in the Moscow Educational House' appears. The article analyses the causes of high child mortality. In 1876, I.P. Skvortzov stayed 2 months in Brussels and visited the Hygienic exhibition [10]. During the trip, he got acquainted with the sewage system in Danzig (now - Gdańsk) and Hamburg and was struck by the extremely bad air in Berlin, where then worked only the Sewer Commission under the guidance of Professor Rudolf Virchow.

Returning to Kazan, I.P. Skvortzov conducted practical classes with students, where he tried to explore the water, soil, food and beverages. The Russian-Turkish war of 1877 gave rise to the expansion of his educational activities in the field of Hygiene - he was invited to give lectures in the Officer Assembly of Kazan on military field hygiene. The material of the lectures was later published as a 'Short course of military field hygiene for military doctors and officers'. In the newspaper 'Herald of people's help' he published the article 'Doctor's advices to soldiers', and in the newspaper 'Medical records' - an article 'War and hygiene' [<http://irli.altsoft.spb.ru:80/object/64451779>].

In the document No. 792 of July 19, 1878 it is noted that according to the decision of the Ministry of National Education the independent Department of hygiene with medical police is organized [*O povy`shenii v zvanii e`kstraordinarnogo professora docentov Bogolyubova, Tolmacheva, Skvorczova,*

Vy`soczko i drugix, NA RT Fund 977, Inventory Medfak, Case 1369]. Associate Professor Skvortzov was approved as Extraordinary Professor in the Department range from June 23 by decision No. 7236. This was preceded by his presentation to the Academic Council of the Faculty of Medicine and the University (document No. 192) with a list of his published works for the period from 1874 to 1877 [NA RT Fund 977, Inventory Medfak, Case 1369].

5. Microbiological investigations of I.P. Skvortzov

In 1878, plague broke out in Kazan (Vetlyanskaya epidemic got up the Volga) [11]. I.P. Skvortzov took the most active part in the fight against it. This work was included in his article ‘Vetlyanskaya epidemic and taken with her sanitary police measures’ [12]. In 1879, Skvortzov started writing ‘Comprehensible hygiene’ [13]. The book was awarded the Great Peter prize in the same year. On the basis of this book was written the work ‘Public hygiene for the military’, which in 1881 it was printed by the General Directorate of Military Schools, and the author was awarded a gift from Emperor Alexander II [<http://irli.altsoft.spb.ru:80/object/64451779>].

The views of I.P. Skvortzov on the biology of bacteria deserve special attention. The position of R. Koch at that time was generally recognized - in his opinion bacteria are immutable and permanent species. In particular, in work ‘About germs observed in Asiatic cholera, and the hypothesis of ‘microbiosis’’ [14] Irinarkh Polikhronievich discusses the biology of *Commbacillen* - ‘commas’ by R. Koch. I.P. Skvortzov writes that they can occur in feces in healthy people and are not an etiological agent of *cholera nostras*, but can aggravate its course under certain circumstances. Skvortzov writes that from veal or beef infusion it is possible to isolate the bacteria similar to ‘commas’ of R. Koch - thus it is possible to find larger ‘curved’ microbes which on morphology are similar to earlier described by Prior and Finkler [15]. Both large and small ‘curved’ microbes had a high mobility - writes I.P. Skvortzov - ‘depict a swarm of gnats’ - their motion was helical. The author goes on to describe other different types of microbial movements, noting that they can last so long “that there is not enough patience looking into the microscope to wait for the termination”. Helical rotation can be replaced by a whirligig-shaped one. It is important to note that Skvortzov reflects on the clinical significance of various forms of microbial movement. In his opinion, his movement of a huge number of microbes can irritate the intestinal mucosa, causing hyperaemia, desquamation and hypersecretion. I.P. Skvortzov writes that each microbe is surrounded by a transparent semi-liquid mucous membrane. Sporulation (as in *B. subtilis*) is missing. by the opinion of the author, It is important to note that studying this issue, Skvortzov was familiar not only with the works by R. Koch, but also by his followers - Nicati and Rietsch, Pfeiffer, Babes and van Ermengem – later these works were collected in a monograph by S. Flugge [16].

I.P. Skvortzov did a great job in cultivating small ‘curved’ microbes on various nutrient media. At that, he compared the behaviour of his microbes with

the microbes of Koch. Skvortzov gives a strikingly detailed (by day and by hour) description of the morphological changes in the colonies of small meat 'curved' microbes during their cultivation on gelatine and concludes that they have similarities with the 'commas' of Koch. It is said about the similarity of growth on solid blood serums, potato medium, milk and veal broth. I.P. Skvortzov concerns the issue of experiencing unfavourable conditions by bacteria - he noted that the 'curved' microbes are able to resume growth a month after drying them under the cover glass. Irinarkh Polikhronievich notes that Koch's 'commas' is much more sensitive to drying. Under the influence of acids (in particular - nitric acid) 'curved' microbes almost completely die [14, p. 39].

6. Hypothesis of microbiosis

It is extremely important to note that in this work I.P. Skvortzov offers for the first time his new hypothesis of microbiosis to the scientific community [14, p. 50]. The hypothesis consisted of 10 provisions. In the first provision it is noted that the Schwann-Virchow aphorism *cellula e cellula* should be replaced by a more general thesis - *vivum e vivo*. The second provision states that microbes appear as a result of biological decomposition of higher bodies - the process of **biolysis**. Third provision defines the process **biotes** - it is an association of microbes of the same species **monobes** (in the case of two different types - **diplobes**, etc.) to tissues and organs of higher organisms. In the fourth provision I.P. Skvortzov states that in humid environments the most spread have **hematoides** similar to blood formed elements and common not only in animals but also in plants. The fifth provision says that the microbes that give hematoides are called **hematobes**. In the sixth provision, it is noted that observations of the disintegration of the red blood cells of the frog, rabbit, humans, report the appearance of microbes, identical to the 'curved' microbes or 'comma' of Koch in the case of Asiatic cholera. During the process of biolysis of red blood cells, hematobes are appeared. According to Skvortzov, 'curved' and 'commas' may belong to hematobes, although there is evidence that they belong to **sarcobes** (producers of **sarcoids**). The seventh provision mentions the works of Jaime Ferrán y Clúa [17], whose microbes, according to I.P. Skvortzov, are hematoides. The eighth provision states that microbes are found in all biological bodies, which the author calls **entobes**. Microbes that are not part of living organisms, or appear there under certain conditions, are called **ectobes** (**phytobes** are ectobes of plants, **zoobes** are ectobes of animals). In the ninth provision Skvortzov writes that a contagious disease is a consequence of invasion outside of ectobes, some of which may survive within an organism and start to protect it from other ectobes. The last provision - 'curved' ('comma') belong to entobes of the human body [14, p. 52]. Thus, it is clear from the presented hypothesis that it concerns both particular and general issues of microbiology. One of the first in Russia I.P. Skvortzov raised the question of pleomorphism of microbes, its own microbiota and their protective action. All this puts him in one rank with the leading microbiologists of the world.

7. Last years of work in Kazan

From July 1879 to July 1882, I.P. Skvortzov remained a teacher at Kazan University, and also served as a senior doctor in all the charitable institutions of the Kazan Province Zemstvo, ranging from provincial hospitals to orphan houses. At the same time he was the Director of the paramedic school and the head of the variola- vaccination hospital. Soon I.P. Skvortzov receives an offer from the Ministry of Public Education to occupy the Department of hygiene in Warsaw and he agreed. In September 1882, I.P. Skvortzov refused from the Zemstvo service and moved to Warsaw for the position of Extraordinary Professor. On his way to Warsaw, he wrote essays ‘On the Middle and Lower Volga region’ [18]. This was the end of his relationship with Kazan University. Although the above hypothesis of microbiosis was formulated after leaving Kazan, the knowledge base for its formulation was undoubtedly laid in the Kazan period of work of I.P. Skvortzov.

8. Conclusion

The further fate of I.P. Skvortzov is connected with Warsaw and Kharkov universities. He served in Warsaw for 3 years. The geographical location of the city contributed to his visit to hygienic exhibitions in Berlin (1883) and London (1884). The first part of the ‘Practical Hygiene Course’ was written in Warsaw [19]. In addition, there was work on the organization of hygienic laboratory. In 1885, I.P. Skvortzov was transferred to the position of an Ordinary Professor in Kharkov University, where again there were similar organizational tasks. Life was just full of different events. He actively writes scientific works. He is interested in global problems of the structure of the world, he creates a ‘Dynamic theory of the Universe’ [20]. He was involved in the fight against the cholera epidemic of 1892 in the Caucasus [21]. I.P. Skvortzov organized in Kharkov, ‘The Society of the black cross’ to help the hungry. He was struggling with a typhoid epidemic in Kharkov (1891-1892) and he was engaged in the study of the use of Caucasian and Borjomi mineral waters. Actively travels across Europe, the Middle East. I.P. Skvortzov is increasingly concerned about general biological problems [22-24]. I.P. Skvortzov died in 1921.

Thus, the life and scientific work of I.P. Skvortzov demonstrates his irrepressible interest in understanding the mysteries of life. Combining the work of a doctor with the research work, he has achieved outstanding success in the fields of Hygiene and Microbiology. The scientific heritage of I.P. Skvortzov requires further understanding, and he is undoubtedly worthy of memory and respect in the intellectual environment of society.

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