

THE DIFFICULT CHALLENGES OF NO MAN'S LAND OR THE RUSSIAN ROAD TO THE PROFESSIONALIZATION OF WOMEN'S ENGINEERING (1850-1920)

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1.- A Forgotten Institution.

"Probably because of the time lapse, not many people are aware that the first higher technical school for women in the world was founded in Russia in 1906. Despite the fact that this school had existed for 12 years before the revolution and that it had more than 1.000 female-students, it is difficult to find information about it in the educational guides any." So starts one chapter of the memoirs of Boris Krutikov, a civil engineer (or engineer of ways of communication), who graduated in 1900 and who was one of the first teachers at the Petersburg Women's Polytechnical Institute [1].

This higher technical school, known initially as the "Petersburg Women's Polytechnical Courses", had in fact been ignored for nearly 80 years, and until the early 1990s no information about it was available in reference books.¹ Even though it had been occasionally mentioned in some school lists, this institution had never been a subject of study in the most important national and foreign works on the history of education, whether general or for women in the Russian Empire.² Paradoxically, perhaps because of our approach to the subject via history of engineering, we were able to unearth in a specialised library, the manuscript memoirs of Boris Krutikov and to trace the early history of this very original institution, which still awaits its definitive history.³

¹ The literature on the history of education in Russia, whether secondary or higher, university or special, male or female, is ample, rich and contradictory. The main difficulty is that we are faced with two groups of printed sources published in two completely different periods of Russia: Imperial period and the Soviet one. Naturally, our list of sources, despite the length, is far from exhaustive. It nevertheless seems sufficiently representative to allow us to draw some interesting conclusions. Since our aim is not to provide a complete critical analysis of the sources used, some preliminary remarks are in order. The historiography of women's education is characterised by some distinctive features. One of these is that many of its historiographers were initially recruited from the former militants of the women's movement who subsequently devoted themselves to the history at the end of their professional careers. These authors include former teachers, party officials, engineers, doctors, even scholars but not professional historians. Their works are more like memoirs than analytical historical studies. See, for example, [2-6]. Another feature concerns some characteristics of Soviet historiography, in particular its well-known tendency to avoid politically embarrassing subjects, such as the Jewish question or to omit facts considered ideologically improper. Let us cite only one example. The policy of the Russian government as far as women's education is concerned is traditionally presented as extremely reactionary and obscurantist. It becomes evident that the situation was more complex when analysing, for example, the official *Ministry of Public Education Review*, which contains regular overviews and separate articles on women's education abroad, including higher education [7]. Note that we are dealing with the official organ of one of the most conservative ministries responsible for education. Many of these articles are nothing but detailed reports on an impressive number of European institutions for women visited on the demand of the disreputable ministers, including the hated Dmitri Tolstoj.

² See [2; 3; 8 - 10, and others]. As for the monographies published during the early 1990s [10; 11], these deal essentially with the general history of higher education in Russia and devote only a few pages to the institution we are interested in. To complete this bibliography, we must add a short essay [12] presenting the Petrograd Women's Polytechnical Institute in [13] and two small reports [14; 15].

³ Unfortunately, a large collection of documents about the pre-revolutionary history of this institution is not available today because the Archives of the city of St-Petersburg have been closed to the public

Even though it was not the first or the only women's institution in the world (this kind of statement is always relative), a special higher technical school for women seems certainly to be an early accomplishment as far as both women's education and engineering education are concerned in the late 19th and early 20th centuries in Europe and North-America.⁴

The product of different historical circumstances, this institute became in one sense symbolic given that it crowned a difficult struggle carried on for half a century by the most progressive sector of Russian society for women's rights and free access to higher education and further professional integration. For a fuller understanding it is necessary to study the specific and constantly changing socio-political context of the pre- and post reformed Russian State, which was dominated by the rise of revolutionary-democratic thought and movement. Second, it is essential to bear in mind the different and often contrasting lines of educational thought during this period: elementary versus classical, general versus professional, female versus male. Special emphasis should be placed on the ramified system of State higher engineering schools which had been developing in Russia since the beginning of the 18th century, and to the complicated administrative hierarchy of well established *chins* (Russian personal degrees), functions, grades and privileges.

2.- Daughters and Stepdaughters of the Enlightened Empresses or the Roots of Women's General and Professional Education in Russia.

Women's education in Russia was born under the reign of Catherine II with the inauguration of the "Imperial Educational Society for noble girls" (St-Petersburg, 1764), a boarding school known as the Smolny Institute.⁵ This initiative, which was

for several years. See [16]. We were able to consult this collection in the early 1980s. Ivanov in his book published in 1991 gives num. 139 as its archive reference [10]. The reference has probably been changed today.

⁴ See the special issue of *History and Technology* on women's engineering education in Europe and the USA [17].

⁵ According to many historians, the Smolny Institute had been based on the model of the famous French École de St-Cyr founded in 1686 by the marchioness de Maintenon, Louis XIV's morganatic wife. [18; 19, p. 71-136; 20, p. 194; 21, p. 269-271]. Furthermore, a century ago this problem was analyzed and criticized by D. Tolstoj, minister of Public Education at the time, who argued that the only thing in common between these two institutions was the idea of a school for noble girls. "If we compare the Saint-Cyr and the Smolny Institute, he said, the only analogies of these institutions were that they were conceived as boarding schools for daughters of nobles, were open to infants, were divided into four age categories and each age group dressed in a particular colour" [22, p. 53]. Another analogy could be added, i.e., both institutions were attached to monasteries. The main difference between them was that 7 months after the school for noble girls, another school for girls open to all classes was affiliated to the Smolny Institute. Let us again quote Tolstoj: "... their curricula, and especially their aims were not only different but contrary. Despite the fact that the curriculum of Smolny school was insufficient, it was much wider than that of Saint-Cyr; the spirit of this school was absolutely monastic, whereas that of the Smolny Institute was exclusively and even excessively secular" [22, p. 54].

This case is very significant because it shows how careful one should be when considering the models, references and prototypes in the field of education. Devoting many years to the history of technical education in Russia and in Europe, the authors of this paper have attempted to deal with it in greater detail in some of their studies. See [23].

It is important to note that a reference to a foreign educational model is neither innocent nor accidental. Even if this does not correspond to any real similarity, it nevertheless reflects some tendencies and some public sentiments typical of a given historical period. Studied in depth, this could reveal many fascinating insights into the secret mechanisms of decision and policy-making. Let us just mention the most frequent and typical references to the foreign models and prototypes

designed to educate "a new kind of Russian woman", who was better mannered and more sensitive, was taken up in the main provincial towns. In 1797, these institutes passed under the patronage of Empress Maria Fedorovna, wife of Paul I, whose specially created Administration was, for a century, responsible for all kinds of philanthropic institutions, including residences, orphanages and schools open to girls irrespective of class.⁶ More educative than educational, their curricula included carefully chosen subjects such as foreign languages, music, dance, social etiquette, and needlework. This last activity played an important role in the training of poor gentry-girls and orphans. A special section for girls of humble origin was affiliated to the Smolny Institute in 1765. It numbered initially 240 girls.⁷ Together with private residences, these schools were the most important women's educational institution for over a century. They laid the groundwork for the further development of women's general and professional education, which entered a new phase in the second half of the 19th century. All of them were to disappear after the October revolution.⁸

Naturally, this kind of education suffered from grave shortcomings, which did not escape the notice of contemporary writers. The limited and one-sided character of this education as well as its practical uselessness was satirised by Nikolaj Gogol in his famous novel *Dead Souls* written in 1840s.⁹

2.1.-Turning point.

A series of important political events disrupted the stability of the state machine in the middle of the 19th century. Following the defeat in the Crimean war and after the death of Nicolas I in 1855, the country, which since the late 1840s had embarked on the road to industrialisation, underwent a period of reforms. This epoch was marked by one of the most important political acts in modern Russian history – the abolition of serfdom (1861). This also became the turning point in the social situation of Russian women. There were an increasing number of women who were obliged to earn their own living given the growing proportion of women in the urban

concerning a number of women's institutions in Russia. Thus, according to N. Dobroljubov, the private girls' school "Atenej" founded by Mrs Truba in St-Petersburg in 1858 was based "on the same principles that govern the educational system of Athénées in France" [24, p. 372]. The Women's Gerier Courses in Moscow (1872) would have been organized with reference to the women's courses of higher education in Berlin (see [25, p. 173-174] and CGIA SSSR, f. 229, op. 2, d. 1080, l. 3). According to O. Kajdanova, the idea of popular universities (coeducational institutions; opened in Kazan, 1894; in Moscow, 1896; in Kharkov, Nijny Novgorod and some other provincial towns, 1897) came to Russia from England [6, t. 1, p. 366]. "The popular university in the city was preceded by the agricultural school of higher education in the country", she added that the idea of this institution came to Russia from Denmark. [6, t. 1, p. 371]. Note that after the October revolution these references were no longer important because all the above institutions, women's or coeducational, public or private, urban or rural were closed [6, t. 1, p. 372].

⁶ For the Institutes for noble girls and the Administration of Empress Maria Fedorovna, see [2, p. 36-46; 3; 8, p. 9-10].

⁷ In 1842, this section was reorganized and became a separate Aleksandrovskij school, then, in 1891, the Aleksandrovskij Institute. Note that the serf girls who graduated from this school obtained their freedom [18].

⁸ See [18; 20; 21, p. 269-271; 22; 26].

⁹ "... But these are all vulgar things, and Manilova is a well-educated lady. And as everybody knows, good education is imparted at the pensions. And at the pensions, as everybody knows, there are three main concerns that represent the foundation for all human virtues: the French language which is indispensable for a happy family life, the pianoforte to offer some pleasant minutes to the husband, and, finally, the economic part: knitting of purses and other surprises [27, p. 25, Russian version].



Fig.1.- "If only male power could be smashed like this glass!"

(A cartoon of the epoch: *Iskra*, 1859, n° 37, September, 25, p. 365. See TISHKIN, G.A., *Zhenskij vopros v Rossii: 50e – 60e gody XIX v. Leningrad, Izd-vo Leningradskogo Universiteta*, 1984)

population.¹⁰ St-Petersburg was naturally one of the most sought after places for young women in search of work. Their concentration in this city gave way to a very particular phenomenon, i.e. the ladies' communes. These were hostels for women who lived and worked together, sharing their limited resources with one another.¹¹

2.2.-Gymnasia.

Faced with this new demographic and economic situation it was no longer possible for the government to ignore the problem of women's education, be it general or vocational. In his Report to the Emperor on 5 March 1856, Norov, the minister for public education, officially raised the question of equal access to higher education for men and women. This proposal served as a starting point for the creation, in 1858, of a number of female gymnasia with a classical curriculum all over the country. One of the earliest, which was patronised by the Empress Maria Fedorovna's Administration, was opened in St-Petersburg on 19 April 1858.¹² Their number underwent a rapid increase. Thus, in 1864 Russia had 123 secondary schools for girls (boarding schools, residences, progymnasia¹³ and gymnasia); in 1866 there were 38 gymnasia (and 54 progymnasia), and 25 more were opened the following year.¹⁴

¹⁰ In the case of the large industrial cities this dynamic was particularly impressive. Thus, in 1860, there were 176.000 women out of a total number of 495.000 St-Petersburg inhabitants, whereas in 1865 they numbered 220.000 out of a population of 540.000. In relation to the male population, which numbered at that time 320.000, their rate of increase was proportionally 0,3% and 25%. See [28, p. 145-146].

¹¹ See [29, p. 224] with reference to the Stasov family archives: IRLI, f. 294, op. 5, d. 408, l. 7 verso and 8].

¹² For the history of this gymnasium (Marshansky school for girls) directed by N. Vyshnegradsky, the well-known mathematician professor, see [20]. According to some data, the earliest female gymnasium was created thanks to the private donations in Costroma in 1857. See [2, p. 46; 30, pt 40, p. 153]. The number of female gymnasia attached to the Administration of Empress Maria Fedorovna was constantly increasing. In 1911, for example, they numbered 35, with 16.298 pupils [2, p. 45-46].

¹³ The Progymnasium was an incomplete secondary school.

¹⁴ See [28, p. 144]. Since the early 1860s this process had been going on at such a fast rate that the official *Ministry of Public Education Review* decided to introduce, in 1869, a special section dedicated to new items on schools for girls (as part of general chronicle of school life) [31, p. 56]. This review is a very reliable indicator of governmental policy in the domain of women's education (note, however, that the collected materials deal essentially with the institutions depending on the relevant ministry; therefore they do not contain information concerning the institutions sponsored by the Administration of Empress Maria Fedorovna and some other institutions). Of the 276 volumes of the *Review* published between 1869 and 1914, we were able to analyse 74 volumes (26,8%). This choice was not deliberate but depended upon technical reasons. We can consider the selection sufficiently representative to enable us to draw some conclusions. Thus, in 55 volumes (out of 74) we were able to find 184 official governmental documents of all kinds (orders, instructions, directions, decrees) concerning primary and secondary education for girls. Twenty-three deal with the opening of new schools or with the upgrading of existing ones (from municipal schools to progymnasia and then to gymnasia) [32-34]. This pattern was generally common to all schools, state as well as private, primary as well as secondary (this was analysed in detail by O. Kajdanov [6] following the example of private schools). As a general rule, the local organizations or authorities initiated them. As for the State, the authorization was accompanied by some financial support including funds for construction or for buying the school building as well as annual subsidies (see, f. ex. [33]). The financial aspect of this problem is very well illustrated by the information concerning stipends. We were able to number 100 documents granting 173 stipends to girls [35; 36]. Information available concerning the sources of funding: 92 stipends (53,2%) were created thanks to private donations; 20 stipends (11,6%) from public collections (various subscriptions, charity dinners', etc.); 2 stipends (1,1%) from funds of public organizations; 18 stipends (10,4%) were paid by the State; 32 (18, 5%) and 9 (5,2%), by municipal and local authorities.

2.3- Early vocational schools for girls.

Secondary vocational training for girls was another field which was promoted during the 1860s. Although this had already started in the early 1830s, it was for many years neglected. Nevertheless, a fuller study falls beyond the scope of our study. However, a few odd pieces of the puzzle found in historical literature could add some light on the role this education played in the policy of women's professionalization.

One of the earliest initiatives in this field must be attributed to Timofej Prohorov (1797-1854), the owner of the calico printing factory in Moscow. The factory school he set up for women between 1833 and 1835 was designed to teach reading, writing, and women's handicrafts.¹⁵ All the other examples date from much later. Thus, in May 1867, a Needlework school for women was opened in Vilna: its

Another important way to fund schools for girls was for the school to be named after some distinguished person or to be sponsored by a member of the imperial family or by the Emperor himself, and we numbered 28 decrees dealing with such nominations [37]. Thirty-five more decrees were of a more general character (from granting some additional funds to allowing privileges to a number of private gymnasia) [38].

Besides these impressive figures or regular reports and overviews related to women's education [31; 39-43], which demonstrated the interest of the State in this matter, we were able to find a large number of publications dealing with specific schools and gymnasia [44]. An important historical work was devoted to the gymnasia supported by the Administration of Empress Maria Fedorovna [20]. The annexes to the annual reports of the ministry of Public Education are full of statistical information. We were able to consult three of these for 1868, 1869 and 1876 [45]. According to these, on 1-1-1869, the ministry of Public Education was responsible for 170 secondary schools for girls; the following year their number reached 184, in other words the growth rate was 10,4% during this period. Note that gymnasia and the progymnasia at that time numbered 45 and 50, respectively (with a growth rate of 11,5% per year). (For comparison with 96 men's gymnasia affiliated to this ministry on 1-1-1870, [96]).

Subsequently, the growth rate of secondary girls' schools slowed down. If we compare the data given on 1-1-1875 and on 1-1-1876, the number was 202 secondary girls' schools (including 64 gymnasia and progymnasia) and 216 (including 66 gymnasia), respectively. The growth rate per year was at that time 5% and 6%.

The subsequent growth of secondary schools for girls affiliated to the ministry of Public Education is yet more significant. In 1908, the number of girls' gymnasia and progymnasia reached 351 (compared with 494 men's gymnasia and *real* schools), in 1913 they were 920 (710 for men), in 1915, 1.001 (797 for men). In 1913 the secondary schools for girls, with 303.690 pupils, outnumbered those for boys, with their 219.906 pupils during the same period. Schools for both sexes depending upon other ministries, administrations, or private institutions were not considered.

The quality of this education, including that imparted in gymnasia, is another issue worth examining. A number of authors pointed out the low level of these schools that taught short courses of mathematics and physics and no classical languages when compared with some prestigious schools for boys. All this constituted a considerable obstacle for girls to be admitted to schools of higher education for boys [30, pt 40, p. 191-195]. As regards primary and secondary education for girls see also [2, p. 46-60; 24; 46; 99].

To complete this overview, it is necessary to stress one more important aspect of this educational policy of Russian State: the emergence of special sections for girls within the schools for *inorodcy* (special term for Russian subjects of non Slavonic origin). Such a section affiliated to the Bashkir school was opened in Orenburg in November 1883 [32]. By the end of the 1880s their number had grown sufficiently to persuade the authorities to enact the official statute and regulate the functions of their honorary patrons [47].

¹⁵ This initiative followed a trip to some European countries (namely, Germany), undertaken by Prohorov in 1832-33 in order to familiarize himself with Western companies and state schools. Prohorov made a second trip to Western Europe in 1846. He visited factories, plants, public schools, and universities and attended some lectures on both trips [48].

curriculum included embroidery, cutting-out patterns, linen- and dress-making.¹⁶ In October 1867, shoe making was incorporated into the curriculum of the Yalutorovsk girls' school (region of Tobolsk).¹⁷ The city of Odessa put forward another interesting initiative: a Handicraft school open to girls regardless of class or religion was inaugurated in December 1868 thanks to the financial support of the Tulovsky family. This school, besides providing an elementary general education, imparted special knowledge and skills in the field of bookbinding and turning. For poor girls it was free of charge.¹⁸

Even though the vocational schools for women were at that time more numerous than the few examples cited, the question of their spread and improvement remained unresolved. As this was a problem of public concern, it should be considered within the constantly changing context of the last decades of the 19th century. In the course of time, it became in some ways a double-edged weapon in the women's struggle for professionalization. In the late 1870s, the Russian government became more and more sympathetic to the development of various secondary professional schools for girls in handicraft and manufacturing as well as in agriculture and industry. There were a number of public and private initiatives, namely those of the Russian Technical Society (RTO),¹⁹ which obtained official approval and even received considerable financial support.²⁰ Nevertheless, at the same time, even though most of them were vocational, there were few institutions which prepared their graduates for real professional activity.²¹ Within the scope of our study, this favourable attitude would be attributable, among other

¹⁶ As its promoters proudly asserted, three of their pupils even learned to operate a sewing machine, a rare innovation purchased in 1869. [42, p. 57-58].

¹⁷ [31, p. 62-63].

¹⁸ [40, p. 254-255].

¹⁹ The role of the Russian Technical Society (RTO) was, in fact, very important. A report on the state of women's professional education in Europe presented by V. Iversen at its session of May 1879 gave a new impetus to the development of vocational schools for women. One of these (vocational school of Mrs Korobova) was opened in St-Petersburg in October 1879. During the same year RTO appointed S. Davydova to study the state of Russian handicraft schools, including those of lace-making. As a result, a special practical school for lace-makers was opened in St-Petersburg in August 1883 with the aim of preparing teachers for the local school workshops of lace making. By 1912 Russia had already about 60 such professional handicraft schools (including 30 in the capital itself) [49].

²⁰ As for State funding to various professional schools for girls see [50].

²¹ See the case of the school for girls active in the city of Cherepovetz, which was named "vocational" by the Imperial decree of 12-2-1900 [33]. This school was funded by both the city and the State. Its unique special "vocational" class had a five year curriculum including needlework, cutting-out patterns, knitting and general domestic science "... preparing graduates for the occupations suitable for a housewife in a modest family" [33]. To balance this case study, let us consider a contrasting example, that of the Moscow women's handicraft school named after its sponsor Grigorij Shelaputin (opened in July 1903) [51, p. 4-5]. This secondary institution open to all students irrespective of class and religion enjoyed the status of "elementary technical school" and was partly supported by the State. Although its curriculum also included the inevitable domestic science, the education was designed to prepare students for professional activity. The graduates gained the certificate of apprenticeship with the aim of becoming masters after a three-year practice [51, p. 9]. The subjects taught included the following: catechism, Russian language, arithmetics, Russian history, geography, hygiene, first medical aid, drawing, book-keeping, needle-work, and so on [51, p. 7-9]. In 1913 the fifth practical class of this school was transformed into a workshop to prepare handicraft teachers. A considerable sum of money was allocated by the Treasury to equip it [52]. Another interesting experience deals with the creation of Ljudmilinskaja women's agricultural school in the region of Tchernigov (1.07.1903). Its curriculum included: gardening, truck farming, bee keeping, etc. See [53].

WOMEN'S EDUCATION IN RUSSIA: MAIN PERIODS
1764-1855 – emergence and domination of boarding schools for girls (institutes for girls from noble families and pensions)
1856-1864 – development of the system of state secondary schools for girls irrespective of social class and first (failed) attempt to gain access to higher education at State universities and at some professional schools of higher education
1864-1873 – exclusion of women from State schools of higher education and the subsequent emigration of women abroad (until its prohibition); first attempts to create institutions of higher education for women in Russia
1872-1886 – inauguration of various courses of higher education for women, which did not give any official recognition to the graduates
1886-1889 – period of reaction: closing of nearly all courses of higher education for women
1889-1905 – re-opening of the Bestuzhev courses of higher education for women in St-Petersburg and gradual emergence of new educational institutions for women
1905-1915 – decline in women students at the State universities and marked increase of female and coeducational schools owing to public and private initiative
1915-1917 – removal (<i>de jure</i> or <i>de facto</i>) of the ban on higher education for women
1917 – merger of all schools and creation of a common state coeducational system

things, to a paradox which considered this model as an alternative rather than as a normal step towards higher professional education.

3.- Education as Emancipation: From Well-mannered and Sensitive Noble Girls to "Short-haired monsters".

"To admit young women to the university when we could not manage young men was the height of madness."

(V. N. Tchicherin, *Memoirs*)²²

²² Quoted according to [28, p. 138].

In autumn 1859, Natalia Korsini (Utina), the first Russian female student, turned up at the University of St-Petersburg. She did it without any preliminary authorisation and entered the lecture hall accompanied by the rector Pletnev, who introduced her to professor Kavelin. Korsini was soon joined by her sister and by four other young women: Maria Bogdanova, Antonida Blummer, Maria Bokova and Nadezhda Suslova.²³

A few months later, given their numbers, the presence of young women attending various university courses would no longer strike anybody as unusual. In the lectures of some teachers "women were nearly as numerous as male-students".²⁴ Some members of the teaching staff, i.e. the teachers of natural sciences, did not welcome this initiative: in order to deter the young women they deliberately used strong or even offensive language, especially in the lectures on anatomy or physiology. Despite this, the courses in natural sciences were those that were most in demand since in the girls' secondary schools these subjects were traditionally limited or even excluded from the curriculum. This demand fitted also with a new ideology of Nihilism which emerged in the early 1860s and within which the veneration of natural sciences acquired an almost sacred character.

After St-Petersburg, "hundreds and hundreds of young girls and women" attended the other big universities, for example in Kiev, Kharkov and Odessa. In 1861 women were also accepted as free students at the Medical-Surgical Academy.²⁵

This influx of women into higher education was totally unexpected and became a reality of Russian social life in the early 1860s. There was a very simple administrative explanation: it was made possible largely because of the University Regulations of 1835, whereby no official opposition or limitation to the access of women to higher education had been formulated (perhaps because nobody had contemplated such a possibility). It was further facilitated during the early reform period by the decision taken in 1857-58 to cancel all restriction in number of university candidates, which had previously been limited to 300 students. Public lectures were also permitted. But, perhaps the most important point was the exclusion of military training from the university curriculum.

At the same time this new situation immediately raised a number of problems. One of these problems was essentially academic: how to deal with the status of a

²³ See [8, p. 31-53; 28, p. 144; 54]. According to Tishkin who studied this question in particular, no official documents are available that could allow us to establish a more or less complete list of the first St-Petersburg University. Their total number is also unknown. Their names have reached us thanks to the memoirs of their contemporaries who mentioned them essentially because of the excessive social and political activity of these ladies. Here are some more names of the young ladies who were among the first to attend the university courses: V. Glushanovskaja, M. Korkunova, M. Obrucheveva, E. and P. Pypiny, A. Suslova, and so on [28, p. 149].

²⁴ [55, p. 214]. Referring to this situation in her PhD thesis, Ruth A. Dudgeon alluded to the earlier publication of L. Panteleev's memoirs *Iz vospominanij proshlogo* [From the Remembrances of Long Ago], St-Petersburg, Merkushev, 1905, p. 133-135. Panteleev was a student at St-Petersburg University at that time. Her statement nevertheless differs from that of Panteleev cited in the text because she stated that there were "... more women than men in the lectures of certain teachers" [8, p. 33]. Is this a linguistic problem or the difference between two versions of the memoirs? According to the quotation in [25, p. 171] the second version of the Panteleev's text does not seem to be modified.

²⁵ It is important to stress that in any case all the women attending the university courses enjoyed at the time the status of free students albeit without no official rights.

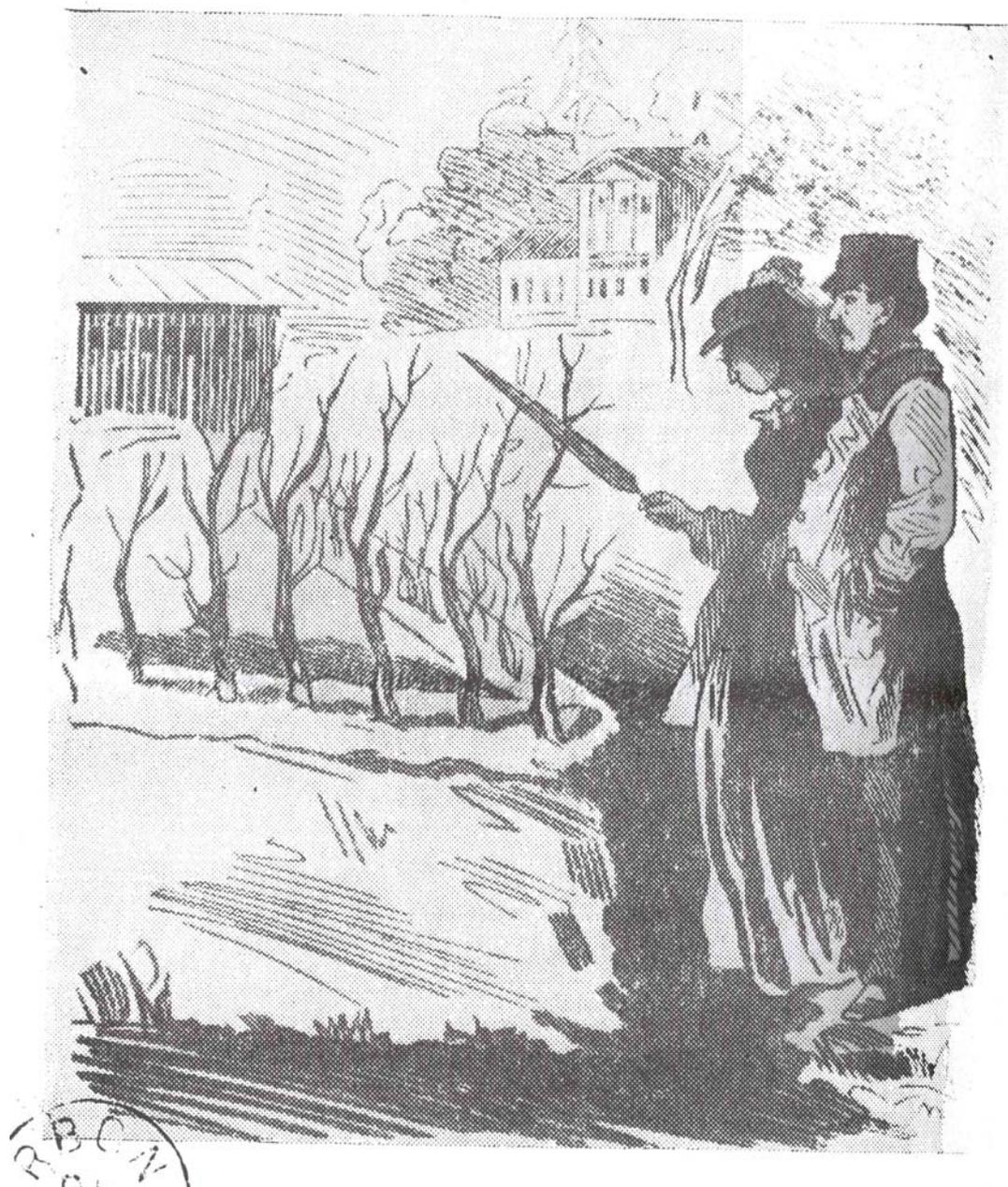


Fig. 2.- **“What a strange idea to plant birch trees around the dacha!- It is nothing but an economic arrangement. There is a girls’ boarding school there and this school needs birch-rods; so this meets the annual production”**

(A cartoon of the epoch: Iskra, 1863, n° 25, July, 5, p. 343. See: THISHKIN (1984))

female student population, and with their access to exams and their rights to gain diplomas.

This problem was far from being solely administrative. Its close affinity with the very concept and aims of the Russian university made it fundamentally different from its West-European prototypes. Despite their superficial similarity, the contradictions were pointed out by P. M. von Kaufmann, ex-minister for Public Education and author of an alternative project of the 1884 university reform.²⁶ In his long account on this subject published in 1909 in the *Ministry of Public Education Review*,²⁷ he clearly opposed the role played by the government in promoting, regulating and supervising of university education in his country and abroad. The dominant role of the State in Russia, he argued, remained complementary to social action and private initiatives which originated in this kind of education in Western Europe. Created by the State, the university in Russia was from the beginning conceived as a state school of higher education which was designed "to prepare young men to enter ... the civil service".²⁸ Consequently, the university diploma, which ensured a guaranteed access, with a relevant grade within the List of officials (*Tabel' o rangah*), became an important incentive to a professional career. For its part, the State undertook to regulate to the last detail all aspects of university life, academic as well as administrative. Moreover, despite the official declarations of the founders, who regarded themselves as followers of Western prototypes, the status of the Russian university in fact resembled much more the French Grande École than to the autonomous academic corporation. To give women access to the university diploma, and thus, to the civil service, was in this context a considerable challenge fraught with serious social implications. Moreover, this problem arose at a very inappropriate moment, when the government had to face the mass student disturbances that broke out in the main university cities.

The second problem was closely related to this complicated political situation. The very first female students were very active politically and they immediately joined the student revolutionary movement. Some of them became members of radical revolutionary organisations such as "Earth and Freedom" (for example Suslova, Bogdanova, Blummer and Korsini, namely all the first female students of the University of St-Petersburg).²⁹ Equal educational rights for males and females became a strategic demand of the most radical socialist trends.

The "educational" aspect of female emancipation in Russia was, in fact, its most striking feature. According to Sophie Satina, it was in this respect that it differed from the feminist movements in the West. For the latter, she argued, the struggle for general education was only complementary to the main goal of gaining civil, political

²⁶ For the text of these Regulations, generally recognized as much more reactionary when compared with those of 1863, see [56]. Note that, as in the previous case, there were no direct prohibitions on women's access to the university. Everything was detailed in the following ministry circulars (for example, [57]).

²⁷ See [58]. Note that von Kaufmann's project elaborated in 1907 and published two years later was regarded by the editors as a private opinion not shared by the editorial committee.

²⁸ [58, p. 3]. Compared with the universities in Western Europe, which had been founded many centuries ago, the Russian university, with its 250-year history, is a very young institution. With the exception of Moscow University founded by Mikhail Lomonossov in 1755, all Russian universities were founded following the creation of the Ministry of Public Education in 1802. The first university to be created, in 1802, was the University of Derpt (1802), followed by those of Vilna (1803), Kazan (1804) and Kharkov (1804-1805). Subsequently, the University of St-Petersburg (1819), the University of Kiev (1831), the University of Odessa (Novorossiisk, 1865), the University of Warsaw (1868) and the University of Tomsk (1888) [58, p. 2; 59; 60, p. 148-149].

²⁹ See [28, p. 155; 8].

Access of Women to Western Universities*	
University of Zurich	early 1860s
France	1868
University of Leipzig	late 1860s (with subsequent prohibition)
Sweden and Finland	1870
Denmark	1875
Italy	1876
England	long process started in 1876
Belgium	1880
Norway	1884
Spain and Romania	1888
Greece	1890
University of Heidelberg	1891
Austria-Hungary	1897
USA: Michigan	1870
Boston	1873

* Data quoted after: [7, p. 7-8] and [112, p. 55].

and economic rights for women to secure their active participation in the political and intellectual life of their country. In Russia the struggle for equal rights to higher education, for a number of reasons, took priority in the female movement.³⁰ Developing this thesis, we can say that emancipation itself was perceived by Russian women, above all, as free access to higher education. This point is essential for understanding the development and issues of higher professional education for women in Russia with respect to other cultural contexts.

The first female students as well as being the most dynamic, resolute and emancipated members of their sex were also the most militant advocates of University rights and freedoms. During this period the movement grew and began to oppose the government with renewed vigour. In joining the revolutionary movement and in participating in the political struggles women students pursued a two-fold aim: to gain support for their own demands and to fight for common political rights with men, who were discriminated against in the Russian Empire.³¹

Such a militant stand occasionally assumed very radical forms. Nihilism was one of its extreme manifestations because of its singular, provocative and particularly visible character. Sceptics and materialists, who were its champions, demanded rights of personal freedom and rejected traditional life-style, well-established social customs and opinions. They repudiated all religious and moral

³⁰ See [2, p. 2; 3, p. 1].

³¹ The following elements provide evidence of the highly militant social activity of the women's: publication of a special women's review *Zhenskij Vestnik* (Women's Herald), September 1866 - February 1868; existence of various women's *artels* and associations such as Society of cheap flats (since 1859), Society of women translators and women publishers (1863 - 1879), with an *artel* of women-bookbinders attached to the latter (created before 1863), and some others ([29; 61]; see also [28; 55; 62]).

principles, all values of traditional family and wedlock. The "theory of rational egoism" was their intellectual programme and life-style. The natural sciences were their cult. Although adopted by both males and females, this theory was essentially associated in the public mind with the idea of women's emancipation. Dressed in black, ill-mannered, masculine, "short-haired monsters", smoking, swearing, talking politics, finance, and science, they became the popular stereotype of cartoons and novels. The best-known literary image of such a nihilist woman was provided by Ivan Turgenev in his famous novel *Parents and Children* (Evdoxia Kukshina). A positive interpretation of the emancipated woman, that of Vera Pavlovna, was supplied by Nikolaj Chernyshevskij in his militant novel *What is to be done?*, which became the favourite reading of the revolutionary oriented young Russian intelligentsia. There is one more subtle aspect of this movement which historians of women's education should bear in mind: for a large number of Russian women such defiant conduct was their way of registering their protest against the male hostility to their educational rights. Since the preservation of "femininity" was one of the main arguments of the opponents of higher education for women, young women finally rejected it as an oppressive obstacle to their dream and took up arms against it with frenzy.³² Paradoxically, in so doing, they contributed to their caricatured image of the woman-nihilist as a revolutionary and socially dangerous element. Enjoying considerable popularity for the subsequent decades, this image did much harm to the very idea of emancipation and higher education for women. It led logically to the conclusion that the existence of women-students was in itself undesirable. "To admit young women to the university when we could not manage young men was the height of folly" –the ruling classes shared this opinion of the minister for Public Education. According to Kropotkin's memoirs, "Alexandre III hated educated women. When he happened to meet a woman wearing spectacles and a garibaldi hat, he felt intimidated and thought that he was being confronted by a nihilist about to discharge her pistol".³³ (Incidentally, it should be mentioned that the Emperor was very near the mark because on 1 March 1881 he survived a bomb attack. The signal for letting off the terrorist bomb was given by young Sofia Perovskaja, a former student of Women's *Alarchinskie* Courses. But all this occurred much later).

Thus, in the explosive situation of the early 1860s when after the euphoria of the Great Reform, the Russian government had to deal simultaneously with peasant, student and national disturbances (in Finland and in Poland), which broke out all over the Empire, it was considered convenient to neutralize at least some of the agitators. As a result, a positive decision to be taken in 1861 with the approval of nearly all the University Councils (except those of Moscow and Derpt) was abandoned.³⁴ New University Regulations promulgated in 1863, although formally indifferent toward women's education, were drawn up so that they could restrict it *de*

³² There is the opinion of E. Lihacheva, historian of women's education in Russia, and one of its most zealous advocates who lived through the events: "Since the very beginning of the movement, society as a whole had shown little sympathy with the women's yearning for science; faced with such a hostile attitude, these women became embittered and started to protest openly against society". Quoted according to [30, pt 40, p. 155].

³³ See [28, p. 217-218].

³⁴ The point concerning women's right to attend university courses was officially adopted by the new University Regulations project elaborated in 1862. The authors of this version, members of the Scientific Committee of the General Direction of Schools (appointed by the minister for Public Education) also supported the idea of giving women full access to science degrees [63]. For the negative attitude of the universities of Moscow and Derpt and the negative influence they had on the university policy see [25, p. 171; 55, p. 219].

facto. Using a system of ministry circulars sent to all the universities, access to higher education was closed to women, and all female-students were excluded from the universities.³⁵ The longest to resist was the Medical-Surgical Academy, where female-students received support from Milutin, the Minister for War. The last women student had nevertheless to leave in 1864.³⁶

4.- The Challenge of Alternative Issues: Emigration versus Home Solutions.

*"Soon, more doctors for Russia
will be trained in Zurich than in Russia itself"*
(N. Kozlov, January 1870)³⁷

Although the first attempt by women to gain access to higher education by entering the higher institutions of the Russian State had failed, the censors soon lost control of the situation. Both former women students and a new group of young girls from the numerous gymnasia, which prepared them for higher education, refused to comply with the restrictive rules. They took up the challenge and responded on a massive scale. For many of them it entailed looking abroad for training; for those who could not or did not want to leave, it meant persisting with their demands and intensifying their struggle in their own country.

Much can be said about the women-students from the Russian Empire who studied abroad. Generally speaking, they constituted for nearly half a century the largest number of women students at the main European universities, notably Berlin, Bern, Königsberg, Liège, Paris, Zurich etc.³⁸

However, this subject is as attractive to scholars as it is difficult to investigate. There is a dearth of information; the archives are scattered and often unavailable. In order to draw a collective portrait of this population, which numbered thousands of individuals, it would be necessary to carry out a sociological study whilst making full use of the collections of matriculums and registers, personal memoirs, various administrative, ministerial and governmental statements, university regulations and press materials.³⁹

³⁵ To compile these prohibitive circulars the ministry officials used some ambiguous points of the new Regulations, i.e. §103 concerning free students and the conditions under which they were allowed to attend university courses [28, p. 189-191].

³⁶ See [25, p. 171]. According to G. Tishkin [28, p. 191], there was nevertheless one exception to this general rule. One female-student, V. Kashevarova-Rudneva, was allowed to proceed with her medical studies because she pledged herself, on completion of her course in the Academy, to work as a doctor in a remote region among the Bashkir.

³⁷ Extract of the report submitted to the Medical Council of the ministry of Internal Affairs by N. Kozlov, director of the Medical-Surgical Academy, and by the physicians N. Zdekauer and A. Krassovskij. See [28, p. 199].

³⁸ Reading official documents we came across one striking fact, which raised further questions. While Russian women, desperately, looked for education abroad, the Russian government subsidised foreign girls to be educated in Russia. Thus, in 1868 the minister for Public Education obtained a sum of 1500 roubles to be paid annually to the Odessa gymnasium for 5 Bulgarian girls selected by local communities in Bulgaria. On their return to Bulgaria, these graduates became teachers in the local schools for girls [43]. Naturally, this forms part of the diplomatic games of the Russian government. Given that this concerned secondary education, it could be understood. Nevertheless, we came across to some foreign registrations, i.e. one American and one Belgian, for courses of higher education for women and we have been unable to account for this. This merits further investigation!

³⁹ A very rich collection of matriculums and registrations of French university students is conserved in Paris.

Some very interesting research has been made in this field by scholars of modern Jewish history, specifically by those of the history of Jews from the Russian Empire.⁴⁰ These two subjects should be examined in conjunction. First, because both Russian women and the Russian Jewish minority formed part of the oppressed part of the population and both were obliged to fight hard for their educational rights. Second, because Jewish women from the Russian Empire in order to achieve their emancipation had to face a threefold oppression because of their sex, their Jewry inside the traditional Jewish community and the discrimination beyond the Pale. Having joined the mainstream of women's educational migration abroad since the early 1870s, they subsequently constituted (between 1880 and 1910) the largest number of Russian female students abroad.⁴¹

As for the Russian pioneers of this movement, they were active abroad for a decade from 1864 to 1873, when their number shows a sharp fall. This was linked to the governmental decree of 21 May 1873, requiring all Russian women who were studying abroad to return home in exchange for a promise of an education in Russia.⁴² Paradoxically, this measure could be attributed to the same reason that caused the exclusion of women from the Russian universities ten years before: their excessive and uncontrollable political activity wherever they stayed. The Russian police, whose agents were everywhere, were very well informed about the political ideas of Russian students in Europe. Thus, it kept abreast of events through their contacts with the ideologists of Russian populism (*narodnichestvo*), and in the Russian section of the I International. In this regard, Zurich caused particular annoyance: a large number of Russian women who attended the university of this Swiss city could make contact there with the most dangerous agitators of the revolutionary underground.⁴³ To provide them with educational opportunities at home

⁴⁰ See [64; 65]. This subject deals with Jewish girls in the Russian Empire who studied in Italy in the early 20th century and it has been treated in a special section devoted to the training of Russian Jews abroad by Gouzevitch, D. (1998) *Jews in the Culture of Russia abroad*, num. 6, Ed. Mikhail Parkhomovsky, Jerusalem, 480 p.].

⁴¹ This increase is consistent with two events in Russia: introduction (1887) and the legalization (1908) of the *numerus clausus* and the failure of the revolution of 1905. More than 19.000 Russian and Romanian students were enrolled at the University of Paris between 1905 and 1914 (this means 1.000 to 2.800 registrations each year), and 5.820 of them were women. According to some estimation for the period prior to World War I, 75% of these Russian students were officially of Jewish origin. This emigration had another peculiarity: between 1906 and 1913, a large number of women, constituted nearly 70% (from 60 to 68%) of all the foreign women enrolled at the University of Paris. Their distribution among the faculties is even more striking: East-European women accounted for between 92 and 99% of all foreign women students of law; between 96 and 98% of foreign women students of medicine; between 58 and 65% of women students of philology. See [66].

⁴² Whereas the demand for women's education was no longer challenged, that of women's professionalization remained one of the most controversial issues during the whole period. To illustrate the complex nature of this matter, let us quote the Imperial Decree of 14-1-1871, which defined the professional domains open to women: midwives and nurses, doctor's assistants, vaccinators and druggists in the hospitals for women; educators and teachers in the primary schools and in the junior classes of gymnasia for girls; telegraphers and signalists; book-keepers in some institutions for women. It excluded women "for hire, for any clerical work or any other function at any state institution where the places are obtained by appointment or by election" [21, p. 560-561]. It is interesting to compare this document with another one, written by Empress Maria, Alexander II' wife. On 2-10-1870 she defined the aim of women's education "as necessary for family welfare" [67].

⁴³ Russian students were, in fact, particularly numerous in Switzerland. According to some statistical data, in 1901-1907 they numbered 2.513 (32,7% of all the students in Swiss universities) and in 1910-1911, 1.725. As regards the University of Zurich, they were 382 in 1905, 480 in 1907 (a third of all the students in Zurich). See [65, p. 190]. As for women students, i.e. during this period (the significant year 1873) the University and the Polytechnicum of Zurich numbered together 108 Russian girls,



Fig. 3.- **Nadezhda Suslova (1842-1918), one of the first Russian women students to be awarded a doctor's diploma (1867) from the University of Zurich, was allowed to practice medicine in Russia (THISHKIN (1984))**

whereas all the other foreign female-students all over Europe numbered fewer than 20 women [30, p. 156]. Note that the author of the decree used a very subtle rhetoric to extend this obsessive governmental "Zurichophobia" to the widest public opinion. He stressed in particular the extremely deplorable and isolated position of Russian women who studied in this Swiss city. Such a situation was caused, as it is said in the decree, by their weak general educational background and their poor knowledge of foreign languages. Add to this a vindictive attitude of the local society, and one could understand why Russian women-students abroad preferred politics to science: this preference was no more than a ploy to compensate for their disappointment and failure. As the government sympathised with the creation of schools of higher education for women "with a strictly definite and complete curriculum" first in St-Petersburg and Moscow, and then, as new funds would be found, in the other university cities, all the Russian women students at the University and Polytechnicum of Zurich were informed that they had to return to Russia before 1 January 1874. Those students, who persisted in attending lectures at these institutions after this date would be excluded from all activity depending on the Russian State or from all examinations in a Russian academic institution [10, p. 102; 30, p. 158; 62]. For Russian girls-students in Zurich see also [8, p. 74-76].

was finally considered to be the lesser of two evils. Another reason in support of this decision was the increasing pressure of Russian public opinion, which expressed concern over the brain drain from the country. Despite the official lamentations, Russian women students abroad gave a striking demonstration of their professional efficiency. In 1867 two Russian women were awarded doctor's diplomas: N. Suslova from the University of Zurich and E. Lej from the University of Paris. The former obtained, in the following year, her doctorate in medicine, surgery and midwifery from the Medical Council of the *Alarchinskie* Courses in Moscow and was allowed to practice medicine in Russia.⁴⁴ The latter suffered, in contrast, a very tragic fate. As the first woman-doctor of mathematics and physics at the Sorbonne, 24 year old Elena Lej committed suicide just after being awarded her second degree because she suffered a mental breakdown.⁴⁵

Meanwhile the struggle carried on by the militants of the women's educational movement bore its first fruits. Different approaches were tried, namely the home universities, called "Universities of the Wind", a very mobile form of private higher schools which attracted, as lecturers, the cream of the Russian professorship such as I. Sechenov, A. Borodin, D. Mendeleev, I. Mechnikov, V. Kovalevskij, etc. The next step consisted in organizing special scholarly courses for women.

5.- Higher Courses for Women as a Starting Point towards a New Social Status.

*Don't marry girl-students, they are fat like sausages,
better marry women medical students, they are lean as rakes*
(Student ditty of the epoch)

The first three specialized institutions for women were called Women's Courses and were created almost simultaneously in Moscow (Lubjanskies Courses, 1869,⁴⁶ and Vladimirskies Courses, January 1870⁴⁷) and in St-Petersburg (Alarchinrskies Courses, 1869-70).⁴⁸ Their level corresponded generally to that of secondary schools, although the Vladimirskies Courses adopted a university curriculum. This initiative was continued in some important cultural and administrative centres like Kiev (1871-72-78), Kazan (1872?-76), Odessa, Warsaw, and Kharkov.⁴⁹

⁴⁴ See [28, p. 196].

⁴⁵ See [68].

⁴⁶ For the Lubjanskies Courses, see [2, p. 69-75; 3; 8, p. 85-88; 25; 30, pt 40, p. 170-176; 69, p. 5,9; 70, p. 174-179; 71; 72, p. 41].

⁴⁷ Officially, the Vladimirskies Courses were coeducational, but in practice they had an exclusive population of women-students. Thus, out of 900 first year registrations, 767 (85,2%) were female [28, p. 195]. The courses functioned between 1872 and 1875 and were constantly moving to new premises. For a few months they were located at the Vladimir regional school building. For some lectures, the Courses used the classrooms of the Medical-Surgical Academy or of the university gymnasium attached to the history-geographical faculty. For the Vladimirskies Courses see [2, p. 90-94; 3; 8, p. 89-91; 41; 72, p. 40; 73, p. 41; 74].

⁴⁸ For the Alarchinrskies Courses see [8, p. 87-88; 25; 69, p. 6; 72, p. 41; 74].

⁴⁹ During the period of reaction, between 1886 and 1889, all the courses of higher education for women (except the Bestuzhev Courses) were closed. There was a new wave of admissions at the turn of the 19th and 20th centuries, with the opening of higher courses in Moscow (1900) [30, pt 44, p. 18-20; pt 46, p. 7-12; 71]. Subsequently, similar courses were re-created in Odessa (1906), in Kharkov (1907), in Warsaw and Tbilisi (1909), in Simbirsk and Tomsk (1910), in Ekaterinoslav (1916),

This first experiment, which had been rather successful, now gave an impetus to the organization of higher (and) professional schools for women. The main question under debate turned on the specific patterns and possible issues.

The most radical project, that of a University for women, was put forward by 30 feminist militants and 43 university teachers from St-Petersburg. However this idea appeared to be too dangerous to the ruling classes who had not yet forgotten the "short-haired" revolutionary agitators who had been active in the universities during the early 1860s. As a result, the government adopted a more favourable attitude towards the two alternative proposals that were more moderate: those of professor Gerier in Moscow and of Milutin, minister for War in St-Petersburg.

The Gerier Courses in Moscow. The proposal by professor Gerier of the University of Moscow was based on the belief that women should not be allowed to gain higher professional education but rather a higher general one. This would, he argued, allow women to better understand the cultural and spiritual needs of their husbands. The only professional activity he allowed was teaching in schools for girls or at least in gymnasia. In 1872 the two-year Gerier Courses⁵⁰ were inaugurated and affiliated to Moscow University. The certificate awarded to the graduate, however, did not confer any legal rights for professional activity even in the field of teaching.

*The Courses for Learned Midwives in St-Petersburg.*⁵¹ Milutin's initiative, which was supported by N. Kozlov, the Chief military-medical Inspector, started from the opposite concept of women's education as we can see from the name of the Institution he suggested. The Courses for Learned Midwives opened in St-Petersburg in the same year 1872 and provided a broad medical education. The diploma awarded was inferior to those of the Medical Academy but gave the right to practice as a physician. Nevertheless, the level of education was very high, and its quality was put to the test during the Russian-Turkish war of 1877-78, when graduates of these Courses worked as nurses, medical officers and even as military surgeons.

Incidentally, it should be mentioned that Milutin possessed a very subtle political intuition and a very good knowledge of human psychology. By offering women an opportunity to gain professional status, he encouraged their resistance to all kinds of revolutionary propaganda. The administration of Medical Courses had more to fear from the professional milieu, because newly trained female physicians encroached upon the very closed corporative world of career and professional privileges protected by the List of officials with its well-established system of *chins*.⁵²

The Higher (Bestuzhevskie) Courses for Women. One more institution, which opened its doors in 1878, marked, finally, the turning point in the approach to the

etc. For the higher courses for women, including pedagogical and commercial, see [2; 3; 8; 10, p. 361-362; 11; 30; 39; 40; 42; 43; 75, p. 166; 76].

⁵⁰ In 1879 they became three-year courses. See [2, p. 75-79; 3; 5; 8; 10; 25; 30, pt 40, p. 176-182; 69; 71; 77].

⁵¹ For the Courses for Learned Midwives see [46; 74]. In fact, the education of midwives in Russia has very old roots. The earliest school of this kind (Women's Institute of Midwifery) was opened in St-Petersburg in 1785, under the reign of Catherine II. Then followed: School for Midwives in Moscow (1801; Nicolaj I reduced its curriculum from 4 to 2 years); Midwives' Institute in Kiev (1844); Section for preparing female doctor's assistants attached to the St-Petersburg Foundling Hospital (early 1850s). See [2, p. 79-89; 3; 8; 30, pt 40, p. 155; pt 46, p. 45-58; 70, p. 164-174]. The University of Derpt had its own Courses for Midwives [78]. For more information about the system of medical education for women in the Russian Empire, i.e. the status and rights and further careers of graduates, see [35; 79].

⁵² There was resistance to medical education for women from male doctors who feared professional competition.

higher education for women. The Bestuzhevskie Courses were so called after the name of their founder, professor Bestuzhev-Rumin from the University of St-Petersburg, and were conceived *de facto* as a university, with two parallel history-philology and physics-mathematics sections (a third section of law was added in 1905). Remarkably, this was the only institution to survive the years of reaction (1886-1889), which proved fatal to all its others.⁵³ The history of this original institution as well as the activity of its teachers and graduates has already been studied and we shall not dwell on the details here.⁵⁴ Nevertheless, to give an idea of its importance, some key-dates and data should be mentioned. According to a Report submitted by the sponsoring Committee to the government in 1916, the number of students at that time surpassed 6.000 (with 2.800 in the history-philology faculty and nearly 2.400 in the physics-mathematics faculty) whereas the teaching staff numbered 136 teachers and 33 assistants. The graduates of these Courses progressively gained the right to work as teachers in gymnasia, and in 1913 their diploma was considered to be equivalent to the university one. In 1916 they were authorized to have their own State Examination Commission. In 1918 they became the III Petrograd University and a year later they were incorporated into the University of Petrograd. One further aspect should be mentioned: a very strong emphasis was placed upon the natural sciences and especially upon mathematics.

6.- Towards Higher Technical Education: Disciplinary and Organisational Challenges or How to Cross the Rubicon?

Mathematical training played a decisive role in the professionalization of women's engineering. From the historical point of view, three factors are worthy of mention. The first one deals with public opinion concerning the very aptitude of women to assimilate this particular knowledge and to apply it to all professional activities. In Russia, as in other countries, this was traditionally sceptical. The second factor, closely linked to the latter, relates to an adequate background in mathematics for candidates entering engineering schools. The third one concerns specific standards in the curricula of schools of higher education for women as well as the way the students assimilated them.

By the early 20th century all these barriers had been broken down. The first breach in public opinion was provided by the striking success of some Russian women who had trained abroad. If the name of Elena Lej, the first woman doctor in physics and mathematics at the Sorbonne, remained unknown because of her early death, we cannot say the same about Sofia Kovalevskaja, the famous Russian mathematician and mechanic.⁵⁵ Despite emigrating from Russia at the age of nineteen and completing all her professional studies abroad, her scientific

⁵³ In 1886-1889 they were temporarily closed to a new enrollment, but thanks to the complicated political manoeuvres of its founders this institution was able to escape definite annihilation [2, p. 97-105].

⁵⁴ See [2, p. 97-105; 3; 8; 30, pt 40, p. 166-170; pt 44, p. 13-18; pt 46, p. 2-7; 46; 73; 75, p. 125-165, 180-187; 80 - 82]. The authors of this article also studied this subject [82]. The building where the courses were located (Vasiljevskij Island, 10th Line, n° 33-35) belongs today to the University of St-Petersburg (Faculty of Geography). A special memorial plaque informs the public about its previous leaseholder.

⁵⁵ Sofia Kovalevskaja first studied at the Universities of Heidelberg (1869) and Berlin (1870), then pursued her mathematical training as Weierstrass' student (1870-74). Doctor of philosophy at the University of Göttingen, she became professor at the University of Stockholm in 1884. See [83].

achievements were recognized by her compatriots: in 1889 she was elected correspondent-member of the Academy of Sciences of St-Petersburg and thus became the first (and for a long time the only) Russian woman academician.

As for day to day training, the ability of women to cope with this task was demonstrated by the very existence and the ten years of success enjoyed by the Higher (Bestuzhevskie) Courses for Women with their full university curriculum in physics and mathematics. Their unique astronomical section was organized by 1906 on the basis of a special course in astronomy taught from the beginning.⁵⁶

The astronomy syllabus was elaborated and taught by scientists such as S. Glazenap, O. Baklund, and A. Zhdanov from the Pulkovo Observatory. The syllabus included the following subjects: celestial mechanics, celestial geometry and spherical geometry, practical astronomy, geodesy and, later, astrophysics. Moreover, by 1896-97 the Courses had succeeded in managing their own astronomical observatory situated on the roof of the building and in organizing a well-equipped astronomical study for practical works. The women-astronomers who graduated from these Courses worked subsequently in Pulkovo and in many other observatories all over the country.

With women-physicians, women-astronomers and women-teachers, all of them graduates of the various higher courses, the professionalization of women became an accomplished fact.

On the other hand, hundreds of secondary schools, state as well as private, with a gymnasium's curriculum, attempted to train girls in the same way as boys, i.e. providing a large number of women with a classical background in mathematics and natural sciences for specialized higher education.

The challenge of the syllabus was an important, though not the only, obstacle to technical education for women. To initiate technical education an adequate organizational and administrative form had to be found. During their more than thirty-years' existence, the higher educational institutions for women experienced a variety of interactions with public opinion, the labour market and the State. Their joint experience served as a starting point to elaborate an appropriate model for training women engineers.

This difficult "organizational" challenge can be better understood if we examine the problem of higher technical training for women through a different perspective –that of engineering education.

7.- Higher Engineering Schools as Part of the Male World.

Engineers in pre-revolutionary Russia were trained in institutes, special technical schools very similar to the system of French *Grandes-écoles*. All of them initially formed part of the corresponding engineering corps, and, after the demilitarisation of the latter in 1867, they remained attached to the relevant ministries, providing engineers only for the Civil service. Irrespective of whether they were military, militarised or civil, all engineering administrations were governed by both a very rigid system of internal regulations and a hierarchy of ranks established by the State in the List of officials. Dominated by a corporate spirit and conceived without regard to the female world, this system tended to remain monolithic and thus impervious to women (even if miraculously they were well trained professionally) for the simple reason that such a situation was unforeseen by the State regulations.

⁵⁶ See [80, p. 478-479].

However, in 1863-64 this very system originated one of the earliest forms of women's professional employment as technical staff of the telegraphic and railway agencies, albeit without any right to grades, advancement, long-service bonus or pension.

The technological institutes that initially trained chemical engineers for both the Civil service and private enterprise provided a rare exception to this system. It is little wonder that in 1905 when women once more gained access to State schools of higher education (not yet as regular but as free students!) the technological and agronomical institutes were, among their preferred technical schools.⁵⁷ In addition to polytechnical institutes, a third type of higher technical school emerged in Russia at the turn of the 19th and 20th centuries. This type of school had a peculiar feature that made it attractive to women: based on the German technical universities, it was free of all traditional conservatism and corporate attachment. Together with the higher courses, autonomous private or public institutions, it served as a model for the emerging technical schools for women.

8.- Paradoxes of the Corporate Mind or Advantages of "No Man's Land"?

Turning our attention to the history of technical education for women in Russia, we should start by stressing its very paradoxical aspect. Not only did male State engineers support the educational initiative put forward by a small group of female militants, but also some of the most prominent and senior of them became the real motors of this campaign. Their role is all the more significant in that it is linked to the only successful institution, which survived in Russia in the early 20th century.

This phenomenon is worth studying more fully. An analysis could, in fact, help us to clarify the internal structure that impeded or stimulated, within a professional context, a dialogue between two traditionally segregated worlds: male corps and feminism. At this juncture we are not in a position to provide a comprehensive answer to this question. It should be pointed out that engineers proved in general to be less rigid and hostile toward engineering for women than other corporate professional groups such as physicians. Engineers as individuals, however, not the world of State engineering, it must be added. This division should be borne in mind when dealing with the field of professional issues for women. In contrast to liberal professions such as medicine, the world of State engineering with its well defined areas of activity and its well-established hierarchy remained closed to women for many years to come. Thus, State engineers, especially those who occupied senior positions, had nothing to fear by way of competition from this quarter. At the same time, the rapid industrialization of Russia in the late 19th century opened up many new possibilities and perspectives, whilst skilled workers for different branches of private industry were still lacking. The senior and highly placed State engineers were among the first to appreciate this need since many of them worked in close contact with private companies. It is here where we can find one explanation of the key role State engineers played in the creation of the higher Polytechnical Courses for Women, which opened in St-Petersburg in 1906.

⁵⁷ The number of female free students was limited until 1915 before decreasing. So, by 1909-1910 there were 2 in Tomsk Technological institute, 14 in the Kiev Agronomical institute, 28 and 30 in Petersburg and Kiev Technological institutes [10, p. 295].

9.- From a Project of Drawing School to the Petersburg Polytechnical Institute for Women (PPIW)⁵⁸.

«A Polytechnical Institute for Women is nothing but a natural step on the road commenced long ago»

(Nikolaj Shchukin)

9.1.- The beginning.

The first proposal came from women. In particular, we should attribute it to Praskov'ja N. Arian, herself a former student in physics and mathematics of the Bestuzhev Courses, wife of an engineer and one of the most ardent advocates of women's professionalization.⁵⁹ In 1898 she proceeded with the idea of organising drawing courses. Although it lacked support of the Russian Women's Philanthropic Society where she submitted it, this project was partly carried through one of its members. Argamakova, who introduced a special drawing course in her private professional school.⁶⁰

Four years later Arian resubmitted her project. Two professors of civil engineering, Nikolaj Belejubskij and Valerian Kurdjumov,⁶¹ helped her to draw up the plan and the programme. On 7 February 1902 she presented it, on their recommendation, at a session of the Permanent Committee for Technical Education, which was attached to the Russian Technical Society.⁶² The idea of a special three year "Technico-graphical Institute" received an enthusiastic response in the engineering milieu and was approved by the Society, but three more years were to elapse before it took its definite shape. Praskov'ja Arian still remained its guiding soul and motor and succeeded in gaining some very active, competent and influential supporters in both engineering circles and fashionable society. Thus, the regulations of the "Society for procuring funding for women's technical training", which she set up in 1904, were supported by V. Kurdjumov, N. Belejubskij and A. Nebolsin, all teachers of the Institute of Ways of Communication [Institute of Civil Engineering], but also by A. Filosofova, P. Stasova, E. Konradi, V. Taranovskaja, Countess Panina and Baron Gincburg,⁶³ influential high ranking people.⁶⁴ On 20 March 1905 its

⁵⁸ For the history of this institution see [1; 15; 16; 84 - 89].

⁵⁹ In her youth, Paskov'ja Naumovna Arian belonged to the young people's popular democratic movement in 1870 ('narodnichestvo'). In 1899 she published an almanac *Pervyj Zhebskij Kalendar* [First Women's Calendar], one of the earliest mouthpieces of women's equality. She was also a member of numerous societies and associations. See [12].

⁶⁰ See [15, p. 76].

⁶¹ Kurdjumov was then one of the leading specialists in the field of descriptive geometry (see [90]). There was probably an explanation for his interest in a project of technical graphical institution.

⁶² According to V. Pjaseckij (1905), an active participant of these events, P. Arian's presentation at the RTO in 1902 was followed by the creation of drawing courses for women in Moscow and in St-Petersburg ([87, p. 6], see also [85, p. 2]). It is unclear whether or not there were some links between the St-Petersburg drawing courses and the Argamakova school. A former professor of the Women's Polytechnical Institute affirmed that several months after the Arian's report, the private Architectural Courses for women, and later on the Building courses, were inaugurated in Moscow [15, p. 76]. A. Ivanov, in his summary tables of women's institutions in Russia, gives a date later than 1901 [10, p. 354-375]. According to this author, it was a state school functioning under the ministry of Public Education, and not Architectural courses. Although the same tables include the Moscow school of painting and architecture affiliated to the Moscow Art Society founded in 1843 [10, p. 366], an architectural faculty has been active since 1898. In 1917, it was a coeducational school dependent upon the ministry of Internal Affairs, but we do not know when it opened its doors to women.

⁶³ Here we are probably dealing with Baron David Goracievic Gincburg (1857- after 1910), born into a unique Jewish family that succeeded in reconciling two incompatible objectives: maintaining their Jewish religion whilst belonging to Russian nobility. All the members of this family –Evsel, the



Fig. 4.- The Mussin-Pushkin house (68/2, Zagorodnyz avenue) in St-Petersburg, where the Women's Polytechnical Courses were located in 1906

(Reference: Photo by Evgenij Kraev, archives of Gouzévitch).

founder, Gorace, Ury and Solomon, his sons, David, his grandson— were well-known for their philanthropic works. David was a distinguished orientalist and a member of the Academic Council of the ministry of Public Education as well as of many scientific societies. He was also president of the St-Petersburg Jewish community and member of the Committee for diffusing knowledge among Jews. He also founded and contributed to the funding of numerous societies, associations and institutions, such as, the Society of Oriental Studies, the Société des Études Juives in Paris, the Society for Jewish Scientific Publications. He contributed to the Jewish encyclopaedia and was one of the organizers and teachers of the Courses of Oriental Studies (1907-1916) for young Jews of both sexes [10, p. 370; 91].

⁶⁴ See [15, p. 76; 86, p. 47; 87].

regulations were approved by the Ministry of Public Education. In the beginning of May the Society members held their first meeting chaired by Nikolaj Shchukin, professor at the Technological Institute and Military Engineering Academy and one of the leading railroad engineers. On the same day the first donations amounting to 12.000 roubles were collected.

As so often happens, this successful alliance was greatly favoured by the disastrous political situation due to the Russian defeat in the Russian-Japanese war and to the subsequent social and economic crisis. Given the seriousness of industrial gap and of the pressing need for competent staff to overhaul the obsolete technologies, the government grew more sympathetic to the proposals of the group and finally yielded to its pressure, agreeing to consider women-engineers as a potential reserve source of skilled workers.

On 22 August 1905 the Society, with Nikolaj Belejubskij as its head, was authorized to set up the "Petersburg Polytechnical Courses for Women" (PPCW) inaugurated on 15 January of the following year.⁶⁵

The Ministry deliberately imposed the neutral "Courses", which were given by the proposed institute, in order to avoid any confusion with a school of higher education. This was the agreement the organizers were obliged to accept, renouncing, for the time being, any right to official recognition of the professional rights of the graduates. This concession was designed to gain time and to continue with their project, the real goal of which was clearly formulated in the regulations: "promoting higher technical education for women in those branches of technology where the use of female labour was most appropriated".

9.2.- Intellectual project.

The intellectual project of the founders was, in fact, very ambitious. The new institution consisted of four departments related to four main branches of engineering activity: architecture, building, electro-mechanics, and chemistry. The duration of study was soon increased to five years and later extended to nearly seven. Such a long time was necessary to cover a wide curriculum which "for each department should not exceed that of the relevant male institute".⁶⁶ To fulfil this goal, the Polytechnical Courses for Women succeeded in recruiting the cream of the teaching staff of St-Petersburg. Beginning with professor Nikolaj Shchukin, its aforementioned permanent director, staff included prominent teachers from the main higher technical institutions of the country such as the Institute of Ways of Communication (with famous bridge builders such as N. Belejubskij, G. Perederij,⁶⁷ I. Aleksandrov,⁶⁸ S. Kareisha,⁶⁹ N. Puzyrevskij, V. Ljahnitckij); the Institute of Civil Engineers (L. Serk and R. Gabe); the Technological Institute (B. Rosing), but also the distinguished architects, members of the Academy of Arts, namely professors L. Benua, V. Pokrovskij, I. Fomin, I. Pjaseckij, S. Beljaev, A. Jakovlev, V. Jastrzhembskij, etc. By 1916 the academic staff numbered nearly 100 persons.⁷⁰

⁶⁵ From the very beginning the "Petersburg Polytechnical Courses for Women" were under the trusteeship of the St-Petersburg's Educational District [86; 88].

⁶⁶ See [15, p. 77]. The male institutions of reference were: Institute of Mining Engineers, Higher Artistic School, Imperial Academy of Arts (for Building and Architectural departments); Technological Institute and Institute of Electrical Engineering (for departments of Chemistry and Electro-mechanics) [86, p. 51].

⁶⁷ The designer of two famous bridges cross the Neva: Volodarskij and Lejtenanta Schmidta.

⁶⁸ The designer of the Dneproges project.

⁶⁹ Director of the Institute of Civil Engineering.

⁷⁰ For the teaching staff in later periods, namely for the years 1923-24, see [89; 93].



Fig.5.- Nikolaj Belelubskij (1845-1922), engineer of ways of communication, one of the founders and first professors of the Women's Polytechnical Courses

This difficult intellectual and professional choice was from the very beginning adopted by the initiators of the project, who were determined to carry it out despite all kinds of problems and obstacles.

9.3.- Problems.

Like any bold enterprise, the newly created institution had to undergo a teething period. It should be remembered that it was born on the wave of the euphoria of the first Russian revolution, i.e. in a period of extreme social tension, hardship, and want. The decision "not to demand financial support from the government" was a second, challenge facing the founders.⁷¹ By allowing the opening of the institution, and by abandoning control over its functioning, the government not only abstained from awarding degrees to its graduates but also declined to fund it. The organizers were therefore obliged to find a way to ensure the survival of their creation, which was initially conceived as non profit-making. The Courses were maintained thanks to tuition fees, annual membership subscriptions of the Society members, various donations and fees from lectures and concerts organized for the benefit of the institution.

The funds were allocated in the following way: firstly, to pay off debts, then to cover equipment expenses and to pay workers; the rest was used to pay for the allowances of the students and for the fees of administrators and teachers.

The very first donations and membership subscriptions were used for renting premises, equipping laboratories and classrooms.

Given that the Courses functioned in an autonomous way, they were located in a few private apartments rented on the third, fourth and later also fifth floors of the Mussin-Pushkin house (68/2 Zagorodnyj avenue).⁷² Some of these flats served as laboratories. The physics and chemistry laboratories were managed and equipped from the first academic year. Subsequently, some 15 or more laboratories were added, i.e. those for organic chemistry or electro-mechanics.⁷³ The school imparted its own geodetic study. The best-equipped laboratories at some Petersburg higher technical institutes were also used including the famous mechanical laboratory at the Institute of Ways of Communication directed by Belejubskij.

9.4.- Curriculum, scholarship and teaching.

The Courses were initially conceived as an institution, which was open to all social classes. The main criterion for admission was a relevant level of secondary education which "should comply with the requirements necessary for entering male schools of higher education".⁷⁴ What this meant was that the candidates should have completed a full course at the female gymnasium with good marks in mathematics.⁷⁵

⁷¹ Let us cite this point as it was formulated in the program: "not to ask for any financial support from the government or any professional rights for students until the real results were obtained attesting the useful activity of graduates in the field of science and technology" [15, p. 77]. The hope of obtaining funding from the industrial world was short lived. For example, the Nobel brothers were able to give only 3.000 roubles [10, p. 152]. All this entailed the rise of tuition fees from 100 to 150 roubles [86, p. 50].

⁷² At the corner of Zagorodnyj avenue and Serpuhovskij street. Today this building is occupied by Medical school n°8 attached to the Petrograd District Section of Public Health of the City of St-Petersburg. Belejubskij lived in the neighbouring house, Serpuhovskij street, n° 4 [86, p. 49; 87, f. 20; 92].

⁷³ See [86, p. 56].

⁷⁴ See [15].

⁷⁵ See [1, p. 207-208].

During the first two years all the students followed a common programme, before proceeding with special training in one of the departments of their choice. In 1908, the common faculty was divided into the architectural and building departments. At the same time, teaching staff drew up the syllabuses for the four proposed departments. The teaching was organized in a classical manner common, in its main principles, to all departments: this included lectures, practical and laboratory classes, guided visits to the relevant companies (plants, factories, laboratories, electric power stations, building sites, etc.), an undergraduate thesis, compulsory summer industrial practical courses and a graduation project. This was completed by special courses and activities for each specialization. The department was responsible for the academic schedule, establishing the contents and the order of priority of various teaching activities and exams. For example, students in electro-mechanics were allowed to take their exams at any time of the academic year. Special complementary training in mathematics and physics was envisaged nearly everywhere in an attempt to catch up with the level at male gymnasia, which were much more advanced in these disciplines.

Unfortunately, there is a considerable lack of data on the distribution of students by departments (and later by faculties). According to Kurbatov, the Department of Architecture attracted in 1906 the largest group from 224 candidates. This was due, among other factors, to the presence of professor Pokrovskij, the distinguished painter-architect from the Academy of Arts. Initially there were three (and subsequently four) ateliers in this department, each headed by a prominent master-architect (Pokrovskij, Ljalevich, Lidval, Benua). Mention should also be made of the dean of architecture, V. Pjaseckij, and the department secretary, engineer and painter Ruvim Gabe, both great experts and admirers of the arts. Moreover, students had classes of painting in watercolours and modelling. The so called "architectural Wednesdays" initiated within this department and attended by prominent painters and architects, such as the famous constructivist V. Shchuko were a resounding success: they attracted numerous students to whom various architectural subjects were offered and discussed with the help of the best experts in the field. The "sculpture evenings" conducted by the notable sculptor L. Shervud was another exciting event in students' memories. A very high artistic level generally characterized their architectural projects. They were also strongly influenced by the proximities of the construction department, which considerably benefited their engineering. According to Beleljubskij's memoirs some of his student projects were highly appreciated by Rabut and Ocagne, professors of the French *École des Ponts et Chaussées*, who were able to see them in 1910.⁷⁶ Besides the architectural projects, the students had to elaborate projects dealing with water-supply and sewerage, heating and ventilation, road-building and construction. At the end of their studies, students of this department were obliged to carry out an architectural project with a preliminary dissertation chosen from many subjects such as: "Historical Museum Building", "State Duma Building", etc. On one occasion, in 1916, a project for a "Women's Monastery" was proposed by a Mother-Superior who came to the institute from the country looking for a woman-engineer able to direct building works in the religious institution she headed. Curiously, none of the students showed any interest in this project.⁷⁷

The Building Department trained specialists in the field of civil engineering (bridges and roads), industrial building, waterpower use, sanitation, organization of

⁷⁶ See [86, p. 58].

⁷⁷ See [12, p. 14-15].

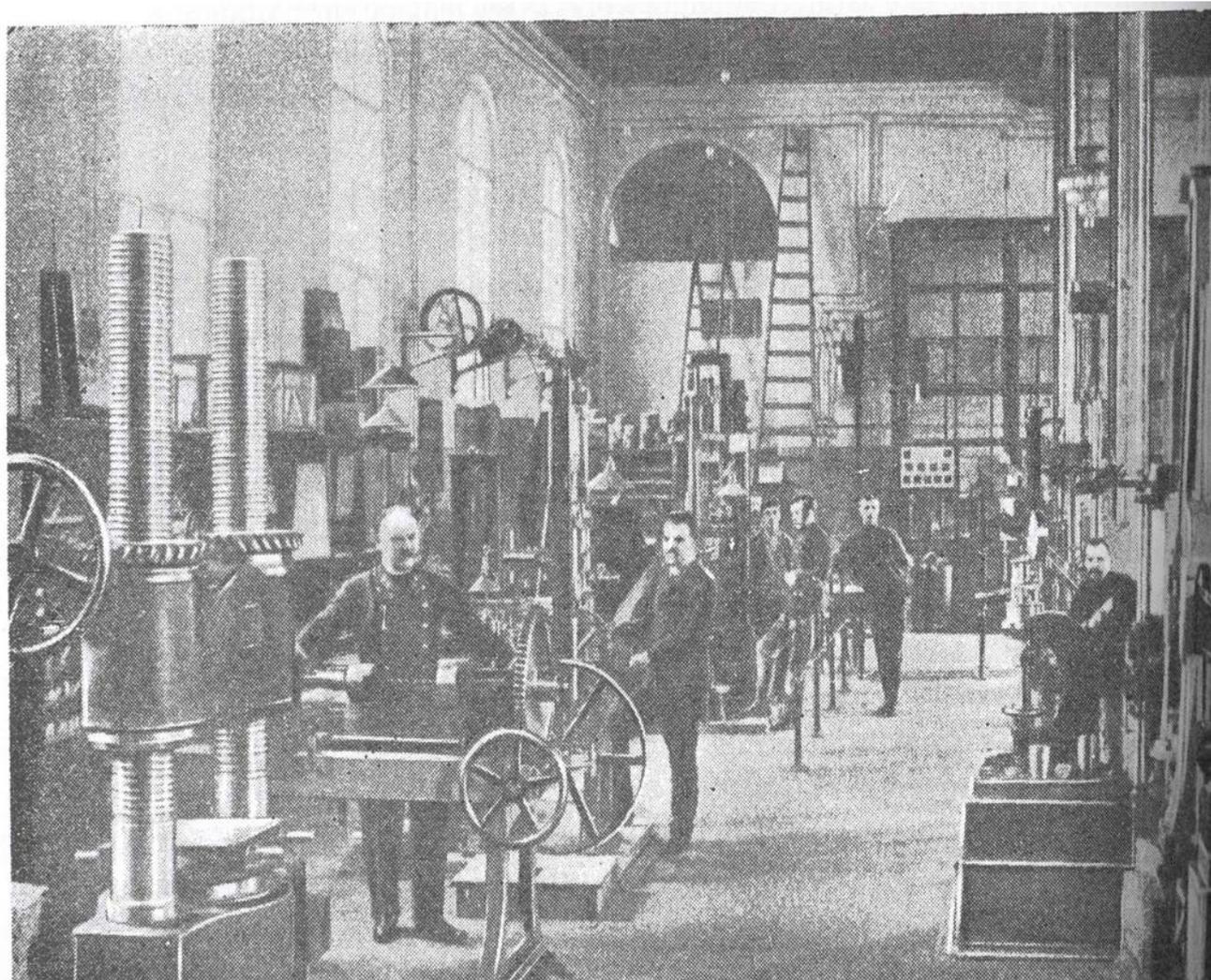


Fig. 6.- The Mechanical Laboratory of the Institute of Engineers of Ways of Communication directed by Belejubskij and used by him as a teaching laboratory for the Women's Polytechnical Courses (Leningradskij Institut inzhenerov..., 1960, 87)

public services and amenities, etc. Its syllabus was very broad. Besides the theoretical disciplines, each student had to write a number of undergraduate dissertations in the course of her studies. The topics proposed for graduation projects included wide span bridges, railroads and railway stations, weirs, hydroelectric power stations, irrigation systems, dockyards and ports. Vasiliij Starostin, dean of the building department since 1913, was in charge of a course on the foundation of buildings. His colleague, Nestor Puzyrevskij, the great expert in Russian hydrography, occupied the chair of internal waterways.⁷⁸ Practical works in the field had since 1913 been directed by V. Ljahnickij, who commenced his teaching duties immediately after returning from Latin America where he took part in the building of the Panama Canal. Professor G. Perederij, one of the greatest Russian bridge-builders and theoreticians of elasticity, delivered lectures on bridge building and directed graduation projects.

The Chemistry Department was also very much in demand. Despite many technical problems due to very small and inadequate premises, its syllabus based on that of the Technological Institute was completed thanks to the efforts of its dean Yulij Zalkind, who was also responsible for the course in organic chemistry. Inorganic chemistry was taught by two professors, A. Bajkov (later to become academician) and V. Kurbatov.⁷⁹ This department differed from the others in that the first woman chemist, N. Vrevsklaja, from the very beginning (1906) formed part of the teaching staff. A graduate from the Bestuzhev Courses, she was recommended by Bajkov to work as assistant in the laboratory of analysis. A number of specialized laboratories were finally set up, i.e. laboratories of general chemistry, qualitative and quantitative analysis, organic and physical chemistry, and chemical technology. After completing her undergraduate dissertation in applied mechanics and architecture (sic!), each student was obliged to attend two summer practical courses stipulated by the curriculum, one of them in a factory. Subsequently, they all had to prepare a diploma dealing with some original research in chemistry according to a chosen specialization. By 1922, forty-five women-chemists had graduated from this department, specializing in various fields of fundamental and/or industrial chemistry (metallurgy, technology, oil, silicates, dye-industry and so on).

The Department of Electro-mechanics offered a high-level and wide-ranging curriculum, which was designed to train students for any branch of applied mechanics, electrical or thermal engineering. This included a variety of subjects dealing with theoretical and applied mechanics and electro-technics, but also with special equipment and the art of construction. The Department gave a series of courses on machines and transformers of continuous and alternative current, signal and relay protection systems, telegraphy and electric tramway lighting, high tension lines and turbine-plants. Courses on steam and internal-combustion engines, machine tools and hoisting equipment were also offered to the students. The teaching staff in various fields of mechanics and electrical engineering rivalled those of three other departments. Boris Rosing, who became its dean in 1908, was known as the inventor of an original electronic system, which allowed pictures to be obtained thanks to the cathode-ray tube; in the Women's Polytechnical Institute he gave lectures on electrical measurements. The course of general electro-technics

⁷⁸ The book *Thoughts on the organizing of internal waterways in Russia*, Nestor Puzyrevskij published in 1910 remained for decades the standard textbook in this field.

⁷⁹ Besides his works on inorganic chemistry, Kurbatov was known as a historian of the architecture of St-Petersburg and as the author of the fundamental monograph *Gardens and parks*. He was also one of the few people to write his memoirs about the Women's Polytechnical Institute. See [15].

was taught by Mihail Shatelen, the first professor of electro-technics in Russia. P. Osadchij and P. Vojnarovskij, his colleagues from the Electrotechnical Institute, were in charge of two other special courses –telegraphy and electric networks. The teaching staff also included the representatives (and even directors)⁸⁰ of three other higher institutes of engineering: Polytechnical, Technological and Ways of Communication.

9.5.- Students: school and day-to-day life and some traits for a collective portrait.

The very first call for candidates elicited a spectacular response: in October 1905, i.e. less than two months after the governmental decision, 700 applications were registered. This figure itself can tell us a lot about the distance the women's movement had covered in the meantime. Emancipated and the most resolute of Russian women were no longer satisfied with merely the right to education. They wanted the right to choose their own education, to gain access to other professional careers and to challenge a system that had denied them education so wilfully for such a long time. They hoped to gain access to a wider labour market given that the demand for new jobs was particularly acute in a variety of technological fields. It should be remembered that after the revolution of 1905 the country entered a new accelerated phase of industrialisation. For some of the young women to be able to attend the newly inaugurated institution in the capital meant a chance to escape the provincial routine and to opt for a different life.

The annual evolution of the student' population raises some interesting points (see the Diagram). Generally speaking, their number was constantly increasing. From 224 students in 1906 it increased to 415 in the following academic year and attained 1.500 in 1916-17 before reaching its peak of 1.750 students in 1923-1924, the last year of independent existence of the PPWI.⁸¹ During the decade prior to the revolution of 1917, from 30 to 200 additional candidates were admitted almost annually. A slight fall in admissions in 1910-1911 could probably be explained by certain disenchantment owing to the absence of official credentials. By contrast, the rise in admissions since 1912-1913 seemed to be linked to the expected ratification of the new regulations. This occurred in 1915 and led immediately to a twofold increase in admissions of the first-year students. The data for the following period are scarcer. Between the two peaks, of 1916-1917 and 1923-1924 we have information only on the academic year 1920-1921, which reveals a sharp decrease in the number of admissions. This was undoubtedly linked to the catastrophic impact of the Civil war. However, many more data are necessary for a fuller comment.

Krutikov's memoirs give us some idea about the kind of students that attended the institute. He grouped them into three main categories: "enthusiasts who worked with much zeal (they were the majority), average students who did just the minimum to pass their exams, and finally those who went to St. Petersburg to enjoy to the full all the delights of the capital under the pretext of studying".⁸²

To complete this portrait, let us turn our attention to the material conditions of the life of the students and to their extra-curricular activities.

⁸⁰ So, P. Osadchij subsequently directed the Electro-technical Institute, whereas G. Depp, a notable heat engineer who gave our women-students lectures on steam engines, was head of the Technological Institute.

⁸¹ See [15, p. 78; 85, p. 4].

⁸² See [1, p. 207-208].

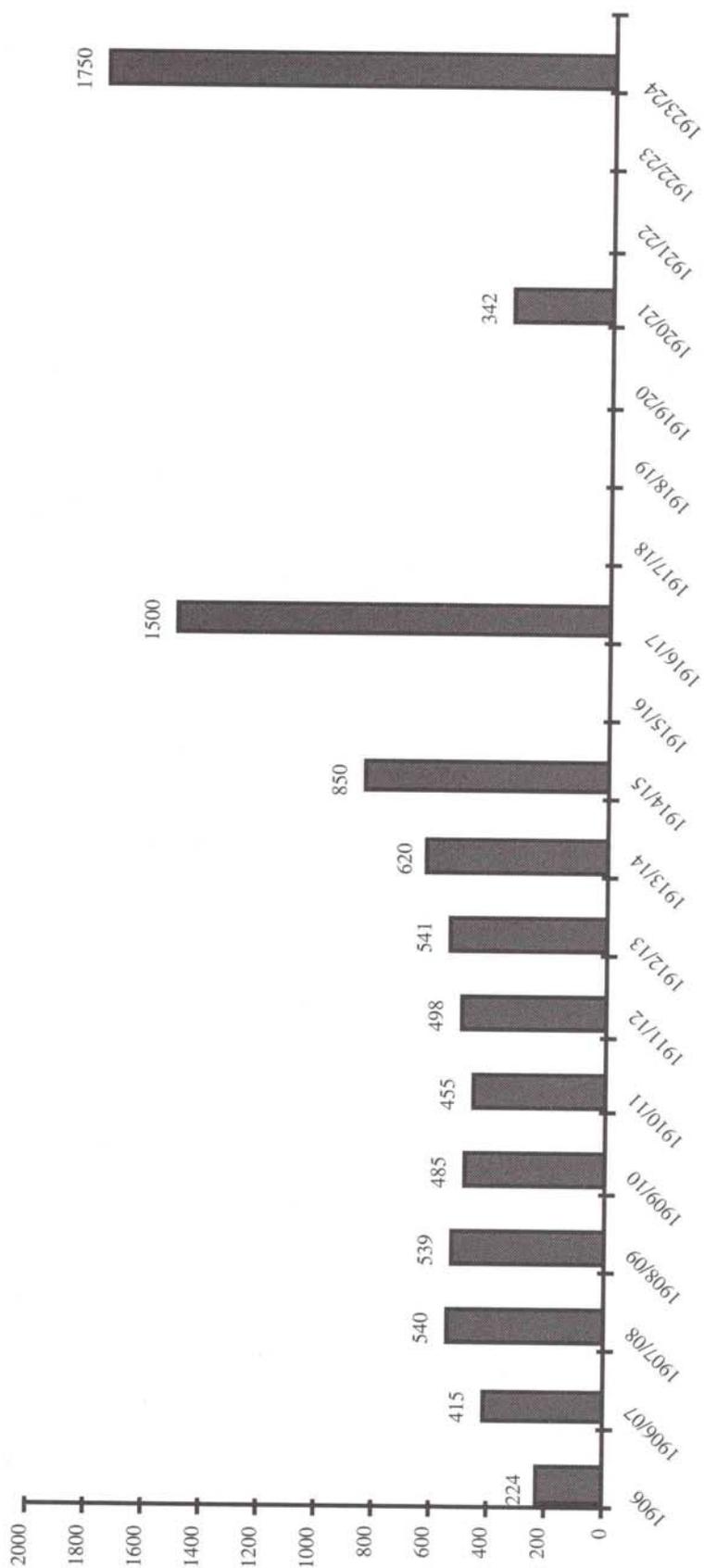


Diagram: Annual number of students enrolled at the St-Petersburg Polytechnical Institute for women

All the sources are unanimous in stressing the extreme and constant financial hardship of the majority of students. The annual tuition fees initially fixed at 100 roubles or less, depending on the income of the girl or of her family, soon proved to be insufficient and was augmented to 150 roubles. No stipends were envisaged, and some small lump-sum grants from the "Society for procuring funding for women's technical training" were few and far between. Rent consumed a major part of the students' budget, especially as few of the girls (most of them came from other towns) could count on regular help from the family. Given that the way of life of our women-polytechnicians was similar to that of their counterparts from the Technological Institute, some statistical data on this centre could be extrapolated to our case. Thus, out of 1.000 student-technologists questioned in the late 1900s, 5% could not pay for their daily lunch whereas 33 % suffered from constant malnutrition.⁸³

In an attempt to overcome this serious problem, some philanthropic organizations such as the mutual assistance fund, the students' dining room and employment office were set up. Thanks to the last organization, students managed to obtain odd jobs such as giving lessons to rich families, copying texts, carrying out statistical and drawing works or corrections.

The above data suggest (even in the absence of specific statistics) that the majority of women-students came from urban families with very modest incomes, most probably from the poor gentry, middle-classes, and parish clergy.⁸⁴ The fact that information about social origin was absent from the 227 short biographies of graduates of this institution published in 1967 suggests that the number of daughters of proletarians and peasants (if at all present) was negligible.⁸⁵ Some comparative statistics from the annual report of the Higher Bestuzhevskie Courses for 1901-1902 seem to confirm our hypothesis (for the first period at least) since they are rather eloquent about the typical social composition of any women's school of higher education of the early 20th century. Thus, out of the total number of 1.154 girl-students 713 (61,8%) were daughters and wives of gentry, military and civil officials; 250 (21,7%) were girls from the middle-classes; 48 (4,2%) came from families of clergy; 66 (5,7%) were daughters and wives of the professions; 27 (2,3%) peasants; 25 (2,1%) students' wives and daughters of soldiers; 25 (2,2%) foreigners. The religious composition is more interesting. Orthodox Christians made up the largest group of 1.037 (89, 9%) students. This was followed by Jews and Karaites (40 persons or 3,5%), various Protestant denominations (36 individuals or 3,1%), Catholics (27 or 2,3%), and finally, some other Eastern Christians (14 or 1,2%).⁸⁶

Returning to our polytechnicians, it is necessary to stress a second peculiar aspect of their collective portrait, that of their extracurricular activity. From the very beginning, it was clearly politically oriented. The militant attitude of this new generation of women-students was worthy of their female forerunners of the 1860s and 1870s. This attitude, moreover, assumed a new significance, which was encouraged by both the internal evolution of the women's movement and by the political changes during and immediately after the first Russian revolution.

Let us remind ourselves that prior to 1905, in the revolutionary movement and in the political struggles, women-students pursued a two-fold aim: to gain support for their own educational demands and to fight for common political rights with men,

⁸³ See [12, p. 17-18; with reference to *Kharakteristike sovremennogo studenchestva*, St-Petersburg, 1910, p. 49-50 – no visu].

⁸⁴ The orthodox parish clergymen were not only able but obliged to marry.

⁸⁵ See [12, biograpfii].

⁸⁶ See [81a, p. 103].

who were discriminated against in the Russian Empire. The law detailing the principles of elections in the newly created State Duma put an end to this common lack of civil rights in December 1905. Despite official promises to introduce the basic foundations of civil freedoms, as formulated in the tsarist manifesto of 17 October 1905, women were not given the suffrage and so, continued to find themselves politically inferior to men. The general rise of the revolutionary movement which was now in open conflict with the tsarist regime, with radical students being (according to Lenin) "in the forefront of all democratic forces",⁸⁷ considerably influenced a proper political orientation to the demands of emancipated women. However, the revolutionary movement was at that time neither homogeneous nor monolithic. A variety of conflicting political trends contributed to the growing demarcation among politically active student groups. Women from the Women's Polytechnical Courses soon found themselves in the thick of these events. The first to be mentioned in this connection is the social-democratic group, which included E. Smitten, G. Schvarz, A. Kuz'mina and R. Lianozova. This group joined the general student revolutionary movement. After a three-year post-revolutionary recession, the militant student movement regained its impetus. Thus, about 2/3 of the Bestuzhev Courses women-students questioned in 1909 admitted taking part in various meetings and demonstrations. As for our polytechnicians, they were, according to K. Ivanovskaja,⁸⁸ active participants of numerous student gatherings that arose spontaneously "for any occasion" in nearly all the schools of higher education. While demonstrating against the death penalty with other students on the 9 and 10 November 1910, some of them were arrested. The subsequent events unfolded in accordance with another of Lenin's affirmations: "... the small beginning of small academic conflicts is a great beginning, because it will be followed –if not today then tomorrow, if not tomorrow then the day after tomorrow, by great sequels".⁸⁹ We all know that on this point he was perfectly right.

9.6.- Graduates.

Despite such an exuberant political dynamism, the teaching process, curiously, followed its course. It seems that the really militant revolutionary activists were not very numerous.⁹⁰ In any case, most students continued with their studies, and six years after the PPCW had been inaugurated the first three engineers graduated from it. They were Appolinarija Nichipurenko and Aleksandra Sokolova from the Department of Electro-mechanics and Agnija Ivanickaja from that of Chemistry.⁹¹ Forty-seven women graduated during the three following years, i.e. prior to the confirmation of the new regulations. Such a small number of graduates compared with the number of admissions could be explained by three factors. According to Krutikov', not all the students were interested in completing their studies; they could also abandon them if they got married. Another explanation could be offered by comparing with another institution, the Moscow City Popular Shanjavskij University, which was a coeducational private school and which granted its graduates no official recognition or diploma but only a good education.⁹² The administration of Shanjavskij University took exception to the fact that, since the

⁸⁷ See [12, p. 18; with reference to: V.I. Lenin, *Polnoe sobranie sochinenij*, t. 11, p. 351 – no visu].

⁸⁸ K. M. Ivanovskaja studied in the PWWI since 1910. See [12, p.19].

⁸⁹ Quoted after [12, p. 20].

⁹⁰ The book published in 1967, which was very ideological, could only provide a few names.

⁹¹ See [12, p.20].

⁹² For the Moscow City Popular Shanjavskij University see [6, p. 370-371; 10; 11; 94].

demand for highly-skilled workers was considerable in the provinces, its most talented students were regularly recruited by agents of various provincial enterprises who offered them jobs and guaranteed salaries with the result that they left before graduating. The third and most important reason was the confused status of the graduates. It should be remembered that according to the regulations established in 1905 no professional rights were stipulated. At the same time, in the early period, graduates were not yet so numerous. The problem of their further employment was nevertheless tackled by the administration, which started by resolving the problem of professional instruction.

If women were tolerated in the laboratory, the presence of the long-skirted engineers on building sites was still unthinkable allegedly because it constituted a hindrance when climbing ladders. To allocate their students for the summer practical course was one of the constant concerns of the course teachers. A solution was finally found thanks to contacts and the considerable professional influence exerted by Shchukin and Belejubskij in the industrial world. The first step was also the most difficult one. Women-students proved to be diligent workers, and the following summer they were invited by the administration to return and to try their hand as supervisors and technicians. Another result of these practical courses was the most crucial. On the initiative of some railroad and waterway departments that were willing to employ PPCW graduates as engineers, the Ministry of Ways of Communication granted them official authorisation.

In many other European countries, for instance in France, the situation of women's professionalization took a new turn during World War I. From the reserve labour force many of them passed directly to the active labour posts and even top professional positions. Bearing in mind that male engineers occupied the senior posts, women-polytechnicians managed to join the companies, where they proved to be very efficient. In 1915 their professional skills were finally recognized by the government, and according to new regulations adopted on 26 September, the Courses were reorganized. This became the "Petrograd Polytechnical Institute for Women", "with all the rights granted to such an institution".⁹³

Its subsequent reorganization occurred after the October Revolution, which abolished the administrations of the old regime. By the decree of 23 February 1918, the Institute passed under the People's Commissar for Education.⁹⁴ It also moved to a new location on Vasiliev Island, line 10, num. 3. A further development of the coeducation put an end to its existence as an autonomous institute. Under the name of the Second Petrograd Polytechnical Institute it was mentioned for the last time in the Address Book for 1924. The following volume ended on 28 January 1925 with no mention of the institute. Having lost its distinctive character, it was merged with the First Petrograd Polytechnical Institute.⁹⁵ The last information about its graduates dates from 1923, when there were 250.

10.- Some words on employment challenges.

To better understand the employment challenges of these women graduates we should bear in mind that a nineteen year autonomous history of our institution covers two distinct periods: before and after the October 1917 revolution. Each

⁹³ See [86, p. 43; 88].

⁹⁴ See [88] with reference to the *Sobranie zakonienij i rasporjazhenij rabochego i krest'janskogo pravitel'stva* [Complete Collection of Decrees and Orders of the Workers' and Peasants' Government], 1918, num. 28, p. 367.

⁹⁵ See [89] and [95].

period was dominated by its own social and professional orientation, its labour market and professional opportunities.

A study of the professional activity of graduates remains to be undertaken. Information is wanting. There are some memoirs that give us an impressive account of works and projects in which young women-engineers were engaged. Thus, by 1916 they had already taken part in many important projects dealing with the construction of railroads, bridges, factories, power stations and port constructions all over the country.⁹⁶

Like all their compatriots, our women engineers who had just commenced their professional careers had to endure two revolutions and three wars, industrialization and collectivisation, NEP and terror. Many of them succeeded in entering this new world and some of them were able to exploit their high social rank and enjoy good careers. Politically, this was facilitated by the equal educational and professional rights for males and females granted from the start by the Soviet State (with an especial emphasis on the full emancipation of women) and by the emigration and progressive removal of the engineers of the Old Regime from Soviet companies. This was facilitated by a generally lower level of engineering training since the late 1920s because of the reorganization of the whole educational system (removal of the Old Regime teachers, massive production of poorly-trained graduates, former workers, soldiers and peasants entering schools of higher education without any normal secondary preparation, etc.). A population of well-trained and highly skilled young women-engineers, who finally gained access to the labour market and to new opportunities, welcomed this new situation.

Nevertheless, the variety of personal patterns and professional careers of women graduates during the Soviet epoch forms part of a very different social and political history, and should be studied separately.

In this regard, it may be helpful to quote two sources. The first one is professor Kurbatov's article proudly listing the achievements of his former women-students in the late 1940s.⁹⁷ The second one (which is the most complete to date) is the sixtieth anniversary book of the PPIW *Pervye zhzhnshchiny inzheneriy* [The First Women-Engineers] published in Leningrad in 1967. This book contains a valuable biographical appendix concerning women who attended the PPCW/PPIW between 1906 and 1923 [12]. Kurbatov's list (List 1) has 25 names. The anniversary list (List 2) has 227 names. Despite the difference in scale, the two lists are not identical. Out of 25 women-engineers quoted by Kurbatov, 7 are absent from List 2, which is more complete. However, some of the names present in the two lists are spelled differently.⁹⁸ At the same time List 2 is far from exhaustive since it contains all the information the authors could find and (what is more important!) what they were permitted to include in their book. Moreover, the biographical abstracts published concern both the graduates and the former PPCW/PPIW students who completed their studies much later or did not finish them. Since the second source is more representative and seems to be more reliable,⁹⁹ it will serve as a basis for our

⁹⁶ See [86].

⁹⁷ For some complementary information about graduates, see the most recent work of Û. Vorob'eva [11, p. 115] with reference to [13].

⁹⁸ For example, Cicianova instead of Cicishvili, Sizova instead of Sigova, Silina-Petrova instead of Petrova-Silina.

⁹⁹ See the introduction of the book [12, p. 5-6] where the authors acknowledge some Leningrad archives for help).

analysis and Kurbatov's data will be used only in case the cited names are present on both lists.

Each of the 227 biographies does not exceed six lines providing very briefly, not to say sparingly, the data concerning only professional careers: year of admission in PPCW/PPIW, main field of activity, main achievements (if any), length of service, and year of death. There are no details about social origin, family, or personal life.

Here are some examples of the biographies concerning three pioneers who graduated in 1912:

NICHIPURENKO, APOLINARIJA FEDOROVNA. Year of admission, 1906. Engineer-electrician. *Candidate* (Soviet equivalent of doctor) in technical sciences. Senior researcher. Worked in the All-Union Research Institute for Hydro-technics specializing in the study of water gates. Since 1942 –in the Research Institute for Land-improvement and Hydro-technics of Tbilisi (Georgia). Author of a series of works on water gates. Length of service 34 years.¹⁰⁰

SOKOLOVA-MARENINA, ALEKSANDRA IVANOVNA. Year of admission, 1906. Engineer-mechanic. *Candidate* in technical sciences. Physicist. Worked in the field of technology of measuring instruments and electrophysiological methods of investigation in the domain of higher nervous activity. Author of the course "Theory and calculus of measuring instruments" and of some other works related to the hypnotic state of the organism. Deputy of the Soviet of Leningrad (1932-1938). Length of service 49 years.¹⁰¹

IVANICKAJA, AGNIJA PETROVNA. Year of admission, 1906. Engineer-chemist. Main field of activity - teaching. Simultaneously worked as researcher in the Research Institute of Chemistry (department of physical chemistry) where she studied problems of colloidal chemistry. Professor and head of the chair of inorganic and analytical chemistry of the State University of Byelorussia. Published five works prior to 1927. After this date no information is available.¹⁰²

Now let us present some general data. The following categories could be distinguished in accordance with their main fields of activity, which are not necessarily engineering:

- civil engineers	17 persons	(7,5%)
- engineers-chemists and engineers-technologists	27 -"	(11,9%)
- mechanical engineers	27 -"	(11,9%)
- engineers-architects, civil architects	37 -"	(16,3%)
- electrical engineers, power engineers	40 -"	(17,6%)
- building (civil) engineers, hydraulic engineers	59 -"	(26,0%)
- architects, architects-painters, engineers-painters	15 -"	(6,6%)
- revolutionary, party workers and administrators	3 -"	(1,3%)
- non-engineering professions, higher education	2 -"	(0,9%)

Women-engineers distinguished themselves in the following domains:

–*Industrial construction*. Senior and chief-engineers of the greatest All-Union works such as Dneprostroi (f. ex. Sofia Jastrebova-Vedeneeva, Lidia

¹⁰⁰ See [12, p. 209].

¹⁰¹ See [12, p. 215]. According to Kurbatov, she also directed a laboratory at the All-Union Metrological Institute.

¹⁰² See [12, p. 201].

Amchislavskaja, Gitta Dunaevskaja, Nadezhda Poljanina); Volkhowstroj (Aleksandra Antoshina, Valentina Buzinova-Dybovskaja); electric power-stations in the Caucasus and Central Asia (Olga Kopytovskaâ, Amelija Rizenkampf-Mackevic, Olga Kostenko-Karaseva), etc.

–*Scientific and industrial research.* Some of the graduates worked, in fact, as researchers in a number of State Research Institutes (f. ex.: V. Mylova, engineer-chemist who organized the apatite production in Kirovsk and took part in the technological elaboration of the synthetic rubber "Sovpren" (she died during the siege of Leningrad); Maria Sigova-Matisen, engineer-chemist and expert in the domain of synthetic rubber; Sofia Kaufman, engineer-architect, theoretician and historian of architecture; R. Grozzenskaja, engineer-chemist and inventor of a new method of producing water-proof cardboard for the motor-car industry.

–*Higher general and technical education.* Teachers and readers in numerous and very prestigious schools of higher education such as Leningrad Polytechnical Institute (Ekaterina Moissejenko-Goreva); the State University of Tbilisi, Georgia (Nina Cicishvili); Tashkent Institute for Agricultural Irrigation and Mechanisation (Tat'jana Kolpakova, head of the department of Water Power Use); Leningrad textile Institute (Sofia Orlova-Mihalevic); Leningrad Institute of Civil Engineering (Anastasija Bolotova-Veller), etc.

According to the biographical index, women with various academic ranks and degrees ("Candidates", "Doctors", "Dozents", "Professors") numbered 20 (8,8%). Thirty-three women without any academic degree worked as researchers and another 19 as lecturers in the higher schools. Together they constituted 72 women, i.e. 31,7% of the whole number.

Five women obtained second higher education (in medicine, foreign languages, arts). Thirteen women or 5,7% of the total number occupied key engineering and/or administrative positions within the industry (directors, managers, chief experts and instructors, chief engineers and chief architects, scientific secretaries and members of various ministerial committees). Another 8 women were members of Republican governments, senior Party officials and managers in fields other than technology. Moreover, 8 women of the list were deputies of the regional and city Soviets. So, women in senior industrial positions, administration, Party and Soviet officials numbered 29 or 12,8% of the total.

One more interesting fact: except for a few examples, the length of service was extremely long: less than 10 years, 5 women; 10 or more than 10 years, 23; 20 or more than 20 years, 48; 40 or more than 40 years, 39. Tat'jana Kolpakova's length of service was 52 years (mechanical engineer, PPCW 1907).¹⁰³ Many of our women-engineers were still alive in 1967. Such long professional careers seem significant since they essentially cover the post World War II period. The catastrophic shortage of male labour due to the war made female specialists all the more essential, and our women-engineers thus gained more access to professions.

To complete this short statistical and sociological overview, some information concerning rewards is presented: 22 women-engineers obtained a *grade*, and 7 of them, two. Two others had personal (i.e. very high) pensions.

This list could be much longer and much more detailed. But even the information and examples cited are sufficient to highlight the main feature, which is common to the two sources: their selective nature. In fact, both lists concern only successful careers. The explanation is simple. It is sufficient to recall the dates of

¹⁰³ See [12, p. 203].

publication: 1947 and 1967, respectively, i.e. the late Stalinist and the early Brezhnevian "post-thaw" periods. Furthermore, both are anniversary publications. This means that there were no one failed careers; no unauthorized biography could be published at that time. There was no information about emigrants, victims of terror and repression, displaced persons, etc. This must account for the terse style of the bibliographical abstracts, which ignore all personal details.

Nevertheless, even such lapidary information can provide clues to anybody willing to read between the lines. Agnija Ivanickaja was one of the pioneers of the PPCW, all trace of whom was lost after 1927. Despite the fact that this period has been described as "vegetarian" by the poet Anna Akhmatova, the sudden lack of information about such a prominent person, professor and chairwoman, seems alarming. Another example: Natalia Kobylina, who entered the PPCW in 1906, was the first to graduate from the Building Department. According to the text, she "occupied chief engineering positions at the People's Commissariat of Ways of Communication, on the buildings of the White Sea canal (Belomorkanal) and Moscow canal (kanal im. Moskvj)... Died in 1939".¹⁰⁴ Perhaps, it was a natural death, perhaps not. The fact is that she was working under such appalling conditions and was in charge of the labour of thousands of prisoners. But in what capacity? As a civilian employee, military officer or as a prisoner herself? 1939, the year of her death, was also the year in which Beria eliminated all the senior GULAG supervisors who had worked there under his forerunners Jagoda and Ezhov.

A number of other biographies also raise questions. Given the political activity of women at the time, how do we account for such a small number of women with a revolutionary past or belonging to the Party? Perhaps, this category was ignored because it suffered most from the repression and terror.

It should not be forgotten that most women engineering graduates of the PPCW/PPIW were embraced by the Soviet System, and, with a few exceptions, were able to pursue brilliant careers in engineering, administration and science.

Naturally today, following the collapse of the Soviet system, these hagiographic biographies do not arouse the same feelings as in 1947 or 1967. Nevertheless, they allow us to formulate some questions and to outline directions for further research. In order to grasp the true significance of these brilliant careers we have, first, to follow them in detail through the specific context of the agitated 70 years of Soviet history. Secondly, we should draw parallels, as far as is possible, with those of their many former co students who were less successful or rejected by the system. Thus, an exhaustive study making full use of a variety of sources should be undertaken: archives, official documents, publications, interviews, etc. It should be borne in mind that the sources of the Soviet period are few and far between, especially as we are dealing with a female population whose members changed their family names, and in some cases, concealed their social origins.

This should be a multidisciplinary study given that the history of women engineers concerns, as we have shown, different approaches, historical as well as sociological, cultural as well as economical. As far as Russia is concerned, the history of women engineers should also be studied in conjunction with the history of the revolutionary-democratic and Jewish movements.

11.- Unique but not Alone.

¹⁰⁴ See [12, p. 203].

As we have already noted, the Petersburg (Petrograd) Polytechnical Institute for Women, despite being a rather unique institution, was not an isolated case. There had been a number of other attempts to offer women access to technical training. Although less successful, their joint example testifies to both the changing attitude of society and the women themselves who, in the early 20th century, felt strong enough to meet the most difficult educational and professional challenges of the male engineering world. Before concluding, let us take a final look at the general panorama of this indomitable struggle as reported by Russian and foreign historians.

Remember that Arian's 1902 initiative (her project of "Technico-graphical Institute") resulted in the creation of a number of drawing schools and courses for women in both capitals. In the tables accompanying her book, R. Dudgeon gives us a much earlier example of Women's Architectural Classes inaugurated in Odessa in 1899. According to her, these three-year long courses had two departments: architecture and drafting. Unfortunately, nothing is said about their subsequent fate.¹⁰⁵

Coincidentally with the PPIW, the private Courses of Higher Architectural Knowledge with a four year curriculum were initiated by E. Bagaeva and L. Molas in St-Petersburg.¹⁰⁶ They were placed under the authority of the ministry of Trade and Industry. As can be seen from Belejubskij's memoirs (dated of 21-12-1915), this institution no longer functioned at that time, nor did the Romanova's Building Courses, which were organised at the same time.¹⁰⁷ But perhaps, Ivanov's opinion has more weight, since not only does he state that they continued to be active in 1917 but he also quotes the number of students –160 women– who attended them in that year.¹⁰⁸

Two more private Polytechnical Institutes for women were created in 1917 in Moscow and in Ekaterinoslav.

The Moscow Institute had three departments: building engineering, which developed the curriculum of the Institute of Ways of Communication, and two specializations of architecture (approved by the Regulations of 1916) based upon the relevant curricula of the Institute of Civil Engineers and the Academy of Arts. (The courses were not initiated because of the Revolution). According to the Regulations, three more departments –those of Mechanics, Chemistry and Electrical Engineering– had been planned, but as in the previous case, the Revolution did not allow this project to come to fruition. As Belejubskij was among its organisers, we can conclude that the example of the PPIW began to bear fruit, supported this time

¹⁰⁵ R. Dudgeon mentions some other institutions for women, but unfortunately it is not clear from the text whether they were inaugurated (and if so, when?) or whether they existed only as projects. These are: Polytechnical Courses of I.I. Khoina (Odessa), Polytechnical Courses of St-Petersburg (sic!) Society for a People's University, First St-Petersburg Polytechnical Courses [8, p. 400-401]. The last name reminds us of the name attributed later to the institution we are interested in –the Second Petrograd Polytechnical Institute.

¹⁰⁶ See [8, p. 397; 10, p. 368; 86, p. 51; 96, p. 272]. R. Dudgeon calls them "Women's Architectural Courses of E.F. Bugaeva and states that they were opened in 1904 or 1905. She links their existence to the two-year "drawing course for women" active in 1902 (perhaps we are dealing there with the same courses that were mentioned in Pjaseckij's memoirs [87, p. 6]).

¹⁰⁷ We were not able to find any further reference to this institution, at least, under this name. At the same time, A. Ivanov mentions the St-Petersburg Women's Building Courses, a four-year institution under the ministry of Public Education opened in 1904 (the date of their closure is unknown) [10, p. 155, 372]. Is this the same institution?

¹⁰⁸ See [96, p.154, 272].

OTHER HIGHER TECHNICAL INSTITUTIONS FOR WOMEN CREATED IN THE EARLY 20TH CENTURY
<p>Women's Architectural Classes, Odessa, 1899 (Three year courses had two departments: architecture and drawing)</p>
<p>Courses of Higher Architectural Knowledge, St-Petersburg, 1906 (Private courses with a four year curriculum, founded by E. Bagaeva and L. Molas, under the Ministry of Trade and Industry)</p>
<p>Polytechnical Institute for women, Moscow, 1917 (Three departments: building engineering, based on the program of the Institute of Ways of Communication; two specializations of architecture, based on the programme of the Institute of Civil Engineers and of the Academy of Arts).</p>
<p>The Ekaterinoslav Polytechnical Institute Ekaterinoslav, 1917 (A four year coeducational institution founded by A. Press and L. Rabinovich designed to ensure the training of Jewish youth; two departments: mechanics and electrical engineering; the inauguration of four other departments –civil engineering, architecture, trade and economy– was stipulated; its graduates were allowed to take the examinations for the grade of engineer or candidates of commerce at the relevant State institutions)</p>
<p>Polytechnical Courses for Women Kharkov, 1916 (Public institution founded by the Society of Technologists of South Russia; had two faculties: mechanics, with departments of machine-building and technology, and civil engineering, with departments of railroads and regional and local economy)</p>
<p>Courses of Electrotechnics, Moscow, 1910 (A coeducational institution created thanks to the joint efforts of the RTO and the Moscow city Duma with the aim of retraining men and women who already had received a higher technical or scientific education)</p>
<p>The Moscow Trade Institute, 1906 (Affiliated to the Society for the Diffusion of Commercial Knowledge)</p>
<p>The Higher Commercial Courses, 1906 (Affiliated to the St-Petersburg Society for Assistance to Higher Commercial Education; in 1917, the Petrograd Institute of Commerce)</p>
<p>The Petrograd Higher Commercial Courses named after M. Pobedinskij, 1906 (In 1917, the Institute of Trade and Industry)</p>
<p>About 20 projects for engineering institutes remained unfinished. Most of them were presented by non-governmental organizations, and we think that many of them were conceived as coeducational institutions</p>

by rich industrialists and members of the State Duma such as A. Konovalov and M. Novakov.¹⁰⁹

As for the Ekaterinoslav Polytechnical Institute, this institution, which provided a four year course, was funded by two professionals, engineer-technologist A. Press and mining engineer L. Rabinovich, with the specific aim of training Jewish youth. On 31 January 1917, it opened its doors to 235 students of both sexes who were grouped into two departments –mechanics and electrical engineering. The inauguration of four other departments (those of civil engineering, architecture, trade and economy) was stipulated shortly thereafter. At the end of their studies its graduates were allowed to take examinations for the degree of engineer or *candidates* of commerce in the relevant State institutions.¹¹⁰ To understand the almost revolutionary significance of this experience, it must be placed in the context of the extremely complicated relations between Russian Jews and the Imperial State, with particular regard to the struggle of Jewish youth for their educational rights.¹¹¹

In Kharkov the Polytechnical Courses for Women were inaugurated on 15 November 1916 thanks to the efforts of the Society of Technologists of South Russia. They had two faculties: mechanical (with departments of machine-building and technology) and of civil engineering (with departments of railroads and of regional and local economy). Their curricula were very similar to those of the PPIW.¹¹²

One more interesting experiment that did not survive 1917 should be mentioned to complete our overview: the Courses of Electrotechnics opened in Moscow in 1910 after twelve years of joint efforts of the RTO and the Moscow city Duma. It was a coeducational institution, which aimed to retrain men and women who already had a higher technical or physical and mathematical education, and no additional rights were granted to its graduates.¹¹³

In some way, the commercial (trade) institutes could also be included in the category we are interested in. Let us mention three of them, all created in 1906 thanks to public or private initiative, all placed under the authority of the ministry of Trade and Industry, all coeducational, all of them active in 1917: the Moscow Trade Institute affiliated to the Society for Dissemination of Commercial Knowledge; the Higher Commercial Courses affiliated to the St-Petersburg Society for Assistance to the Higher Commercial Education (since 1917, Petrograd Institute of Commerce); the Petrograd Higher Commercial Courses named after M. Pobedinskij (since 1917, Institute of Trade and Industry).¹¹⁴

Ivanov's summary table includes about 20 projects of engineering institutes, which remained unfinished. Most of them were presented by non-governmental organizations, and we can be almost sure that many of them were conceived as coeducational institutions.¹¹⁵

Finally, let us take a look at some numerical data. In 1917, the Russian Empire had 30 higher educational institutions for women and 29 coeducational

¹⁰⁹ The starting number of registrations for the first 1917 academic year was 500. For further information, see [8, p. 399; 10, p. 154-155, 368].

¹¹⁰ See [10, p. 156-157, 368; 97].

¹¹¹ See [98].

¹¹² See [11, p. 67-68, 143].

¹¹³ See [10, p. 156, 372].

¹¹⁴ See [10, p. 366-367]. For the commercial institutions in general see also [11, p. 71-80, 127-138, 160-161].

¹¹⁵ See [10, p. 373-375].

schools of higher education thanks to public or private funding, whereas in the State sector there were 3 and 1 respectively.¹¹⁶ As we can see from the foregoing account, many of them attempted to plan their curricula and to organize their teaching in accordance with the Petersburg Polytechnical Institute for Women. All this constitutes not only a pioneering and successful accomplishment, but also an incentive, which in no small measure contributed to the launching of technical schools of higher education for women in Russia.

12.- Conclusion.

The Petrograd Polytechnical Institute for Women which was set up in Russia in 1906, on the wave of the first Russian revolution, crowned half a century of struggle for emancipation and for educational and professional rights on a par with men. This school was the product of the difficult consensus of many actors representing different domains of the Russian social landscape, governmental and administrative, private and public, associative and corporate. A number of factors helped to make this possible, i.e., the strengthening of the revolutionary movement, the increasingly rapid industrialization of the country and the accumulated experience in the field of creating professional schools of higher education for women. As we have seen, the only institutions that finally succeeded were those that resulted from private or public initiative, whereas the State educational system, universities as well as technical schools of higher education, remained closed to women for many years to come. At the same time, the State engineers, despite the strong corporate spirit characteristic of their milieu, proved to be more sympathetic with women's demands for professionalization than their male colleagues from other professional sectors. Without being threatened directly on account of their status, the State engineers became increasingly aware of the industrial needs and deficiencies. The newly created male Polytechnical institute (1901) based on the German model and free of any corporate attachment served as a prototype for testing a new kind of engineering institution for women. Created outside the State system and sponsored by private and public associations, it functioned as an autonomous technical university which was able to benefit from both the administrative experience of women's courses of higher education and from the intellectual potential of the best State engineering schools. Despite the daunting challenges, the initial results proved to be sufficiently convincing to open up a road towards professional integration for its graduates. However, owing to a unique historical circumstance, the female engineering student trained in the Russian Empire had to pursue her professional career in the quite different historical context of the Soviet State. Studying this dichotomy in greater depth constitutes, perhaps, the most difficult challenge for anybody attempting to understand the cross-cultural context of women-engineers in Russia.

ABBREVIATION

C.	—	Cirkulâr Ministerstva narodnogo prosveshcheniâ
CGIA SPb	—	Central'nyj Gosudarstvennyj arhiv St-Peterburg
M. r.	—	Ministerskoe rasporâzhenie
N. s.	—	Novaâ seriâ

¹¹⁶ See [96].

IIPS	—	Institut inzhenerov putej soobshcheniâ, biblioteka (St-Petersburg)
Otd. 1	—	Otdelenie 1, Pravitel'stvennye rasporâzheniâ (in <i>ZhMNP</i>)
Otd. 3	—	Otdelenie 2, Kritika i bibliografiâ (in <i>ZhMNP</i>)
Otd. 3	—	Otdelenie 3, po narodnomu obrazovaniû (in <i>ZhMNP</i>)
Otd. 4	—	Otdelenie 4, Sovremennaâ letopis' (in <i>ZhMNP</i>)
R.	—	Rasporâzhenie Ministerstva (Ministra) narodnogo prosveshcheniâ
U.	—	Uzakonenie
V. p.	—	Vysochajshee povelienie
<i>ZhMNP</i>	—	<i>Zhurnal Ministerstva narodnogo prosveshcheniâ</i>

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