

Transferring Knowledge: Bulgarian Female Scientists in Bulgarian-German Scientific Networks (1920s–1950s)

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Introduction: Specifying the object of the study

This article deals with the scientific relationships of female Bulgarian scientists (those affiliated with academic institutions and those not) with their colleagues in Germany from the 1920s up to the beginning of the 1950s. The main objective is to examine the participation of these women scientists in the scientific networks that arose between Germany and the Balkans with regard to transfer of knowledge and their positions relative to academic power. The article analyzes the activities of these women in Germany: their doctoral and postgraduate studies, their participation in various scientific forums, their publications in German periodicals, their affiliations with both the German scientific institutions and the established research networks of the time.

This article explores the interwar period (from the end of WWI), the years of WWII, and the early postwar changes in Europe. The beginning of the time period is demarcated with the admission of Bulgarian women into scientific fields, the establishment of various scientific institutions, and an increase in Bulgarian-German cultural relations. The end date (the early 1950s) emerged as a result of the political break in the early Cold War era.¹ Researching this longer period provides an opportunity to make observations on the dynamics in the process of the transfer of knowledge and its attending consequences.

Regarding the sources used

This article is largely based on unpublished archival documents found in personal collections or collections of institutions (those of centralized or local authorities, religious institutions, civic societies, cultural organizations, economic enterprises, etc.). The documents are varied: diplomas, certificates, personal letters, business letters, biographical materials, applications, trip reports and so on. Other primary sources are memoirs, biographies, bibliographies, encyclopedias, and reference books.

Most of the sources are drawn from the *Bulgarian State Archives (BSA)* which were established in 1951 as a monopolistic, state, and centralized institution with several regional directorates. The exceptions to this are the records of some scientific institutions, namely, the *National Library*, the *Bulgarian Academy of Sciences (BAS)*, state museums, and a few universities. Currently there are no records of individuals (collectors and inheritors) who keep historical documents and to which there is public access.

Until 1989, the *BSA* sought additions to their archival collections based on criteria of class-party ideological approach, the principle of political credibility, and the subjective assessment of archivists. In the selection process, what were accepted were the documents of leading political figures and institutions (state and party) that were

1 Relations between Bulgaria and East Germany began after 1949.

suitable to the communist regime. In the 1970s–1980s a gradual change began: archives created special collections on women. These included the documents of communist female activists, wives of famous figures, or women loyal to the communist regime and recognized for it. For these reasons, women in other professions and with divergent political affiliations remained on the archival “periphery”. The most common documents of (or for) them are found in family archival collections or as part of the personal collections of their fathers and husbands (PISKOVA 2009; PISKOVA & POPOVA, no year).

Currently, most of the personal papers of the women scientists are not in the archives. They have not been stored nor passed along by their heirs for various reasons (the notion that “women’s” records were not valuable or a fear of their potential destruction or damage by the state archival system). In the period under consideration in this study, women scientists themselves often did not submit their collected papers, fearing accusations of “fascism”. There is evidence that some of the collections of documents were sent out of the country with emigrants (for example, by W. Plotchewa² to the U.S.A.); others were scattered in the exodus out of Sofia (for instance, E. Filowa was deported to the countryside for almost 28 years); others were deliberately destroyed because of fear of political repression (e.g., after her dismissal from the Sofia University, J. Nikolowa burned many of her letters and personal papers).

Some of documents (including those of German propaganda institutions) were seized in 1944 and today are located in Russia. The archival collections which are available also present various challenges: some of them show signs of “cleansing” by the institutions (for example, *Sofia University* destroyed the file records of its lecturers who had been dismissed for “fascism”); other personal collections were not classified for over 30 years and cannot be used by historians (a good example this that of A. Chranowa at the *Scientific Archive-BAS*); sometimes the donors of the collections themselves “censored” documents for fear of persecution (e.g., in the collection of A. Kolushewa, there are no references to the period before 1944).

Biographies and the works of women scientists can hardly be reconstructed based on memoirs, because none of them left memoirs or diaries written for such a purpose. Their interviews and autobiographies, written for personal use and found in the archives, can be used carefully. Published bibliographies of prominent Bulgarian scientists who collaborated with women scientists and bibliographies of some scientific branches provide valuable information.³ Bulgarian biographical reference books and

² Biographic notes see in App. 5.

³ For example: VALČANOV, Valčan: *Metodii Popov, 1881–1954. Bibliografski prinos* [Metodi Popoff. Bibliographic Contribution]. Sofia 1954; VELINOVA, Liliana: *Ivan Josifov Bureš. Biobibliografija* [Ivan Y. Buresh. Bibliography]. Sofia 1960; ANGELOV, St. et al.: *Bibliografija na bălgarskata mikrobiologia, imunologia i zarazni bolesti* [Bibliography of Bulgarian Microbiology, Immunology and Infection Diseases], 1879–1950. Sofia 1951; DONKOVA, B. et al.: *Katedra Neorganična i analitična himia, 1894–1924. Katedra Neorganična himia, 1924–2004. Bibliografija, 1891–2004* [Department of Inorganic and Analytical Chemistry. Department of Inorganic Chemistry. Bibliography]. Sofia 2007; BONČEV, Panajot et al.: *Katedra po analitična himia* [Department of Analytical Chemistry], 1924–1994. *Bibliografija*

encyclopedias provide concise information about women scientists and a few provide information about their studying abroad.

The State of Research

Women's studies and gender history are underdeveloped research fields in Bulgaria. Such kinds of research began at the start of the 1990s (TODOROVA 1993). The place of Bulgarian women in science generally and at the *Sofia University* in particular remains almost unexplored topics within the methodological rubric of gender history (NAZARSKA 2005a, 2005b, 2010). Even today it is extremely difficult to find even basic biographical data for prominent women who were "removed" from the collective memory in the communist times and because of the lack of family history studies as well. In the history of scientific institutions, the place of women is rarely discussed. In spite of the extensive research on German-Bulgarian cultural relationships, the topic of this article (focusing on the participation of female Bulgarian scientists in Bulgarian-German scientific networks) has not yet been developed in Bulgarian historiography (*Balgarsko-germanski otnošenja* 1972; TOSHKOVA 1975; KJULJUMOVA-BOJADJIEVA 1984, 1991; MARKOV 1986; PETKOV 1995; BOJADJIEVA 2000).

In international research, the cultural relations (in particular the scientific interrelations) between the Balkans and Germany are the object of careful research. But there the emphasis is put on the contribution of prominent male Bulgarian scientists (THIERFELDER 1940; BEER & SEEWANN 2004). Some information can be found in the research on German science during the 1930s–1940s and on women scientists during the 1920s–1940s (BOER et al. 1995; FELBOR 1995; MOSER 2011; ECKART 2006; HAUSMANN 2002; ASH 1998; OGILVIE & HARVEY 2000; RAYNER-CANHAM et al. 2001).

Research methodology and methods

This article uses two main theoretical approaches. The *first* is based on gender theory, according to which "power networks" and power hierarchies exist in institutions of knowledge. There, women occupy inferior positions, attain the position of merely "discriminated elites", and suffer a "vertical and horizontal segregation" based on gender (BOURDIEU 2001). A gender perspective allows one to track an end of this segregation of career advancement and the empowerment of women. Not least of all, this theoretical framework offers opportunities to comment on both the relationship of the scientific careers of women to social stereotypes and on the mentors and their female students within the system of academic advising (DELAMONT 1989; DAVIES et al. 1994; COLLINS et al. 1998; KEARNEY 2000; ROSSER 2004). The *second* approach is social exchange theory and the theory of social networks. Through it one can view social interaction exchanges and transactions of goods, services, and valued resources, as well as the relations of mutual dependence that the social actors have within social structures (RITZER & SMART 2001; WELLMAN & BERKOWITZ 1988; CHARLE et al. 2004; BARKHOFF & EBERHART 2009). The argument of this article is structured on the basis of this theory.

[Bibliography]. Sofia 1994; PARUŠEV, Miroslav. *20 godini "Himia i industria"* [20 Years Chemistry and Industry Magazine], 1922–1942, vol. 1–2. Sofia 1946.

The main methods that allow for exploring data sources are drawn from prosopographical and social network analysis (SNA). Prosopographical analysis makes it possible to process massive amounts of data from various sources and it can both create a collective portrait of a sample and explore the biography of each participant individually. This method is implemented by creating prosopographical (biographical) tables that represent random sampling, and their computer processing by statistical methods (KEATS-ROHAN 2007). SNA allows for clustering, the decomposition of social networks, and actor-based analysis (SCOTT 2000).

Database: For the purposes of this study, I prepared four prosopographical tables: 1. for those female Bulgarian scientists who did postgraduate and doctoral research in Germany, 2. for those who made academic trips, 3. for those who published articles in German science journals, 4. for those who worked in German scientific institutions in Germany, Bulgaria, and Italy. Each of these tables contains in separate columns the following information: the year of birth, birthplace, place and year of graduation, specialty, supervisor's name, institutional affiliation, and the place and time of postgraduate research or academic trips. The third table contains, in addition to biographical information, a detailed bibliographic description of each person's publications.

The SNA were carried out according to the following steps: sampling, data collection, computing and the analysis of the database, and identifying networks. First of all, a random sampling of Bulgarian women scientists associated with German science in the 1920s–1950s was selected. There were distinct subgroups according to the institutions of affiliation and the research areas of the women scientists. Then social (scientific) contact data were introduced. These data focus on personal relationships, the strength of relationships (close personal ties, daily contacts, interpersonal contacts, meeting opportunities, etc.). Data were processed with IBM SPSS Statistics 19 and then analyzed.

Bulgarian Women in the Academy: a historical outline

An academic profession for women became possible after WW I. Prior to that, the path for women had had to pass through several steps: the unification of curricula in female and male high schools (1897–1904), the admission to *Sofia University* (1901) along with permission to study in so-called “male” majors, and finally the difficulties in achieving professional recognition.

After the founding of the Bulgarian state in 1878, the participation of women in the newly created academic life was accompanied by serious difficulties: the small number of scientific institutions and personnel; negative public attitudes towards women's social role; and biases on the part of Bulgarian pioneer scientists that “science was not for women”. For such reasons, women who graduated in the early 20th century seldom had access to higher academic institutions. During the 1920s a noticeable change occurred. After 1918, as a result of the support of some professors (supervisors and mentors), women were appointed as lecturers, assistant professors and curators in universities, art academies, higher level schools, and in public museums. They were engaged with science (NAZARSKA 2005a, 2010).

Despite occasional individual support, the entry of Bulgarian women into the Academy faced strong resistance from the institutions. According to Foucault, anyone who wishes to enter and affirm him/herself in hierarchical institutions faces “power networks” at every level and the instruments of coercion as well (prohibitions, exceptions, divisions, and repulsion) (FOUCAULT 1990: 92–102). Thus the relations that engender domination are permanently maintained. Bourdieu also argues that the efforts of women to change their status as “discriminated elites” in the field of knowledge are doomed, and the vertical and horizontal segregation and the so-called “sexual division of labor” is maintained (BOURDIEU 2001; BOURDIEU 1984: 74–104).

Indeed women scientists at *Sofia University* faced a series of constructed barriers: sexist regulations regarding assistantships (in force: 1924–1939) that allowed the assignment of women only in the absence of male applicants; term contracts of 1–3 years; censure by the Senate and the Faculty Councils, even in the presence of excellent attestations; attacks from their male co-workers (complaints, committees of inquiry, dissenting opinions, deliberate deferment of publications, cancellation of specializations, retirement due to made-up “illnesses”); halting of habilitation processes or obstructions of applications by biased reviews and other backroom maneuvers. After their postgraduate research, women scientists turned from “scientific outsiders” into “scientific insiders” and also into researchers who “empowered” themselves in the Academy (NAZARSKA 2005a, 2010).

In the 1920s–1940s there were very few Bulgarian women scientists and they were concentrated in the capital city: at *Sofia University*, the *State Academy of Music*, the *National Museum of Ethnography*, and the *National Museum of Archeology*; in several state research institutes (the *Royal Entomological Station*, the *Institute of Meteorology*, the *Institute for Agricultural and Economic Research*, *Veterinary Bacteriological Stations*, the *Institute for Public Health*); and also in the private *Higher School for Social Sciences* (at the Bulgarian Women’s Union). At the five other universities and the *State Academy of Arts*, women occupied inferior positions, mostly teaching linguistics; they were not involved systematically with science.

Another important feature of Bulgarian science in this period is that it also developed outside the university: many female high school teachers did research, became members of scientific societies, attended scientific forums abroad, and liaised with foreign scientists. These circumstances explain the relatively small number (compared to other countries) of female Bulgarian scientists involved in international research networks. From the perspective of Bulgarian science, however, their number in the 1920s–1950s is significant and sending them to postgraduate research was precedent-setting, because usually male scientists were the ones sent to such specializations.

The Rise of German Cultural Institutions in Bulgaria and the Involvement of Bulgarian Women

Besides these scientific institutions in the 1920s–1950s, there were other social structures that facilitated the process of knowledge exchange. In the 20th century, Bulgaria and Germany traditionally maintained good political relations. Having been Allies during WWI, their bilateral economic and technical exchange intensified in the interwar period. During WWII, Bulgaria became a member of the Tripartite Pact

(MARKOV 1984; TOSHKOVA 1975; *Bălgarsko-germanski otnošenia* 1972). Since the founding of the Bulgarian state (1878), many Bulgarians had been trained in German universities, polytechnic institutes, and art academies. According to the official statistics from 1944, 2546 Bulgarian students studied in the Reich.⁴ The German language ranked second in its reach among Bulgarian intelligentsia (KJULJUMOVA-BOJADJIEVA 1991: 30; STEIN 2011).

After 1919, the main institutions for mutual cultural cooperation were: the *Bulgarian-German Society* (Sofia, 1927), the *Union of German-Speaking Bulgarians* (Sofia, 1929), German schools in the Bulgarian cities, and annual German language courses for young people and adults (BOJADJIEVA 2000: 90–111; MARKOV 1986). In this period in Sofia the following were founded: a branch of the *German Academy in Munich* (1925), the *Bulgarian-German Mediator's Bureau* (1933), and the *German Scientific Institute* (1940) (KJULJUMOVA-BOJADJIEVA 1991: 66). Two German-Bulgarian scientific institutes (of *Agriculture* and of *Microbiology*) were established in Sofia in the 1940s. The number of Bulgarian and German scientists exchanging reciprocal visits, giving lectures, participating in scientific forums, and publishing in scientific journals, increased rapidly. In the period of 1925–1942, 251 Bulgarian students and postgraduate students in various fields studied in Germany with scholarships granted by the foundations *Alexander von Humboldt*, *Ewald von Massow*, and *German Foundation* (MARKOV 1984: 214, 216–225; KJULJUMOVA-BOJADJIEVA 1984; KJULJUMOVA-BOJADJIEVA 1991: 17, 20, 30–32, 59–217).

Using the two methods (prosopographical and SNA), I found that Bulgarian women scientists in the 1920–1950s carried out an intensive knowledge exchange process with colleagues in Germany, mediated through Bulgarian and German scientific institutions, research networks, and individual scientists. The modes of exchange were: direct knowledge exchange and generalized knowledge exchange. Productive knowledge exchange is not detectable in this period.

Direct knowledge exchange took place through interpersonal relationships (friendships, correspondence, travel, exchange of books, proofs, manuscripts, etc.) and through group action (participation in congresses, workshops, exhibitions, membership in scientific associations, etc.) doctoral and postgraduate research, work in German research institutions, and the academic trips of Bulgarian women scientists.

An analysis of my prosopographic tables (no. 1, 2, 4)⁵ indicates that within the period 1922–1944, 17 women travelled to Germany for doctoral and postgraduate re-

4 Central State Archives (CSA), collection (coll.) 316k, inventory (inv.) 1, archival unit (a.u.) 364, folio (f.) 1–104.

5 Data sources are extracted from: CSA, coll. 1652k, inv. 1, a.u. 1, f. 1–1b; a.u. 4, f. 1–2; a.u. 10, f. 2–2b; a.u. 29, f. 1–3b; coll. 177k, op. 1, a.u. 911, f. 77; coll. 1041k, inv. 1, a.u. 1, f. 1–2; a.u. 25, f. 3; Sofia State Archive (SSA), coll. 994k, inv. 2, a.u. 37, f. 189b; a.u. 38, f. 120; a.u. 39, f. 11b; a.u. 264, f. 29; a.u. 337, f. 65; a.u. 381, f. 57–58, 64; a.u. 237, f. 10, 17, 22, 29, 33, 47; inv. 13, a.u. 27, f. 148; a.u. 37, f. 16, 32; a.u. 39, f. 119, 123 b; Scientific Archive of the BAS (SA-BAS), coll. 1c, inv. 11, a.u. 65, f. 24; a.u. 170, f. 18; a.u. 140, f. 4, 16–17b, 25–25b.; coll. 74k, inv.1, a.u. 101, f. 2; inv. 2, a.u. 635, f. 2–8; a.u. 802, f. 1–2; coll 44c, inv. 1, a.u. 235, f. 1–3; Archive of Sofia University (ASU), coll. 25, inv. 1, a.u. 35; a.u. 47; Bulgarian Histori-

search. The average duration of their postgraduate studies was 7 months. The collective portrait of this random sample looks like this: the group consisted of young women born in the 1890s–1910s. The mean age of female doctoral and postgraduate researchers was 35 years. The majority of them came from large towns and middle-class families and were Bulgarian graduates, while foreign fellows were 23.5%. Women scientists graduated in 1920–1930s and started their doctoral and postgraduate research in lower positions (as associate professors, lecturers, assistant professors, curators, and research associates) at various domestic scientific institutions. There was also a category of women who were engaged in research even though they were high school teachers. With doctoral degrees in German studies, they applied for lecturers' positions at *Sofia University* or for the Bulgarian language chairs at *Leipzig* and *Prague University*. The postgraduate students specialized abroad in several fields: Zoology, Biochemistry, Comparative Anatomy, Bacteriology, Genetics, Analytical Chemistry, Interface and Colloid Science, Physics, Climatology, Medicine, German Studies, and Ethnomusicology.

Before departing for Germany, women scientists from a random sample were already involved in different types of existing and active social networking: kinship (Radka Kaltschewa and Dona Kaltschewa were sisters), friendships (some of them were former classmates or fellow students), workplace (most worked in the same institutions or in close collaboration), and organizational (they were members of the same research associations, unions, etc.).⁶

Bulgarian women scientists were members of a number of national scientific societies: the *Bulgarian Biological Society*, the *Union of Bulgarian Chemists*, the *Entomological Society*, the *Bulgarian Medical Doctors' Union*, and the *Bulgarian Archeological Institute*. Almost all women scientists from my sample joined the *Bulgarian Association of University Women*, a branch of the *International Federation of University Women* (1924), a kind of female scientific network, secured through friendships, permanent communication, professional cooperation, and joint projects.⁷ Female Bulgarian scientists used the domestic scientific societies for presenting papers and publishing articles in the local scientific journals and the popular press.

Important promoters of direct knowledge exchange were the academic mentors, who facilitated and mediated at the beginning the interpersonal relationships of their female assistants and doctoral students.⁸ Prof. Metodi Popoff (1881–1954)⁹ managed

cal Archives at St. St. Cyril and Methodius National Library (BHA-CMNL), coll. 219A, inv. 1, a.u. 143, f. 8,10; coll. 219B, inv.1, a.u. 9, f. 15–18b, 49–50.

6 See Appendix 5.

7 See Appendix 5.

8 In this period, these scientists had no other assistants besides women. This can be explained by the fatherhood of Prof. P. N. Raikow, but can also be considered along the lines of the traditional gender segregation in West Europe where young and unmarried women scientists were kept dependent for years (sometimes sexually and emotionally) on their mentors as seen in: lower positions, term contracts, threat of dismissals, etc.

9 He was a distinguished biologist: specialized, lectured at *Munich* and *Berlin Universities* (1904–1909, 1911–1913), awarded with the Kottenius Prize of *Berlin Academy of Sciences*

the postgraduate studies of women scientists at the *Institutes of Biology, Biochemistry, and Zoology at Sofia University*. As Rector and Bulgarian Ambassador to Germany (1923–1931) he motivated his female colleagues and used his own personal contacts to help network them. During his term of office in Berlin, Dr. Anna Chranowa and Dr. Ariadne Dimitrowa worked at the *Institute of Zoology* (1925–1927), and Dona Kaltschewa trained at the *Kaiser-Wilhelm-Institute (hereafter, KWI) of Physical Chemistry and Electrochemistry* (1930–1931). Taking on similar roles as mediators were: the chemist Prof. Pentscho Raikow (1864–1940), who provided contacts and postgraduate studies for his daughter and Asst. Prof. Theodora Raikowa-Kowatschewa in Germany (1922) and France; the chemist Prof. Assen Zlataroff (1885–1936) for his two assistants, Dona Kaltschewa and Maria Andreitschewa, to specialize in Biochemistry, Interface and Colloid Science in Germany and France, and to help them prepare publications for international journals; the chemist Prof. Dimitar Balarew (1885–1964) for his Ph.D. student Anna Kuluschewa, who acquired advanced training in Spectroscopy at the *Higher School of Technology* in Berlin (1934–1935); the expert in German Studies Prof. Konstantin Galabow (1892–1980), who encouraged the appointment and career growth of Assoc. Prof. Jeanne Nikolowa, and who used his positions in the *German Scientific Institute* in Sofia to facilitate her appointment as a lecturer, her academic trips, and her postgraduate studies in Germany (1941–1942).

What played a major role in these connections were the interpersonal relations with German scientists, manifested in friendships, long-term collaboration, activities in a common research field, correspondence, meetings at scientific forums, exchanges of books and printed materials, etc.

During her doctoral training Ariadne Dimitrowa established contacts with Prof. Paul Schulze (1887–1949), a scientist from the *Institute of Zoology* in Berlin and Director of the *Institute of Zoology* in Rostock. In Berlin she worked with Prof. Paul Lindner (1861–1945), a famous bacteriologist and microbiologist who had also worked in Halle and Freiburg i.Br, and he personally proposed her to join his scientific team at the *KWI for Fermentation* (1927). Dimitrowa exchanged publications with Prof. Victor Jollos (1887–1941), a geneticist and zoologist who lectured in Munich and Berlin, and with Wilhelm Weichardt, a psychologist who was working in Erlangen. She trained herself under the guidance of Prof. Richard Goldschmidt (1878–1958), a geneticist and Director of the *KWI of Biology* in Berlin. Dimitrowa was acquainted with one of the first women professionals in Biology, Prof. Rhoda Erdman (1870–1935), a student of Robert Koch and a founder of the *Institute of Experimental Cell Research* in Berlin.¹⁰

Professor Paul Buchner (1886–1978), a specialist in Cellular Biology and lecturer in Greifswald, Breslau and Leipzig, was a mentor for Anna Chranowa. He invited her to work at the *Institute of Zoology* at the *University of Greifswald* (1926) after she defended her Ph.D. thesis. Having started research for the treatment of oncologi-

(1924), editor of the German scientific journal *Zellstimulations-Forschungen*, a member of *Deutsche Akademie der Naturforscher Leopoldina (Leopoldina Academy)* in Halle (1927).

10 CSA, coll. 1652k, inv. 1, a.u. 1, f. 1–2; a.u. 4, f. 1–2; a.u. 10, f. 2–2b.

cal diseases by means of short radio waves, she specialized in 1942–1944 at the *University Clinic* and at the *Institute of Genetics and Racial Research* in Würzburg, where she was in close contact with leading scientists in this field: Dr. Friedrich Ernst Koch (1901–?), Director of the *Institute of Biology of Dr. Madaus and Co.* in Dresden-Radebeul; Prof. Erwin Schliephake (1894–1995), an oncologist; Prof. Dr. Robert Bierich (1875–1955), a principal at the *Cancer Research Institute* in Hamburg; and Prof. Gunther Just (1892–1950), a biologist and geneticist, who taught in Greifswald, Würzburg, and Tübingen, and was the Director of the *Genetics Research Institute* of the *Reich's Health Office* in Berlin-Dahlem.¹¹

In the field of organic chemistry Dona Kaltschewa was in permanent contact with Prof. Herbert Freundlich (1880–1941), Director of the *KWI of Physical Chemistry and Electrochemistry* in Berlin, founder of the German school for the study of colloids.¹² Through her father, Theodora Raikowa-Kowatschewa communicated personally and by mail with Prof. Arthur Hantzsch (1857–1935), a pioneer in Stereochemistry and a lecturer at Würzburg and Leipzig, and also with Raphael Liesegang (1869–1947), who had made discoveries in the sphere of Photographic Physics and was a researcher of aerosols and gelatins.¹³

Long-term correspondence (during either their doctoral or postgraduate studies) was kept up by the experts in German Studies. Jeanne Nikolowa relied on the suggestions of the philosopher Prof. Hans Leisegang (1890–1951) from Jena and the theologian Prof. Paul Tillich (1886–1965) from Frankfurt.¹⁴ Prof. Max Vasmer (1886–1962), a famous expert in Slavonic studies, urged Dr. Liuba Dramaliewa, a postgraduate in German Studies, to become his Assistant Professor at the *University of Berlin* (1932).¹⁵ Dr. Ziwka Dragneva and Dr. Gora Iwanowa had been friends with the famous scholar Prof. Otto Frank from the *University of Berlin*.¹⁶ The contact of Rajna Kacarova with the prominent ethnomusicologists, Prof. Moritz von Hornbostel (1877–1935) from the *Berliner Phonogramm-Archive*, and Robert Lachmann (1892–1939) from the *Berlin National Library*, were beneficial to her career as a musicologist in Bulgaria (YORDANOVA 1984: 42).

Several Bulgarian women scientists who worked for German scientific institutions in Sofia also benefited from their collaboration with foreign scholars.¹⁷ Dr. Ziwka Dragneva, a Lecturer in German Studies at *Sofia University*, and a member of the Board of the *Bulgarian-German Mediator's Bureau* in Sofia (1933) translated along with Prof. Gerhard Gesemann (1888–1948, the *German University* in Prague) a collection of Bulgarian fiction, which thereafter became an important source for

11 SA-BAS, coll. 74k, inv. 2, a.u. 635, f. 2–8; SSA, coll. 994k, inv. 2, a.u. 381, f. 1, 25, 28.

12 SSA, coll. 994k, inv. 2, a.u. 264, f. 29, 50–51b.

13 NPM, coll. P.N. Raikow, box 10.

14 ASU, coll. 1, inv. 35, a.u. 47, f. 26–29.

15 ASU, 1, coll. 35, a.u. 101, f. 1–2; SSA, coll. 994k, inv. 2, a.u. 440, f. 1–1b; CSA, coll. 1753k, inv. 1, a.u. 997, f. 1–1b; *Almanah na Sofijskija universitet* [Almanac of Sofia University], 1938–1988, vol. 2, ser. 1, Sofia 1988, p. 885.

16 BHA-CMNL, coll. 219-b, a.u. 9, f. 1–43; a.u. 60, f. 1–50.

17 See App. 2.

Slavic Studies.¹⁸ Jeanne Nikolowa, private Assoc. Prof. of German Studies at *Sofia University*, and Ganka Naidenowa, doctor at the *University of Berlin* and an applicant for a Bulgarian language lectureship at *Leipzig University*, were invited to be the main lecturers at the *German Scientific Institute* in Sofia (1940–1942), a branch of the *University of Vienna*. There they collaborated with the historian Prof. Dr. Hans Koch (1894–1989) and the Orientalist Prof. Herbert W. Duda (1900–1975). This co-operation was extremely useful for Naidenowa, who started working as a literary historian after WWII (KJULJUMOVA-BOJADJIEVA 1991).

A graduate from *Sofia University*, Maria G. Bratschkova became a research fellow at the *German Archeological Institute* in Rome (1931–1937). She defended her doctoral thesis in Berlin (1925), and did her postdoctoral studies in the field of classical archeology. At the *Institute*, Bratschkova had the opportunity to communicate with distinguished scholars who had established careers in Germany: Prof. Walther Amelung, Prof. Ernst von Dobschütz, and Prof. Ludwig Curtius. Through the *Bulgarian Archeological Institute* (an association in which she participated), she disseminated her knowledge and publications and shared her contacts. She wrote her study on the shell in ancient art while at the *German Archeological Institute* and published it in German in the *Proceedings of the Bulgarian Archeological Institute*. It was widely quoted in classical archeology, and was awarded a prize by the Bulgarian Academy of Science as an excellent achievement by a woman scholar (1938).¹⁹

The short-term academic trips of the Bulgarian women scientists served as another social institution for direct knowledge exchange.²⁰ Group sessions at seminars, conferences, congresses, and exhibitions facilitated their personal contacts, enabled their participation in professional societies, and helped them prepare for visits to academic institutions. Academic trips were made by 7 scientists with various affiliations (also by freelance scholars). For example, Theodora Raikowa-Kowatschewa, as a member of the *German Chemical Society*, presented three articles in the *Berichte der Deutschen Chemischen Gesellschaft*, and was often invited to its congresses and various public events.²¹ Participation at psychological congresses in Germany moved Katja Papasowa-Kruck from being an unknown figure in the country to a 'visible' one, enough so that she was included – among the few Bulgarian psychologists – in an international handbook.²²

The second mode which can be found using SNA is generalized knowledge exchange. It operates indirectly through intermediaries. Its agents can be mentors (their contribution was discussed in the previous paragraph), as well as scientific publications. All data sources about publications of Bulgarian women scientists in German scientific periodicals and single editions are provided in a separate prosopographical

18 GESEMANN, Gerhard (ed.): *Neue bulgarische Erzähler*. Transl. Z. Dragnewa. München 1936 (1942).

19 SA-BAS, coll. 56k, inv. 1, a.u. 207, f. 1; coll 11k, op. 5, a.u. 351, f. 12; CSA, coll. 1643k, inv. 1, a.u. 24.

20 See App. 3.

21 National Polytechnic Museum (NPM), coll. P.N. Raikow, boxes no. 5, 8, 37.

22 *Psychological Register*, 1932, vol. 3, p. 640.

table (no. 3).²³ After the data was processed, 51 articles published in German science magazines were found. They belonged to 17 female Bulgarian scientists, who were both affiliated with academic institutions and had been working as high school teachers. These papers were mostly prepared as a result of postgraduate studies or scientific projects.

Materials were presented in 34 prestigious and peer-reviewed journals published in Berlin, Leipzig, Munich, and Hamburg. Thirty five of the articles are written by a single author²⁴, and 16 articles were developed in co-authorship with the principal investigators, who were often heads of their own departments. The exceptional role of these distinguished academic mentors should be noted. They were the ones who initiated the printing of the articles and provided women scientists with international contacts: Prof. Metodi Popoff (biologist), Prof. Dimitar Balarew (chemist), Prof. Assen Zlataroff (biochemist), and Prof. Wladimir Markow (microbiologist). The co-authorship by the women was mostly acknowledged and entered in all the bibliographies of these prominent scientists, but some of them subsequently depreciated the importance of the theoretical and practical contribution of their female co-authors.²⁵ In spite of the contacts established by women scientists abroad, only one of them, Dr. Theodora Taslakowa, who had been working about 10 years in various medical institutions in Germany, produced publications in collaboration with local counterparts.²⁶

The women scientists kept up long-term mail correspondence with the editors, which made the indirect relations into personal ones. The private archival collection of Theodora P. Raikowa-Kowatschewa shows the processes involved in the correction of proofs and the reception of author's print-outs. There are also letters in which the editorial boards returned Raikowa's manuscripts for lack of originality in the study and the publishers declined to accept them.²⁷ Sometimes the cooperation of women scientists with certain journals became permanent, because it was related to their participation in scientific networks.

After the SNA, I found that exchange networks of the random sample can be typified as trans-national, interpersonal, and inter-institutional. Also they can be characterized as based on kinship, friendship, the workplace, and organizational factors. The tested knowledge exchange networks were simple (not multi-centered) and had weak power. The "key hubs" in them are mentors who had a crucial role in the selection of women scientists, in their careers (recruitment, promotion, and dismissals), in their reputation in the scientific community, in the establishment of scientific contacts, and in bringing their publications to press.

23 The published dissertations and publications in Austria and the occupied states before 1934–1939 were not included in it. Data sources are extracted from: BHA-CMNL, coll. 219A, inv. 1, a.u. 33, f. 1–2; NPM, coll. P.N. Raikow, boxes no. 5, 8, 10, 11; SA-BAS, coll. 44c, inv. 1, a.u. 235, f. 1–3; and also cited bibliographies (see note 2).

24 See App. 4.

25 SA-BAS, coll. 74k, inv. 2, a.u. 280, f. 17–24.

26 See App. 4.

27 SA-BAS, coll. 172k, inv. 1, a.u. 359, f. 1–1b.

Power-dependent Relations and Social Outcomes

A predominance of direct and generalized social knowledge exchange assumes inequalities and dependence. In the social networks described, power hierarchies are detected according to the type of relationship. When knowledge exchange in the social networks becomes direct, women scientists attempt (though not always successfully) to break the “power networks” and gain the power; they streamline the knowledge exchange and they seek out and exploit opportunities for career advancement. When knowledge exchange in the social networks is generalized, women scientists are in direct dependence on their mentors and can rarely be emancipated.

A good example is the work of Ariadne Dimitrowa, who over a period of 10 years conducted experiments in her joint research on mutations with Prof. M. Popoff. Their correspondence clearly shows who the leading person was. For instance, in 1935, Dimitrowa wrote to Popoff: “I will describe to you our entire experiment [...] So far I have put together some other combinations, but you will see these details when you return.”²⁸ However, half of the articles were signed by Prof. Popoff and in co-authored papers his name was in the first place. In 1938 he suggested to Dimitrowa that she marry, because – as a woman – she would not be able to advance in the Academy. Actually she decided to participate in the competition for the position of private Assoc. Prof. of Zoology (1940–1941), but this gave rise to the professor asking for her dismissal.²⁹ In 1943 Prof. Popoff wrote a very negative review to the Senate about his former assistant, who was applying again for Assoc. Prof. He emphasized a lack of independence in her scientific papers: “Popoff always proposed, but Ms. Dimitrowa only participated”.³⁰

The research exchange networks created between Bulgarian women scientists and their German colleagues were flexible and weak structures over time. The dynamics of the exchange can be described by dividing it into at least three periods: the formation of the exchange networks (the mid1920s), their greatest frequency (1930s–mid1940s), and their crash (from mid1940s–1950). This dynamic was influenced directly by the political situation in the mid1930–mid1940s and by the drawing of territorial and symbolic frontiers in Europe after WWII (the dividing of Germany and the beginning of the Cold War). The analysis of social networks in our case shows that women scientists in the end had mostly negative outcomes.

The participation of female Bulgarian scientists in knowledge exchange networks did not afford them more academic power (by which is meant obtaining higher positions, habilitation, participation in the Senate or on the Boards of scientific societies, etc.). They remained on the ‘periphery’ of science and at the ‘bottom’ of the academic hierarchy. Instead of gaining power after their postgraduate studies, they were dismissed from non-tenured positions. Between 1932–1940 assistant professors Theodora Raikowa-Kowatschewa, Helene Schehanowa, Maria Andreitschewa, and Dona Kaltschewa were removed from the positions they held at *Sofia University*. Gora

28 SA-BAS, coll. 74k, inv. 2, a.u. 393, l. 1, 5, letter of Dimitrowa (Sofia) to Popoff (Berlin), 20.07.1935.

29 CSA, coll. 1652k, inv. 1, a.u. 29.

30 SA-BAS, coll. 74k, inv. 2, a.u. 280, f. 16, 20–24.

Iwanowa, Stella Hadschi-Petrowa, and Ariadne Dimitrowa were not successful in competing for Associate Professorships (in German Studies and Biology respectively) at the same university (NAZARSKA 2005a, 2010).

After the *coup d'état* in September 1944, a government dominated by communists with a pro-Soviet orientation came to power in Bulgaria. The new totalitarian regime (imposed in the years 1947–1949) not only destroyed all the Bulgarian-German cultural institutions, but repressed as “fascists” those who had graduated in Germany, those who had been contributors to German periodicals, and so on. Jeanne Nikolowa, Assoc. Prof. of German Studies at *Sofia University*, and Eudoxia Filowa, assistant in the *National Museum of Ethnography*, were dismissed for their “fascist activity”.³¹ Other women scientists were persecuted for political reasons. The nuclear physicist Assoc. Prof. Elizabeth Kara-Michailova was stigmatized as a “zealous adherent of Nazi Germany”, because she respected German science and technology. Accused of incompetence, she was moved from *Sofia University* to the *Bulgarian Academy of Sciences*. In the same way, Dr. Anna Chranowa was transferred to the *Institute of Experimental Medicine-BAS*, while Dr. Ariadne Dimitrowa was forced to work in the *Institute of General Biology-BAS*. There they mastered the new Soviet scientific theories, but were prohibited from publishing freely and corresponding with their colleagues in West Europe; and they did not receive permission to participate in international congresses. In a similar manner the ethnomusicologist Rajna Kararova-Kukudowa was accused of being a “political enemy” and was moved from the *National Museum of Ethnography* to the *Institute of Music Studies-BAS*. By the end of the 1950s her applications for academic trips abroad were denied by the communist authorities of *BAS*. Her German publications are still not known to the experts today and were not included in her bibliography, even after her death (NAZARSKA 2005b).

Personal losses for women scientists can be traced through two dimensions: firstly, failures in their family lives (most of them remained unmarried and childless, and died because of damage from their experiments in laboratories) and, secondly, their complete absence in the collective memory of the nation.

On the other hand, postgraduate research by women was inspired by their commitment to science and their desire to be useful to their country. In her application to the Dean of the Faculty of Physics and Chemistry in *Sofia University*, Anna Chranowa wrote: “though an Assistant Professor’s position was offered to me there [in Germany], I preferred to work further in my native country, with my professors, who first inspired my love for this science”.³² Describing her great diligence and performance, the principal of Ariadne Dimitrowa noted: “She longed to be sent for postgraduate research abroad”.³³

Through research at leading institutions in the current fields (such as Interface and Colloid Science, Radiography, Biochemistry, and Ethnomusicology) and important topics (e.g. treatment of oncological diseases), women scientists acquired ad-

31 ASU, coll. 1, inv. 35, a.u. 47, f. 5.

32 SSA, coll. 994k, inv. 2, a.u. 381, f. 57b.

33 CSA, coll. 1652k, inv.1, a.u.10, f. 2–2b.

vanced training and novel skills. Sometimes postgraduate studies were the impetus for the preparation of a doctoral thesis or habilitation.

It can be argued that postgraduate research gave the women scientists, (limited to those who were not dismissed and kept their positions in Bulgarian science after 1944), to some extent a symbolic capital, because they became acknowledged experts in their research fields. Even today Dr. Elizabeth Kara-Michailova is appreciated as a founder of Bulgarian nuclear physics and Rajna Kacarova of contemporary Bulgarian ethnomusicology. The publications of Bulgarian women scientists received a positive reception both in their homeland and in Germany. Some of them were widely quoted and referred to in scientific works and bibliographic journals. For her article in *Zeitschrift für die gesamte Neurologie und Psychiatrie* (Berlin), Dr. Helene Schechnowa was nominated for a prize from the *Ministry of Public Education* in 1941 by the doyen of Bulgarian psychiatry Prof. Danadjieff.³⁴

Conclusion

This analysis shows that, although Bulgarian women scientists were few and were affiliated with a small number of scientific institutions, in the 1920–1950s they were involved in scientific networks and in particular the networks existing between Germany and the Balkans. It was found that these networks operated in two modes – direct knowledge exchange and generalized knowledge exchange. Productive knowledge exchange cannot be found during the research period. This means that in the knowledge exchange, Bulgarian women scientists were mostly on the passive side, i.e. they depended on the mediation of their mentors and were much more “receivers” than “senders” of knowledge.

Overall, knowledge exchange with Germany enriched the theoretical and practical training of women scientists and they became well-trained and respected professionals. The knowledge exchange process was an important contribution to Bulgarian science, whole branches of which were developed through the activities of women scientists after their postgraduate studies in Germany. Bulgarian women scientists avoided political contacts with German scientists. Here are a few examples: J. Nikolowa interrupted her study in Frankfurt and delayed the preparation of her doctorate, afraid of the onslaught of Nazism (1933); E. Kara-Michailova refused to start work in Halle (1938), thinking that Prof. Adolf Smekal had pro-Nazi views; although A. Chranowa was formally affiliated with the *Institute of Genetics and Racial Research* in Würzburg, she chose a topic outside of eugenics, namely, cancer treatment with short radio waves (1942–1948). Among women scientists, the only one showing her political affiliation was the communist L. Dramaliewa.³⁵ In spite of maintaining their distance to politics, after 1944 many of these women were accused of “fascism”³⁶ because of their training and stays in Germany, and their relationships with German culture and science. As a result, they were professionally marginalized.

34 SA-BAS, coll. 72k, inv. 1, a.u. 54, f. 3.

35 See: ASU, coll. 1, inv. 35, a.u. 47, f. 15–16, 26–29; LAZAROVA & BALABANOV 2013: 22.

36 After 1944 in Bulgarian political jargon that means “Nazism”.

Finally, the analysis suggests that knowledge exchange with German science became an impetus for a vertical social (academic) mobility of female Bulgarian scientists. They failed to overcome the “power networks” and to break the “glass ceiling”, and remained “discriminated elites”.

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Appendix 1: Doctoral and postgraduate research of Bulgarian women scientists (scholars) in Germany

Doctoral and postdoctoral graduates	Research area	Affiliation	Institution receiver	Funding
CHRANOWA, Anna	Zoology	Sofia University	1925, Berlin, Institute for Fermentation; 1926, <i>doctoral research</i> , Greifswald University; 1940, Berlin, Institute of Zoology; 1943–1944, Würzburg, University Clinic, Institute of Genetics and Racial Research; 1944–1948, Dresden, Institute of Biology of Dr. Madaus and Co.	1925, own expenses; 1926, own expenses; 1940, Sofia University; 1943–1948, <i>Alexander von Humboldt Foundation and Kerckhoff Foundation, Bad Neuheim</i>
DIMITROWA, Ariadne	Zoology	Sofia University	1924–1925, Berlin, Institute for Fermentation; 1926, <i>doctoral research</i> , Rostock University; 1927, Berlin, KWI of Zoology	1924–1925, Ministry of Education; 1926, Ministry of Public Education; 1927, Sofia University
DRAGNEWA, Siwka	German studies	Sofia University; Independent scholar (retired after 1936)	1928, 1930, Munich; 1936, Germany	1928, own expenses; 1930, <i>German Academy</i> ; 1936, own expenses
DRAMALIEWA-KODJEJKOW, Liuba	German studies	Independent scholar (high school teacher)	1932, Berlin	1932, <i>German Academy</i>
IWANOWA, Gora	German studies	Independent scholar (high school teacher)	1930, 1931, Munich; 1937, Berlin University, <i>preparation of habilita-</i>	1930, <i>German Academy</i> ; 1931, own expenses; 1937, Ministry of

Doctoral and postdoctoral graduates	Research area	Affiliation	Institution receiver	Funding
[IWANOWA, Gora]			<i>tion</i> ; 1939, Munich; 1939–1940, Berlin University	Public Education; 1939, <i>German Academy</i> ; 1939–1940, <i>Alexander von Humboldt Foundation</i>
KACAROVA-KUKUDOWA, Rajna	Ethnomusicology	National Museum of Ethnography	1933, Institute of Music Studies – Berlin University, Berlin Phonogram Archive, Berlin National Library; 1933, Leipzig University, Dresden University; 1935, Munich University	own expenses
KALTSHEWA, Dona N.	Biochemistry, Interface and Colloid Science	Sofia University; Higher School of Social Sciences at the Bulgarian Women's Union	1930–1931, Berlin, KWI of Physical Chemistry and Electrochemistry	Sofia University
KALTSHEWA, Radka N.	Meteorology, Climatology	Institute of Meteorology	1938–1940, Berlin-Potsdam	Institute of Meteorology
KOLUSHEWA, Anna	Analytical Chemistry, X-Ray, Spectroscopy	Institute of Health Care	1934–1935, Berlin, Higher School of Technology	Sofia University
NAIDENOWA-ROMANSKA (STOLOWA), Ganka	German Studies	German Scientific Institute, Sofia, 1940–1942; Independent scholar (high school teacher)	1939–1942, <i>doctoral research</i> , Berlin University	<i>Alexander von Humboldt Foundation</i>

Doctoral and postdoctoral graduates	Research area	Affiliation	Institution receiver	Funding
NIKOLOVA-Galabowa, JEANNE	German Studies	Sofia University	1931–1933, Jena, Frankfurt am Main; 1938, 1939, 1940, Germany; 1941–1942, Berlin University, <i>preparation of habilitation</i>	1931–1933, <i>Alexander von Humboldt Foundation</i> ; 1938–1940, Sofia University; 1941–1942, Sofia University
PETKOWA, Raina	Social Work	Higher School of Social Sciences at the Bulgarian Women's Union	1929–1932, Berlin, German Academy for Social and Educational Women's Work	1929–1932, Bulgarian Women's Union
RAIKOWA-KO-WATCHEWA, Theodora P.	Organic Chemistry	Sofia University	1922, Berlin University; 1931, Berlin University	own expenses
SILIANOWSKA-DIMITROWA (NOWIKOWA), Tatiana	Art history and Archeology	Independent scholar	1937–1939, Berlin University	own expenses
STOILOWA, Eugenia R.	Veterinary Medicine, Microbiology	Veterinary and Bacteriology Station, Varna	1938, Berlin, Robert Koch Institute	Ministry of Interior and Public Health
WALKOWA-MOLLOWA, Newjana	Intern Medicine	Sofia University	1942–1943, Berlin University	Sofia University
ZAHARIEWA-KOWA-TSCHEWA, Krasimira	Paleontology	Sofia University	1942, Berlin University	Sofia University

Appendix 2: Bulgarian women working in German scientific institutions

Doctoral and postdoctoral graduates	Research area	Institutional affiliation	Additional institutional affiliation
BRITCHKOVA, Maria	Classical Archeology	1931–1937, German Archeological Institute, Rome	
DRAGNEVA, Siwka	German studies	Sofia University; Independent scholar (retired after 1936)	Bulgarian-German Mediator's Bureau, 1933–1944
NAIDENOWA-ROMANSKA (STOILOWA), Ganka	German studies	Independent scholar (doctoral student, high school teacher)	German Scientific Institute, Sofia, 1940–1942
NIKOLOVA-GALABOWA, Jeanne	German studies	Sofia University	German Scientific Institute, Sofia, 1940–1942
TASLAKOWA, Theodora	Medicine	1926–1937, Research Institute of Hygiene and Immunology, Berlin; Institute for Cancer Research, Berlin; Rudolf Virchow Hospital, Berlin	

Appendix 3: Academic/ Research trips

Scientists and scholars attended scientific forums	Research area	Affiliation	Scientific forums	Funding
KARA-MICHAILOVA, Elizabeth	Nuclear Physics	Sofia University	1943, Weimar, workshop	Sofia University
KONUSHLIEVA-MILEVA, Elena	Ophthalmology	Sofia University	1941, Leipzig, German-Bulgarian conference	Sofia University
NIKOLOVA-GALABOWA, Jeanne	German studies	Sofia University	1941, Leipzig, academic workshop	Sofia University
PAPASOWA-KRUCK, Ekaterina (Katja)	Psychology	Independent scholar (high school teacher)	1930s, congresses	own expenses
RAIKOWA-KOWATCHEWA, Theodora P.	Organic Chemistry	Sofia University	1931, Berlin, Congress of German chemists	own expenses
SILIANOWSKA-DIMITROWA (NOWIKOWA), Tatiana	Archeology	Independent scholar	1939, Berlin, International Congress of Archeology	own expenses
TODOROWA-WELEWA, Maria	Ethnography	National Museum of Ethnography	1942, Frankfurt am Main, ethnographic exhibition	National Museum of Ethnography

Appendix 4: Publications**Andreitschewa-Vankova, Maria** (Sofia University)

ZLATAROFF, Assen, Maria ANDREITSCHewa and Dona KALTSCHewa: Beitrag zur Biochemie des Zinks. Zink und Hefegärung, in: *Biochemische Zeitschrift*, 1931, vol. 231, pp. 123–134.

Chranowa, Anna (Sofia University)

CHRANOWA, Anna: Untersuchungen über die Variabilität von *Palaemonetes varians* Leach, in: *Zeitschrift für Morphologie und Ökologie der Tiere*, 1927, vol. 9, no 3–4, pp. 572–614.

CHRANOWA, Anna: Wiederholte Regeneration bei Planarien, in: *Wilhelm Roux' Archiv für Entwicklungsmechanik der Organismen*, 1939, vol. 139, no. 1, pp. 65–77.

CHRANOWA, Anna: Heilung überimpfter Karzinome bei Mäusen, in: *Zeitschrift für Krebsforschung*, 1942, vol. 53, no. 3–4, pp. 208–217.

Dimitrowa, Ariadne (Sofia University)

POPOFF, Metodi and Ariadne DIMITROWA: Studien zur Beschleunigung der Regenerationsprozesse durch Anwendung von Stimulationsmitteln. I. Studie. Stimulierung der Regenerationsprozesse bei *Hydra viridis*, in: *Biologia Generalis*, 1925, vol. 1, no. 1. 52–78.

DIMITROWA, Ariadne: Untersuchungen über die Beziehung zwischen Tracheen und Aderverlauf im Hymenopterenflügel, in: *Zeitschrift für Morphologie und Ökologie der Tiere*, 1927, vol. 7, pp. 694–739.

DIMITROWA, Ariadne: Untersuchungen über die überzähligen pulsierenden Vakuolen bei *Paramecium caudatum* Ehrbg, in: *Archiv für Protistenkunde*, 1928, vol. 64, pp. 462–478.

DIMITROWA, Ariadne: Die fördernde Wirkung der Exkrete von *Paramecium caudatum* Ehrag. auf dessen Teilungsgeschwindigkeit, in: *Zoologischer Anzeiger*, 1932, vol. 100, pp. 127–132.

POPOFF, Metodi and Ariadne DIMITROWA: Über eine Schwangerschaftsreaktion auf allgemeiner Zellstimulationsbasis, in: *Ergebnisse der Hygiene, Bakteriologie, Immunitätsforschung und experimentellen Therapie*, *Archiv für Gynäkologie*, 1933, vol. 154, no. 3, pp. 522–537.

POPOFF, Metodi and Ariadne DIMITROWA: Über chemisch erzeugte Mutationen bei *Drosophila melanogaster*, in: *Deutsche Gesellschaft für Vererbungswissenschaft*, 1937, vol. 73, no. 1, pp. 467–469.

POPOFF, Metodi and Ariadne DIMITROWA: Durch chemische Einwirkungen experimentell erzeugte Mutationen bei *Drosophila melanogaster*, in: *Biologia Generalis*, 1937, vol. 13, pp. 595.

Fingowa-Pawlowitch, Nadejda (Sofia University)

FINGOWA-PAWLOWITCH, Nadejda: Ein Fall von *Echinococcushepatis multiplex*, in: *Jahresbericht über die gesamte Chirurgie und ihre Grenzgebiete*, 1925, vol. 28, pp. 115.

Hadschi-Petrowa, Stella (Independent scholar) (high school teacher)

HADSCHI-PETROWA, Stella: Die geistige Formung des bulgarischen Bürgertums, in: Südost-Forschungen, 1942, vol. 7, no. 3–4, pp. 654–661.

Jatschewa, Zdrawka K. (Sofia University)

MARKOFF, Wladimir and Zdrawka JATSCHewa: Eine tödliche Epizootie unter den Forellen im Mussallahsee, in: Zentralblatt für Bakteriologie und Hygiene, Mikrobiologie und Hygiene, 1939, Abt. II, vol. 100, pp. 194–201.

Kacarova-Kukudowa, Rajna (National Museum of Ethnography)

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- Taslakowa, Theodora** (Research Institute of Hygiene and Immunology, Berlin; Institute for Cancer Research, Berlin; Rudolf-Virchow-Hospital, Berlin)
- WATANABE, Makoto and Theodora TASLAKOWA: Über den Einfluß der Fütterung mit Chlornatrium, Bromnatrium und Jodnatrium den Harnquotienten C/N bei Kaninchen, in: Biochemische Zeitschrift, 1926, vol. 178, pp. 286–297.
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Appendix 5: Biographical notes³⁷

- ANDREICHEWA-VANKOVA, Maria (1899, Sofia – 1978) Education: Chem., Sofia Un. (1921), grad. stud., Pasteur Inst., Paris (1932–1933); Employment: Asst. Prof., Sofia Un. (1922–1938), supervisor, private pharmaceutical company (1938–1951), part-time Res. Fell., Inst. of Exper. Medicine, BAS (1951–1956), technical Asst., Prof. and Head of Dep. of Biochemistry, Inst. of Crop, BAS (1956–1962); Member: IFUW-Bulg. branch.
- BRITCHKOVA, Maria (1889, Rousse – 1968) Education: Hist. and Geogr., Sofia Un. (1911), Archeol., Berlin Un., Ph.D. (1925); Employment: Asst., Nat. Inst. of Archeology (1919–1923), Res. Fell., Magna Graecia Soc., Rome (1927–1930), Res. Fell., German Archeol. Inst., Rome (1931–1937), part-time Res. Fell., Inst. of Archeology, BAS (1960s); Member: Bulg. Archeol. Inst., IFUW-Bulg. branch.
- CHRANOWA, Anna (1899, Sofia – 1985) Education: Nat. History, Sofia Un. (1921), grad. stud., Pasteur Inst., Paris (1924–1925); Employment: Asst. Prof., Sofia Un. (1926–1946, 1947–1949), Res. Fell., Instit. of Experimental Medicine, BAS (1949–1964); Member: IFUW-Bulg. branch.
- DIMITROVA, Ariadne (1896, Samokov – 1971) Education: Nat. History, Sofia Un. (1921), Rostock, Ph.D. (1926), Sofia, D.Sc. (1957); Employment: Asst. Prof., Sofia Un. (1925–1946), lect., Plovdiv Un. (1945–1947), Prof., Un. of Skopje (1948), Asst. Prof., Inst. of General Biology, BAS (1948–1950), Asst. Prof., Higher Medical Inst., Sofia (1950–1957); Member: IFUW-Bulg. branch, Entomology Soc.
- DRAGNEVA, Siwka (1885, Liaskoveč – 1959). Education: Germ. and Fr. literature, Zurich (1909); Ph.D., Zurich (1922); Employment: high school teacher, Sofia (1909–1923), lect., Sofia Un. (1923–1936), translator; Member: IFUW-Bulg. branch, Germ.-Bulg. Society
- DRAMALIEVA-KODJEJKOVA, Liuba (1897, Sofia – 1978) Education: Germ. Stud., German Un.-Prague, Leipzig, Ph.D. (1925); Employment: high school teacher, Sofia (1925–1942); head of Dep., Min. of Information; lect. and Assoc. Prof., Sofia Un. (1947–1957); Member: head of IFUW – Bulg. branch.
- FINGOWA-PAWLOWITCH, Nadejda (1885, Kalofer – ?) Education: Med., Nancy, M.D. (1912); Employment: hospital doctor, Alexandrovska Hospital-Sofia (1912–1926), Asst. Prof., Sofia Un. (1921–1926), private medical practitioner; Member: IFUW-Bulg. branch, Bulg. Women's Union.
- HADSCHI-PETROVA, Stella (1904, Tulčea – ?) Education: German Studies, Sofia Un. (1932); Employment: high school teacher, Sofia; appl. for Assoc. Prof., Sofia Un. (1937), lect., Sofia Un. (1949–1965).
- IWANOWA, Gora (1898, Karlukovo – 1985) Education: Germ. Stud., Berlin, Vienna, Munich, Ph.D. (1925); Employment: librarian, Nat. Library, Sofia; high school teacher, Sofia; appl. for Assoc. Prof., Sofia Un. (1937); Member: IFUW- Bulg. branch, Germ.-Bulg. Society.
- JATSHEVA, Zdrawka K. (1895, Pleven – 1968) Education: Med., Munich, Bern, M.D. (1920); Employment: hospital doctor, Alexandrovska Hospital – Sofia and Pleven

³⁷ All information about Germany is not included here. See App.1, 2, 3, 4.

- (1920–1923); Asst. Prof., Sofia Un. (1923–1945), Assoc. Prof., Medical Academy, Sofia (1946); Member: IFUW – Bulg. branch, Microbiol. and Biol. Soc.
- KACAROVA-KUKUDOVA, Rajna (1901, Koprivstitsa – 1984) Education: Music, State Acad. of Music, Sofia (1924), postgrad. stud., Prague, Budapest, London, Bucharest; Employment: Asst., Nat. Mus. of Ethnography (1928–1938), head of Dep. of Folk Music, Nat. Mus. of Ethnography (1938–1950), Res. Fell., Inst. of Music Stud., BAS (1950–1966); Member: Intern. Soc. of Music.
- KALTSCHewa, Dona (1892, Sliven – 1973) Education: Chem., Sofia Un. (1921); Employment: Asst. Prof., Sofia Un. (1922–1942), lect., Higher School of Social Sciences at the Bulg. Women's Un. (1932–1944); Member: Sofia Chem. Soc., IFUW-Bulg. branch.
- KALTSCHewa, Radka N. (1896, Sliven – 1972) Education: Math. and Phys., Sofia Un. (1920); Employment: Asst. (1929–1938), climatologist (1938–1943), head of Dep. (1943–1950), Centr. Inst. of Meteorology, Sofia, specialist, Min. of Agriculture, Res. Fell. (1952–1967), BAS.
- KARA-MICHAILOVA, Elizabeth (1897, Vienna – 1968) Education: Phys. and Math., Vienna (1921), Vienna, Ph.D. (1921); Employment: Res. Fell., Radium Inst., Vienna (1922–1935); Yarrow Scientific Res. Fell., Girton Coll. and Cavendish Lab., Cambridge (1935–1939); Assoc. Prof., Sofia Un. (1939–1955); head of the Dep. of Nuclear Physics, Sofia Un. (1945–1955); Res. Fell., Inst. of Physics, BAS (1955–1966); Member: IFUW.
- KOLUSHewa, Anna (1907, Cetine – 1982) Education: Chem., Sofia Un. (1930), Ph.D., Sofia Un. (1934); Employment: chemist and Res. Fell., Inst. of Public Health (1936–1951), Res. Fell., Inst. of Pharmacy (1953–1976).
- KOSTOWA-PLOTCHewa, Wera (1892–1978) Education: Germ. Stud., Berlin, Leipzig, Ph.D. (1915); Employment: freelance translator, lect., Higher School of Social Sciences at the Bulg. Women's Un. (1932–1944); Member: Bulg. Women's Un.
- MOTSCHewa, Christina (1907, Tărnovo – 1947) Education: Agron., Sofia Un. (1931); Inst. of Agricultural Economy, Un. of Cornwell, US (1941); Employment: teacher (1931–1940), Res. Fell., Inst. of Agricultural and Economic Res. (1941–1945).
- NAIDENOWA-ROMANSKA (STOILOWA), Ganka (1914, Čirpan – 1999) Education: Germ. Stud., Sofia Un. (1936), Ph.D., Berlin Un. (1942); Employment: high school teacher; curator, Mus. of P.K.Yavorov; Res. Fell., Inst. of Literature, BAS.
- NIKOLOVA-GALABOWA, Jeanne (1908, Trăn – 2009) Education: Germ. Stud., Sofia Un. (1931), Medicine, Sofia Un. (1946–1948, incompl.); Employment: high school teacher, Plovdiv and Sofia (1931–1936); lect. (1936–1937); private Assoc. Prof., Sofia Un. (1937–1944); part-time Res. Fell., Inst. of Bulg. Language, BAS (1955–1956); part-time lect., Centr. Inst. for Teachers' Training (1964); freelance translator; Member: Club of Bulg. Women Writers, IFUW-Bulg. branch.
- PAPASOWA-KRUCK, Ekaterina (Katja) (1895, Sofia – 1989) Education: Philos., Sofia, Munich, Wurzburg, Ph.D. (1925); Employment: high school teacher, Sofia, translator; Member: IFUW – Bulg. branch; Germ.-Bulg. Soc.
- PETEWA-FILOWA, Eudoxia (1901, Šoumen – 1973) Education: Art Hist., Wurzburg, Ph.D. (1924); Employment: Asst., Nat. Mus. of Ethnography (1925–1944), private

- teacher in German and French; Member: IFUW-Bulg. branch, German-Bulg. Society, Bulg. Archeol. Inst.
- PETKOWA, Raina (1895, Tŕrnovo – 1957) Education: Law, Sofia Un. (1922); Employment: teacher (1914–1916), clerk, Min. of Finance (1922–1929), lect., Higher School of Social Sciences at the Bulg. Women's Un. (1932–1934), social worker, Dir. of Police (1934–1944), teacher (1948–1950), social worker (1950); Member: Un. for Protection of Children.
- RAIKOWA-KOWACHEWA, Theodora (1893, Sofia – 1963) Education: Chem., Sofia Un. (1916), Employment: Asst. Prof., Sofia Un. (1918–1932), chemist, private lab. (1932–1965); Member: Bulg. Chem. Soc., IFUW-Bulg. branch.
- SCHECHANOWA-STEPANOWA, Helene (1893, Plovdiv – 1962) Education: Med., Saint Petersburg, Sofia Un., M.D. (1924); Employment: Asst. Prof., Sofia Un. (1924–34), psychiatrist, Loveč and Kurilo clinics; Member: IFUW – Bulg. branch.
- SILIANOWSKA-DIMITROWA (NOWIKOWA), Tatiana (1910, Jambol – 1983) Education: Philos., Sofia Un. (1935); Employment: editor, Min. of Information (1944–1949), head of Dep. of Museums, Com. of Science and Art (1950–1952), Res. Fell., Inst. of Philosophy, BAS (1952–1955) and Inst. of Art Studies, BAS (1955–1969).
- STOILOWA, Eugenia R. (1906, Stara Zagora – ?) Education: Veter. Med., Sofia Un., M.D. (1930); Employment: veterinary doctor, Šoumen (1930–1935), head of Veterinary and Bacteriology Station, Varna (1939).
- TASLAKOWA, Theodora (1894, Troyan – 1956) Education: Med., Berlin, M.D. (1927); Employment: Experimental Biol. Dep., Inst. of Pathology, Berlin Un. (1926), Res. Inst. of Hygiene and Immunology, Berlin-Dahlem (1928), Hematology Dep., Inst. for Cancer Res., Berlin (1929), Bacteriology Dep., Rudolf Virchow Hosp., Berlin (1934), Chirurgic Dep. of State Hosp., Charlottenburg-Westend (1935), medical doctor, London (1938–1947), Bern (1947–1950), London (1950–1956); Member: Intern. Soc. for Microbiology (1937).
- TODOROWA-WELEVA, Maria (1914, Sliven – 1987) Education: Slavic Stud., Sofia Un. (1938); Employment: Asst., Nat. Mus. of Ethnography (1939–1945), curator, Nat. Mus. of Ethnography (1945–1949), Res. Fell., Inst. of Ethnography, BAS (1950–1979).
- WALKOWA-MOLLOVA, Newjana (1907, Pleven – 2006) Education: Med., Sofia Un., M.D. (1934); Employment: Asst. Prof., Sofia Un. (1942), medical practitioner; Member: Bulg. Red Cross – Ladies' Comm.
- ZAHARIEWA-KOWATCHEWA, Krassimira (1909, Sofia – 1989) Education: Nat. Hist., Sofia Un. (1932), Ph.D. (1939) Employment: Asst. Prof. of Geology and Paleontology, Sofia Un. (since 1943).