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This article is largely based on unpublished archival documents found in personal collections or collections of institutions (those of centralized or local authorities, religious institutions, civic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

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\(^1\) 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. Plotchewa 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

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2 Biographic notes see in App. 5.
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 (Bǎlgarsko-germanski otnośenia 1972; Toshkova 1975; Kjuljumova-Bojadjieva 1984, 1991; Markov 1986; Petkov 1995; Bojadjieva 2000).

In international research, the cultural relations (in particular the scientific inter-relations) 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; Keaney 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.

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. 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 though 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) indicates that within the period 1922–1944, 17 women travelled to Germany for doctoral and postgraduate re-
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 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.).

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 Archaeological 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.

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. Prof. Metodi Popoff (1881–1954) managed...
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 (1888–1936) 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 Koluschewa, 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 Weichhardt, 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. 165k, 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 Wurzburg, 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, Wurzburg, and Tübingen, and was the Director of the Genetics Research Institute of the Reich’s Health Office in Berlin-Dahlem.\(^\text{11}\)

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.\(^\text{12}\) 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 Wurzburg 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.\(^\text{13}\)

Long-term correspondence (during either their doctoral or postgraduate studies) was kept up by the experts in German Studies. Jeannе 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.\(^\text{14}\) 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).\(^\text{15}\) Dr. Ziwicka Dragnewa and Dr. Gora Iwanowa had been friends with the famous scholar Prof. Otto Frank from the University of Berlin.\(^\text{16}\) 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.\(^\text{17}\) Dr. Ziwicka Dragnewa, 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, 1, coll. 35, a.u. 47, f. 26–29.
\(^{16}\) BHA-CMNL, coll. 219-b, a.u. 9, f. 1–43; a.u. 60, f. 1–50.
\(^{17}\) See App. 2.
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 (1902–1975). This cooperation was extremely useful for Naidenowa, who started working as a literary historian after WWII (Kjuljumova-Bojadjeva 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 Ame lung, 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).

The short-term academic trips of the Bulgarian women scientists served as another social institution for direct knowledge exchange. 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. 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.

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

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.
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 author, 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 Balarev (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.

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.

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. 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.” 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. 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.”

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
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.”* 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 Karacova-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.”* Describing her great diligence and performance, the principal of Ariadne Dimitrowa noted: “She longed to be sent for postgraduate research abroad.”

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-
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 Schechanowa 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 Wurzburg, 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.
36 After 1944 in Bulgarian political jargon that means “Nazism”.

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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".

Bibliography


Charle, Christophe; Schriewer, Jürgen; Wagner, Peter (eds.) (2004): *Transnational Intellectual Networks: Forms of Academic Knowledge and the Search for Cultural Identities*. Frankfurt am Main.


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

<table>
<thead>
<tr>
<th>Doctoral and postdoctoral graduates</th>
<th>Research area</th>
<th>Affiliation</th>
<th>Institution receiver</th>
<th>Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chranowa, Anna</td>
<td>Zoology</td>
<td>Sofia University</td>
<td>1925, Berlin, Institute for Fermentation; 1926, doctoral research, 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.</td>
<td>1925, own expenses; 1926, own expenses; 1940, Sofia University; 1943–1948, Alexander von Humboldt Foundation and Kerckhoff Foundation, Bad Neuenheim</td>
</tr>
<tr>
<td>Dragnewa, Siwka</td>
<td>German studies</td>
<td>Independent scholar</td>
<td>1928, 1930, Munich; 1936, Germany</td>
<td>1928, own expenses; 1930, German Academy; 1936, own expenses</td>
</tr>
<tr>
<td>Dramaliewa-Kodjejkow, Liuba</td>
<td>German studies</td>
<td>Independent scholar</td>
<td>1932, Berlin</td>
<td>1932, German Academy</td>
</tr>
<tr>
<td>Iwanowa, Gora</td>
<td>German studies</td>
<td>Independent scholar</td>
<td>1930, 1931, Munich; 1937, Berlin University, preparation of habilitation</td>
<td>1930, German Academy; 1931, own expenses; 1937, Ministry of</td>
</tr>
<tr>
<td>Doctoral and postdoctoral graduates</td>
<td>Research area</td>
<td>Affiliation</td>
<td>Institution receiver</td>
<td>Funding</td>
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<td>----------------------</td>
<td>---------</td>
</tr>
<tr>
<td>[Iwanowa, Gora]</td>
<td></td>
<td></td>
<td>1939, Munich; 1939–1940, Berlin University</td>
<td>Public Education; 1939, German Academy; 1939–1940, Alexander von Humboldt Foundation</td>
</tr>
<tr>
<td>Kacarova-Kukudowa, Rajna</td>
<td>Ethnomusicology</td>
<td>National Museum of Ethnography</td>
<td>1933, Institute of Music Studies – Berlin University, Berlin Phonogram Archive, Berlin National Library; 1933, Leipzig University, Dresden University; 1935, Munich University</td>
<td>own expenses</td>
</tr>
<tr>
<td>Kaltschewa, Dona N.</td>
<td>Biochemistry, Interface and Colloid Science</td>
<td>Sofia University; Higher School of Social Sciences at the Bulgarian Women's Union</td>
<td>1930–1931, Berlin, KWI of Physical Chemistry and Electrochemistry</td>
<td>Sofia University</td>
</tr>
<tr>
<td>Kaltschewa, Radka N.</td>
<td>Meteorology, Climatology</td>
<td>Institute of Meteorology</td>
<td>1938–1940, Berlin-Potsdam</td>
<td>Institute of Meteorology</td>
</tr>
<tr>
<td>Naidenowa-Romanska (Stoilowa), Ganka</td>
<td>German Studies</td>
<td>German Scientific Institute, Sofia, 1940–1942; Independent scholar (high school teacher)</td>
<td>1939–1942, doctoral research, Berlin University</td>
<td>Alexander von Humboldt Foundation</td>
</tr>
<tr>
<td>Doctoral and postdoctoral graduates</td>
<td>Research area</td>
<td>Affiliation</td>
<td>Institution receiver</td>
<td>Funding</td>
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</tr>
<tr>
<td>Nikolova-Galabowa, Jeanne</td>
<td>German Studies</td>
<td>Sofia University</td>
<td>1931–1933, Jena, Frankfurt am Main; 1938, 1939, 1940, Germany; 1941–1942, Berlin University, preparation of habilitation</td>
<td>1931–1933, Alexander von Humboldt Foundation; 1938–1940, Sofia University; 1941–1942, Sofia University</td>
</tr>
<tr>
<td>Petkowa, Raina</td>
<td>Social Work</td>
<td>Higher School of Social Sciences at the Bulgarian Women’s Union</td>
<td>1929–1932, Berlin, German Academy for Social and Educational Women’s Work</td>
<td>1929–1932, Bulgarian Women’s Union</td>
</tr>
<tr>
<td>Raikowa-Kowatchewa, Theodora P.</td>
<td>Organic Chemistry</td>
<td>Sofia University</td>
<td>1922, Berlin University; 1931, Berlin University</td>
<td>own expenses</td>
</tr>
<tr>
<td>Silianowska-Dimitrowa (Nowikowa), Tatiana</td>
<td>Art history and Archeology</td>
<td>Independent scholar</td>
<td>1937–1939, Berlin University</td>
<td>own expenses</td>
</tr>
<tr>
<td>Stoilowa, Eugenia R.</td>
<td>Veterinary Medicine, Microbiology</td>
<td>Veterinary and Bacteriology Station, Varna</td>
<td>1938, Berlin, Robert Koch Institute</td>
<td>Ministry of Interior and Public Health</td>
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<tr>
<td>Walkowa-Mollowa, Newjana</td>
<td>Intern Medicine</td>
<td>Sofia University</td>
<td>1942–1943, Berlin University</td>
<td>Sofia University</td>
</tr>
<tr>
<td>Zaharieva-Kowatchewa, Krasimira</td>
<td>Paleontology</td>
<td>Sofia University</td>
<td>1942, Berlin University</td>
<td>Sofia University</td>
</tr>
</tbody>
</table>
Appendix 2: Bulgarian women working in German scientific institutions

<table>
<thead>
<tr>
<th>Doctoral and postdoctoral graduates</th>
<th>Research area</th>
<th>Institutional affiliation</th>
<th>Additional institutional affiliation</th>
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<tbody>
<tr>
<td>Britchkova, Maria</td>
<td>Classical Archeology</td>
<td>1931–1937, German Archeological Institute, Rome</td>
<td></td>
</tr>
<tr>
<td>Dragnewa, Siwka</td>
<td>German studies</td>
<td>Sofia University; Independent scholar (retired after 1936)</td>
<td>Bulgarian-German Mediator’s Bureau, 1933–1944</td>
</tr>
<tr>
<td>Naidenowa-Romanska (Stoilowa), Ganka</td>
<td>German studies</td>
<td>Independent scholar (doctoral student, high school teacher)</td>
<td>German Scientific Institute, Sofia, 1940–1942</td>
</tr>
<tr>
<td>Nikolova-Galabowa, Jeanne</td>
<td>German studies</td>
<td>Sofia University</td>
<td>German Scientific Institute, Sofia, 1940–1942</td>
</tr>
<tr>
<td>Taslakowa, Theodora</td>
<td>Medicine</td>
<td>1926–1937, Research Institute of Hygiene and Immunology, Berlin; Institute for Cancer Research, Berlin; Rudolf Virchow Hospital, Berlin</td>
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</table>
### Appendix 3: Academic/ Research trips

<table>
<thead>
<tr>
<th>Scientists and scholars attended scientific forums</th>
<th>Research area</th>
<th>Affiliation</th>
<th>Scientific forums</th>
<th>Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kara-Michailova, Elizabeth</td>
<td>Nuclear Physics</td>
<td>Sofia University</td>
<td>1943, Weimar, workshop</td>
<td>Sofia University</td>
</tr>
<tr>
<td>Konushlieva-Mileva, Elena</td>
<td>Ophthalmology</td>
<td>Sofia University</td>
<td>1941, Leipzig, German-Bulgarian conference</td>
<td>Sofia University</td>
</tr>
<tr>
<td>Nikolova-Galabowa, Jeanne</td>
<td>German studies</td>
<td>Sofia University</td>
<td>1941, Leipzig, academic workshop</td>
<td>Sofia University</td>
</tr>
<tr>
<td>Papasowa-Kruck, Ekaterina (Katja)</td>
<td>Psychology</td>
<td>Independent scholar (high school teacher)</td>
<td>1930s, congresses</td>
<td>own expenses</td>
</tr>
<tr>
<td>Raikowa-Kowatchewa, Theodore P.</td>
<td>Organic Chemistry</td>
<td>Sofia University</td>
<td>1931, Berlin, Congress of German chemists</td>
<td>own expenses</td>
</tr>
<tr>
<td>Silianowska-Dimitrowa (Nowikowa), Tatiana</td>
<td>Archeology</td>
<td>Independent scholar</td>
<td>1939, Berlin, International Congress of Archeology</td>
<td>own expenses</td>
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<tr>
<td>Todorowa-Welewa, Maria</td>
<td>Ethnography</td>
<td>National Museum of Ethnography</td>
<td>1942, Frankfurt am Main, ethnographic exhibition</td>
<td>National Museum of Ethnography</td>
</tr>
</tbody>
</table>
Appendix 4: Publications

Andreitschewa-Vankova, Maria (Sofia University)

Chranowa, Anna (Sofia University)

Dimitrowa, Ariadne (Sofia University)

Fingowa-Pawlowitch, Nadejda (Sofia University)
Hadschi-Petrowa, Stella (Independent scholar) (high school teacher)

Jatschewa, Zdrawka K. (Sofia University)

Kacarova-Kukudowa, Rajna (National Museum of Ethnography)

Kaltschewa, Dona (Sofia University; Higher School of Social Sciences at the Bulgarian Women’s Union)

Kaltschewa, Radka N. (Institute of Meteorology, Sofia)

Koluschewa, Anna (Sofia University, Institute of Health Care)

Kostowa-Plotchewa, Wera (Independent scholar) (high school teacher)
Motschewa, Christina (Institute of Agricultural and Economic Studies, Sofia)

Petewa-Filowa, Eudoxia (National Museum of Ethnography, Sofia)

Raikowa-Kowatchewa, Theodora P. (Sofia University)

Schechanowa-Stepanowa, Helene (Sofia University (up to 1934); medical doctor in psychiatric clinics)

Stoilowa, Eugenia R. (Veterinary and Bacteriology Station, Varna)


TASLAKOWA, Theodora (Research Institute of Hygiene and Immunology, Berlin; Institute for Cancer Research, Berlin; Rudolf-Virchow-Hospital, Berlin)


Appendix 5: Biographical notes


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.


teacher in German and French; Member: IFUW-Bulg. branch, German-Bulg. Society, Bulg. Archaeol. Inst.


