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Reviews

Through a Reporter's Eyes, The Life of Stefan Banach
By Roman Kałuża. Translated and edited by Ann Kostant and Wojbor Woyczyński. Boston (Birkhäuser). 1996. 168 pp. $36.95
The Random Walks of George Pólya
By Gerald L. Alexanderson. Washington, DC (The Mathematical Association of America). 2000. 300 pp. $31.95

At first glance it might seem that Stefan Banach and George Pólya had little in common aside from the fact that each was born in the Austro-Hungarian Empire during its waning years. Pólya seemed interested in the questions posed by nature whereas Banach seemed to enjoy best those posed by man. Reflective of this, a persistent, if perhaps ultimately misguided, criticism of Pólya was that he never burrowed as deeply into any one body of theory as he "should" have; it is hard to imagine anyone leveling that particular criticism toward Banach. Pólya traveled widely, while, aside from trips to the Soviet Union during the beginning of World War II, Banach spent almost of all his time in Poland. Even their approaches to writing are quite different: Pólya valued clear exposition and enjoyed the act the writing whereas Banach viewed it as a chore to be endured.

Despite all this, in reading these two lively biographies I was struck most by what the two men had in common: An extraordinarily social way of doing mathematics. The list of Pólya's collaborators is a veritable who's who of 20th century mathematics. While not as wide-ranging, geographically or otherwise, Banach's collaborators are equally illustrious. Not unrelated, perhaps, the Pólya and Banach who emerge from these biographies are charismatic, engaging men who find deep pleasure in good company. Taken together, these two books shatter the stereotype of the mathematician as someone who takes refuge from the social sphere of life in mathematics.

Both of these books are written for a general audience, and to enjoy them, it is not necessary to know much about the mathematics of either man. Indeed, Kałuża is a Polish scientific journalist who makes no pretense to understanding Banach's mathematics. While this is perhaps a shortcoming, it is ameliorated to a large degree by the author's skill in rendering the social milieu in which Banach's career unfolded.[1] Particularly enjoyable is his description of the interactions of the group of mathematicians centered

[1] The translators reorganized the book and, without delving so deeply into Banach's mathematics as to distract the nonexpert reader, provide a welcome mathematical accuracy.

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around Banach who met regularly at the Scottish Cafe (Kawiarnia Szkocka) in the city of Lwów,[2] where Banach lived and worked during most of his adult life.

Kałuża's book is short (the narrative is just over 100 pages) and engaging. It relies heavily on first-hand accounts of those who knew Banach, as well as material from the public record. The author vividly describes the mathematical scene in Lwów between the World Wars, and his portrayals of the mathematicians in Banach's circle are often colorful. For example, Włodzimierz Stożek, an early mathematical collaborator who cowrote mathematical textbooks with Banach and Wacław Sierpiński and was a regular at the Scottish Cafe meetings, was "addicted to hot dogs smothered in horseradish which he claimed cured melancholy." According to Kałuża, Stożek was in a perpetually good mood.

Kałuża's Banach is vibrant and personable, with an obvious joy in good company; hence the reader easily sees that Banach's intensely collaborative approach to mathematics is a logical outgrowth of his personality, as is his impatience with the solitary work of fleshing out mathematical details in his manuscripts. Kałuża recounts a story told by Otto Nikodym regarding the subterfuge that was needed to get Banach to complete his doctoral thesis: Banach's colleagues would ask him for proofs of his theorems which he would give aloud; they would write down the proofs and later present them to Banach for final editing. His dissertation was then assembled from the edits.

Kałuża's skills as a journalist are evident in what I found to be the most lively and interesting section of the book, his descriptions of the meetings at the Scottish Cafe. Not only does Kałuża include several delightful anecdotes, but he gives the reader the clear sense that the gathering of mathematicians was one of those rare cultural moments where a group of convivial geniuses met and did great work. One anecdote in particular seems to exemplify the spirit of how things were done at the cafe. During a marathon discussion, probably over food and strong drink, as was the custom (Kałuża notes that it was hard to outdrink Banach), Banach and others proved an important result about Banach spaces. However, no one recorded the proof, and afterwards the participants could not remember it. Both Hugo Steinhaus [1963] and Stanisław Marcin Ulam [1946] recount the story, and Steinhaus notes as well that (as of 1963) the theorem had yet to be proven.

While I found Kałuża's discussion of the Scottish Cafe to be the highlight of the book, I found his account of Banach during World War II the most disappointing section of his biography. Not only does he not add significantly to our knowledge of what happened to Banach during the Nazi occupation of Poland, but there is much of the story that he does not include.

Banach spent his prewar professional life at the Jan Kazimierz University in Lwów. During the initial Soviet occupation which lasted from 1939 to 1941, Banach fared quite well because many Soviet mathematicians embraced his work. The author does a fine job of describing Banach's ascension in the Soviet mathematical hierarchy. At a time when the Soviets were engaged in the ethnic cleansing of the

[2] A clarification on the use of Lwów is in order. When, after almost 150 years of subjugation under the Austro-Hungarian Empire, Poland reemerged as an independent state at the conclusion of World War I, the city was called Lwów, and the name dates back at least to the thirteenth century. Eastern Poland, including Lwów, was occupied at the onset of World War II by the Soviets in 1939 per the terms of their alliance with the Nazis. After Hitler broke his non-aggression pact with Stalin, the Nazis occupied Lwów in 1941. The Soviets reoccupied Lwów in 1944, and after the war it was annexed by the Soviet empire and was annexed by the Ukraine, where it remains today. The name Lvov is the result of an English translation of a Russian transliteration of Lwów, and one reason the translators favored it is because it appears in standard English and French dictionaries, and its pronunciation is very close to that of Lwów. The city is also referred to as Lviv or L'viv, which are transliterations from the Ukrainian alphabet and are evidently closer to the Ukrainian name than Lvov. Lwów is the preference of most Poles and was used by the author in the original Polish version.

Polish population through executions and deportation to Siberia, Banach not only retained his teaching position but was elevated to Dean and even traveled to Moscow. After the Soviets reoccupied Lwów and other Polish territories in 1944 Banach seemed poised to resume his successful mathematical career with the Soviets.

During the Nazi occupation Banach suffered along with his countrymen. Many of his colleagues were murdered during the execution of a Nazi plan to eliminate the Lwów elite conceived before the war. Kałuża discusses this plan but is vague on the details, which are chilling: Sister Mary Grace Kuzawa [1978] describes how, out of a group of 100 prominent Polish mathematicians, 62 died at the hands of the Nazis. That Banach survived is in itself noteworthy. That he was elected to the Lwów city council during the first Soviet occupation and arrested by the Gestapo for black market currency trafficking makes his survival even more so. Kałuża does not give the details of the arrest, but according to Steinhaus [1963], Banach was imprisoned because several people with German currency were found at his home. Banach was later freed (Steinhaus does not give the details, only remarking that the "case was cleared"), and emerged from jail as have many good mathematicians, with new theorems.

Like many among the Lwów intelligentsia who survived the Nazi occupation, Banach worked as a feeder of lice from which an anti-typhus vaccine was made at an institute run by Rudolf Stefan Weigl, informally called Weigl's Institute. Weigl, who was Polish, developed an effective anti-typhus vaccine during the twenties and thirties that stemmed the tide of several typhus outbreaks in the 1930's. Obviously, the Germans were very interested in preserving the source of the typhus vaccine and, exploiting this, Weigl managed to retain a good measure of control over the institute. As a result, he was able to protect many Lwów citizens by offering them employment.

Curiously, Kałuża does not specify what a feeder of lice is, nor does he discuss the full significance of Weigl's institute. According to a fascinating account of the Weigl Institute by Waclaw Szybalski[3] [1998], the process of feeding lice was as follows: About 800 lice were placed in a small enclosed cage with a very fine screen on one side. The cage was pressed against the calf of a human host by a garter-like elastic band. The lice, able to stick their heads through the screen, sucked blood from their hosts for about 45 minutes. Weigl had attempted to use non-human hosts, but discarded the attempt as impractical because it was difficult to get the animals to remain still, and because the breed of lice used to create the vaccine were highly adapted to human blood.

As grisly as the work sounds, it evidently was not unduly discomforting and afforded Banach an opportunity for mathematics. Weigl sought out intellectuals as workers, and the lice feeders formed into groups according to their interests. Banach worked with a group of mathematicians, and Szybalski recounts that the mathematical discussions became so intense that he was concerned that the mathematicians would forget to remove the lice cages after the requisite 45 minutes and thus feed the lice to death.

After the conclusion of the 12-day feeding cycle, the creation of the vaccine commenced. The lice were transferred to an isolated unit of the lab and were nourished by a different group of human hosts, who were so heavily vaccinated that, according to Szybalski, not one succumbed to typhus. The lice

[3] I am deeply indebted to Professor Szybalski, a molecular geneticist and currently a Professor of Oncology working at the University of Wisconsin who supervised Banach's work detail at the Weigl Institute. My descriptions of the creation of the vaccine and Weigl's role in protecting many Polish citizens during World War II are based upon his article and several discussions with him.

were then infected with typhus, and when nearly dead, the vaccine, a suspension of finely ground louse intestines, was produced.

While Kałuża does not fully explain why Banach survived the Nazi occupation, he hints at the reason in his comment that "an identity card from the Weigl Institute permitted one to survive the occupation in relative security." There is, however, much more to be said about the Weigl Institute's role. Szybalski portrays Weigl as a protector of his workers, a Polish Schindler (referring to the movie *Schindler's List*). Weigl's ability to protect his countrymen stems from Nazi self-interest: They wanted production of the vaccine to continue and were willing to make some accommodation with Weigl. Moreover, the Gestapo were hesitant to detain those who worked at Weigl Institute due to a fear that they might contract typhus, since it was known that the lice feeders often carried lice themselves. Indeed, according to Szybalski, the identity cards that Kałuża referred to contained an explicit warning that the bearer might carry typhus.

Weigl also nurtured a culture of resistance. Szybalski notes that work at the institute provided a cover for the Polish Resistance Army. Moreover, he observes that many of the intellectuals working at the institute formed an underground high school and university. Evidently, Banach taught at this underground university: Steinhaus [1963] notes how one of his former students, whom he left unnamed, told him that she obtained her doctorate from Banach during this time.

Kałuża's narrative concludes with a chapter of commentary from several mathematicians including Steinhaus, Ulam, and Marshall Harvey Stone. Stone's comments in particular are a joy to read.

Included in the appendixes are a list of selected publications by Banach, a bibliography, a list of original sources, and a mathematical essay by one of the translators, Wojbor Woyczyński. The book has numerous photographs and includes an index of names. Unfortunately, it lacks a comprehensive general index.

Alexanderson's book is likewise a very lively and readable biography which follows a chronological approach. However, its point of view is quite different from that of Kałuża's book. For one thing, it is much more personal, since its author was well acquainted with Pólya, first as a mentor and later as a colleague and friend. For another, it is obvious that the book is written from the perspective of someone who has a deep understanding of Pólya's mathematics. Nonetheless, the author manages the nontrivial task of writing a book that is accessible to the general reader and appealing to mathematicians.

Pólya comes across as equally delightful and brilliant, a charming man who made significant mathematical contributions in a stunning variety of areas, many of which—in particular the concept of a random walk and the tilings of the plane which influenced M.C. Escher—may be familiar to a well-educated nonmathematician. Alexanderson enlivens his narrative with many entertaining Pólya anecdotes, yet at the same time carefully provides a clear context for his mathematic accomplishments which makes his book much more than a collection of good Pólya stories.

One anecdote involves a trip that Pólya and G.H. Hardy took to a zoo. They observed a bear who banged at the lock of his cage as if trying to get out, growled, and then quickly turned away, seemingly content once again in his captivity. Hardy remarked, "He is like Pólya. He has excellent ideas but does not carry them out."

Whether Hardy's criticism is justified or not (and after reading R.P. Boas's survey of Pólya's accomplishments in analysis from Appendix 2 one could certainly argue that it is not), the fact that Pólya attacked so many diverse topics presents a challenge to the biographer, who must take care that recounting the twists and turns of Pólya's career does not result in a disjointed or overly episodic narrative. Alexanderson meets this challenge, and as the narrative proceeds a sense of consistency in Pólya's pursuits emerges. We see someone intrigued by challenging and interesting problems whose

moves from topic to topic seem natural. We see his deep and abiding interest in pedagogy and his lifelong desire to make mathematics clear to his colleagues, to his students (and not just the gifted ones) as well as to the public at large.

The appendixes fall into three sections. The first consists of several essays reprinted from Pólya's obituary in the *Bulletin of the London Mathematical Society*. That these essays discuss his significant contributions to probability, analysis, number theory, geometry, mathematical chemistry, mathematical physics, and pedagogy underscores the extraordinary breadth of his accomplishments.

The second section contains three lists: A list of mathematical objects bearing Pólya's name, a list of awards (with winners) named for Pólya, and finally, an annotated list of the mathematicians who appear in the book. That the list of objects named for Pólya spans six pages is itself a testament to his wide influence.

Four of Pólya's papers, which serve as an excellent and accessible introduction to his work, comprose the final section of the appendices.

The book is lavishly illustrated. It contains an extensive bibliography as well as a list of journal problems Pólya posed or solved.

My complaints are few. I would have liked to have known a little more about Pólya's conversion to mathematics. During his early university years Pólya was evidently more interested in literature and languages than in mathematics. Although from context it is apparent that Lipót Féjer influenced his switch to mathematics, I wish that the story of his conversion was more fully told.

Although perhaps beyond the scope of the book, I would also have been interested in a deeper glimpse into the nature of Pólya's desire for collaboration. Was he driven to collaboration because it offered a source of new problems? Was it a means to join two of his greatest pleasures, mathematics and the company of others?

In any event, Alexanderson has given us a very enjoyable and valuable book that leaves us with a strong sense of Pólya the man.

References

Kuzawa, Sister M.G., 1978. Fundamenta Mathematicae: An examination of its founding and significance. Amer. Math. Monthly 77, 1–8.

Steinhaus, H., 1963. Stefan Banach, Studia Mathematica, Supplement 1, 7–15.

Szybalski, W., 1998. Maintenance of human-fed live lice in the laboratory and production of Weigl's exanthematous typhus vaccine. In: Maramorosch, K., Mahmood, F. (Eds.), Proceedings of the EPA–APS Symposium Manual on the Maintenance of Animal/Human and Plant Pathogen Vectors. Las Vegas, Nevada.

Ulam, S.M., 1946. Stefan Banach, 1892–1945. Bull. Amer. Math. Soc. 52 (7), 600–603.

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Through A Reporter's Eyes book. Read reviews from worldâ€™s largest community for readers. 1995 marked the 50th anniversary of Stefan Banach's death. Until...Â Preview â€” Through A Reporter's Eyes by Roman Kaluza. Through A Reporter's Eyes: The Life Of Stefan Banach. by. Roman Kaluza. 3.40 Â· Rating details. Â· 5 ratings Â· 1 review. 1995 marked the 50th anniversary of Stefan Banach's death. Until now, the general English speaking public has had no access to an in-depth life story of a mathematician whose name is one of those most often encountered in modern mathematical research. This small volume, originally written in Polish by a well-known reporter, is an effort to fill that gap in the biographical 1995 marked the 50th anniversary of S...