MY FRIEND JULIUS SCHAUER

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During the academic year 1932/33, Julius Schauder had a Rockefeller Fellowship (a very advantageous fellowship of two years' duration, which requires the recipient to stay abroad). During the five academic years 1931/36, I held a French scholarship of the Caisse des Sciences (which had just been created and was to become the C.N.R.S. ¹¹). It very generously made it possible for me to spend the first semester of the academic year 1932/33 with E. Schmidt and von Mises in Berlin. The day I left Berlin at the end of the term, the Reichstag was burning ²³ and Hindenburg made Hitler Chancellor. The following day, while the first of Hitler's decrees abolishing various fundamental rights were being proclaimed, Lichtenstein in Leipzig kindly gave me the interview I had requested. He repeated to me the advice about reading Julius Schauder's publications which one had given me in Berlin several times. Lichtenstein, a far-sighted man, was frightened. This was going to impair his health, and he would quickly pass away.

After my return to Paris, my thesis was printed, and I could defend it. This defence satisfied me less than the examiners. It convinced me that I had to refine or change the method which allowed me to establish existence theorems without making an assumption implying uniqueness.

It so happened that both Julius Schauder and I had planned to spend the second semester of the academic year 1932/33 in Göttingen, but almost all
the mathematicians had fled. Hans Lewy, for example, had taken refuge in Paris, where he was well-known and highly esteemed on account of his publications and his contributions in the seminar of Jacques Hadamard (Collège de France). Julius Schauder had also come to Paris.

One beautiful morning in spring, Hans Lewy introduced us to each other in a modest restaurant in the rue Soufflot. I immediately said to Julius Schauder: "I have read your paper on the relationship between existence and uniqueness of the solution of a nonlinear equation. I know now that existence is independent of uniqueness. I admire your topological methods. In my opinion they ought to be useful for establishing an existence theorem independent of the whole question of uniqueness and assuming only some a priori estimate." He replied - we were speaking German - : "Das wäre ein Satz". ['That would be a theorem'].

Forty-eight hours later, this theorem existed. In the beautiful Jardin du Luxembourg, the theorem was formulated and the proof worked out. It was in the same park a few days later that Julius Schauder suggested to enrich it with its best application, the existence of the solution of the Dirichlet problem for all two-dimensional convex regions, posed for the elliptic equation:

\[ a(x, y, z, \frac{\partial z}{\partial x}, \frac{\partial z}{\partial y}, \frac{\partial^2 z}{\partial x^2} + 2b(\ldots) \frac{\partial^2 z}{\partial x \partial y} + c(\ldots) \frac{\partial^2 z}{\partial y^2} = 0. \]

After fifteen days of intense work without a set back, meeting in the Jardin du Luxembourg, in Meudon, where I lived, and its woods, we had our paper "Topologie et equations fonctionnelles" summarily written up.

The summer vacation separated us. In November 1933, the only remaining question was the phrasing with which we wanted to dedicate this work to the memory of Léon Lichtenstein (see below the copy of page 1 of a letter of 15-11-1933.) But the editor of the Annales de l'Ecole Normale Supérieure removed our dedication and added to our quotations on the first page of our paper a list of French publications without direct connection to our subject. I was greatly annoyed at these two changes, and I apologized for them to Julius Schauder. I am no longer in possession of his reply, which showed his astonishment, resignation, and courtesy. Three hurried removals during the 1939/45 war caused the loss of more than one document.

What remains of our correspondence has dwindled to some fifteen letters written by Julius Schauder. The earliest one is the four page letter of 15-11-1933, pages one and four of which have been reproduced below to
render homage to Léon Lichtenstein. Pages two and three point out the necessity of rectifying an a priori estimate given by Serge Bernstein, which I succeeded to do in 1937/38. They also mention our friend Hans Levy, to whom we were deeply grateful for taking an interest in our joint work and for making it widely known. Finally, they announce the very beginning of Julius Schauder's research into hyperbolic equations even before he had verified the results (see top of page 4).

The other letters contain:

- statements of results, one of which is particularly important and has unfortunately not been published by Julius Schauder; the possibility of extending the theory of topological degree to locally convex vector spaces (March 1935);
- sketches of some attempts which he gave up;
- announcements of various publications of his;
- an authentic report on the Moscow "Congress of Topology" in 1935, in which he gives evidence of very sound judgement and great breadth of mind, analysing with penetration the capabilities and limits of everyone, whether they were admirably great or somewhat narrow (2-12-1935). While recognizing the great importance of the definition of homotopy groups given by Hurewicz, Julius Schauder notes with regret (page 2): "Die Untersuchungen sind im allgemeinen nicht auf die Anwendungen zugeschnitten und die dort anwesenden Mathematiker interessiert sich nur für die Topologie als solche." ["In general, the studies are not geared to applications, and the mathematicians present were only interested in topology as such."]. He adds a note at the bottom of this page: "Ich habe immer unterstrichen, daß ich kein Topologe bin." ["I have always stressed that I am not a topologist."] and somewhere else (8-7-1936, page 1), "Ich bin, so wie Sie, ein Mann der Anwendungen." ["I am like you a man of applications."];
- some information on the Oslo Congress;
- comments to some of our publications, in particular to the ones following our joint paper: We generalize the definition of the topological degree given by Brouwer, without explaining the details of this definition and without proving its properties; however obvious they may be, we must check them scrupulously (23-2-1935).
"Ich müßte erklären, daß bei Fixpunktten [es] sich um eine Abbildung einer Menge auf sich selbst handelt, während dies bei topologischem Grad nicht sein muß." ["I had to explain that for fixed point theorems the mapping has to be to itself, whereas this is not necessarily the case with the topological degree."] (2-12-1935, pages 6 and 7);
- the hope that our correspondence and new meetings would enable us to collaborate again;
- some brave and clear-sighted references to the difficult, unfair, and finally dangerous character of his personal circumstances.

All these letters are very friendly, warm, and absolutely confidential. I would betray Julius Schauder's confidence if I passed them on to a third person in greater length. Furthermore, they could not be correctly interpreted unless I added a detailed commentary.

At a Colloquium in Geneva organized in 1935 by Robin Nave and chaired by Jacques Hadamard, I had the great pleasure of seeing Julius Schauder again. In 1938, towards the end of spring, a mission to the Institute Français in Warsaw allowed us to meet in Lwów a third time. We did not, however, succeed in writing another joint paper as we had hoped.

When we met through Hans Lewy, we had been unconsciously preparing our collaboration for a long time. Our methods and inferences complemented each other. Very quickly each of us knew the other's thought well enough to solve without discussion the many problems not yet solved.

I cannot explain the nature of our exchanges except by analysing one of them, for example, the one concerning the extension of the Jordan-Alexandroff theorem to Banach spaces:

If two closed subsets \( F \) and \( F' \) of a Banach space \( B \) are homeomorphic images of each other with \( x - x + F(x) \) such that \( F \) is compact, then \( B \setminus F \) and \( B \setminus F' \) have the same number of connected components.

In 1933, Julius Schauder thought that this statement was probably true, its proof, however, difficult. He told me so. In 1935, when preparing my lecture on the theory of the topological degree at the Cours Peccot (Collège de France), I calculated the degree of a composite map and concluded from it an extremely simple proof of that extension of the Jordan-Alexandroff theorem. I drafted a note for publication in the Comptes Rendus de l'Académie des Sciences. It would have been tactless to say that what Julius Schauder had conjectured could be proved so easily. It was polite and scientifically correct to present this paper as a simple by-product of our joint article. I asked Julius Schauder to scrutinize it. His reaction proves the high quality of his character. Considering it to be quite superficial to mention that he had conjectured what I had proved, he replied (23-2-1935, in French):

"Il me fait grand plaisir que vous pouvez généraliser et compléter la théorie d'une manière si belle et élégante. Les différentes phrases où vous confrontez vos résultats aux anciens portent témoignage de votre trop grande modestie... C'est vraiment étonnant qu'on peut obtenir le théorème d'Alexandroff d'une manière si élégante et facile et - si je dois être sincère - c'est même inquiétant pour moi (*); mais je ne suis pas capable de trouver des fautes." ["It gives me great pleasure that you can generalize and complete the theory in such a beautiful and elegant manner. The various sentences where you compare your results with the conventional ones bear witness of your far too great modesty... It is really amazing that one can obtain the Alexandroff theorem in such an elegant an easy manner, and, if I must be honest, it is even disquieting for me; but I am not able to find any mistakes."] In the report on the Moscow "Congress of Topology", which he sent me on 2-12-1935, he wrote: "Ich habe die Bekanntschaft aller führenden Topologen gemacht und erzählte ihnen von Ihrem schönen Ergebnis (C.R. Note) ""[""I met all leading topologists and told them of your beautiful result""], attributing to me a merit that was partly his own. He expresses himself with such clarity and enthusiasm that the one of these topologists whom we revere most says to him: "Ich schäme mich sehr, es für den endlich-dimensionalen Fall nicht bewiesen zu haben." ["I am ashamed not to have proved it for the finite-dimensional case."]. The aim of these quotations is obviously not to establish the modesty which Julius Schauder attributes to me, but to bear witness to his character which was highly sensible, very scrupulous, thoroughly honest, and truly unpretentious.

(*) The context shows that one must understand: "inquiétant à mon avis" ["disquieting in my opinion"].
And yet, he had at that time a real need of scientific prestige; the anti-semitism of the Pilsudski regime, increased by Nazi contamination, forced him to work in difficult conditions. Although Privatdozent at the university, he had to teach in a grammar school for a living. He wrote to me on 4-4-1934: "Ich lebe heute in einer ganz anderen Welt, wo ich mich ganz von meiner Schwierigkeit losrinden kann." ["The holidays are the only time when I have some spare time."] He informed me of his situation in detail in his letter of 8-7-1936, the first page of which I believe I can make known (see copy below; the end of the last sentence is "ich über mich sprechen, um Diskretion."). I want to be discreet and will not quote the entire letter. I suggested to him to accept an offer by Serge Bernstein inviting him to come to Leningrad. I could not foresee the martyrdom this city would undergo. He replied to it on 8-8-1936, at the bottom of page one (see copy below). He knows that France is an uncertain asylum, already submerged. The U.S.A. are his only hope. On 11-1-1938, he writes me a letter whose beginning (copy below) shows despair. I would visit him in Lvów in June 1938. The future would become so dark that we would no longer write to each other.

In 1939, after the conquest of Lvów by the Soviet armies, he was visited by I. Petrowsky and S. Sobolev.

In 1941, after the German conquest, he had to go into hiding. I learned from a Polish source that he was the victim of an informer who was tried and executed immediately after the end of the war.

MADAME JULIUS SCHAUDER

The flat in Lvów, where Julius Schauder, his wife and their newly born daughter Eva lived in 1938, was modern, comfortable, and in good taste. Julius Schauder was backed up by his wife with much devotion. For example, his typed letter of 8-7-1936 contains the note: "Ich habe den Brief der Eltern meiner Frau zur Schreibmaschine diktiert." ["Because I am in a hurry, I dictated the letter to my wife for typing."] From now on, his letters would often be typed.

I learned from a Polish source that under the German occupation Madame Julius Schauder hid with her daughter in a cellar where water came in and where Eva fell seriously ill. Madame Julius Schauder then
Mein lieber Freund!

Von meinem letzten Brief an Sie ist bereits ein halbes Jahr verstrichen.

Ich habe alle Ihre Sendungen wohl erhalten, insbesondere Ihre beiden G.P. Ko-

Part of the last letter (dated 11-1-1938) written by J. Schauder to J. Leray.

gave her daughter into the custody of a catholic convent, allowed herself to be discovered by the Nazis, and disappeared.

EVA SCHAUDER

Immediately after the war, in 1945, Madame Lene Kuchler, a woman of action and heart, whose entire family had disappeared, gathered as many Jewish children as possible, who had been entrusted to catholic convents during the occupation. She wanted to search for their families and give the children a Jewish education. The orphanage she had founded in Poland in the Tatra mountains was the target of attacks: groups of Nazis survived in the mountains. In deep winter all windows were broken. With approximately a hundred or less of these children she took refuge in France, in Bellevue near Neudon.

She looked after Eva Schauder, knew that her father was a mathematician and believed him to be professor at some grammar school. On making inquiries in February 1948, she contacted Harry Zeiner, an engineer at l'Ecole Centrale. He remembered the Colloquium in Geneva (1935), wrote to his former professor, Robin Wavre, who wrote to me. I informed H. Steinhaus (Wroclaw), who (in March 1948) informed Eva's family: a cousin, Dr. Joseph Bratter, in Wroclaw; other cousins in the U.S.A.; Professor Mario Schauder, in Pisa (Italy), the brother of Julius Schauder.

Eva was ten years old, seriously ill, had undergone one operation in Poland, and had to undergo a second one at the Hospital Laennec (Paris). My wife and I visited her at the hospital, where, in a few weeks, she had learned French. She was very attached to the memory of her father, of whom I could give her some photographs. She was a very intelligent and deeply moving little girl.

In April 1948 Madame Kuchler gave me her news. After the summer vacation I telephoned her in vain. I made a trip to Bellevue and found that the orphanage was no longer there. I wrote to Mario Schauder, without receiving a reply. I wrote to him again, in vain. Then I was afraid to become indiscreet. I know from an Italian source that he died some years later. To my great regret, I never again had any other news of Eva Schauder.
EDITOR’S NOTES:

1) C.N.R.S. = Centre national de la recherche scientifique.

2) "Reichstagsbrand" : 27-2-1933.

3) J. Leray et J. Schauder;
   Topologie et équations fonctionnelles,
   Annales l’Ecole Normale Supérieure 51, 45-78 (1934).

The publications in question are the references (29) on page 67 of
the paper cited above. The original reference (29) contained only
E. Gevrey's paper. All of E. Picard's papers appearing in reference
(29) were added. At the time E. Picard was Directeur of the
Annales.

The dedication to Léon Lichtenstein should have read (to be
inserted after the title of the paper and after the names of
the authors):

"Dédie à la mémoire de Léon Lichtenstein."

(communicated by J. Leray to W. Forster).

There is another paper

J. Leray;
Discussion d'un problème de Dirichlet.
Journ. de Math. 18, 249-284 (1939),

which has a list of publications of E. Picard on the first page.
E. Picard was at the time editor of the Journal de Mathématiques.

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a) J. Leray;
   Topologie des espaces abstraits de M. Banach,

Translation:
Translation from the French original by B. Forster and W. Forster
with the kind permission of J. Leray.