A short biography of Friedrich Schiemer, on the occasion of his 80th birthday

Georg Schiemer

An adventurous childhood in the Danube-Auen (1941–1959)

My father, Friedrich Schiemer, was born on January 23, 1941 in Fischamend, a small town in Lower Austria close to the Danube river. He often describes himself as a "Wirtshauskind". His parents owned the "Gasthaus zum Goldenen Hirsch", a local inn in the center of the town which had been run by the family for several generations. Together with his older sister Grete, Fritz spent a happy childhood in Fischamend. His father returned from war captivity in 1946, and while his mother was busy as the innkeeper in the early post-war years, Fritz's caring grandmother Rosalia played an important role in his upbringing. Another influential person for Fritz was his great uncle Niki who also returned from Russian captivity in the later 1940s and lived with the family from then on. Niki played an important role in Fritz's childhood, in particular, as his first fishing companion. A funny anecdote about this time is this: cigarettes were a rare commodity in the post-war period. When Fritz started fishing in the small streams of the Danube Au roughly at the age of five, his great uncle would agree to accompany him to remote fishing locations. In return, young Fritz would have to collect cigarette butts for him. The German term for this long past practice is "Tschick arretieren", roughly translated, to seize cigarette butts.

When asked about his early childhood experiences, my father emphasizes two general influences, which I believe were also formative for his later academic life. The first one was his upbringing in the lively social context of a small inn. There, amidst the whirl of card players, workers drinking their early morning coffee (or Schnaps), and regular guests, Fritz was trained in his social interactions with others. Another effect of growing up in this social habitat was that Fritz became an excellent player of "Bauernschnapsen", a popular card game that he still plays with his relatives in Fischamend around Christmas time.

The second lasting influence was related to his direct natural surroundings, the Danube wetlands. This untamed river landscape bordering to Fischamend with its forests and dry river sections was perceived as an amazon-like nature by Fritz and exerted a strong fascination on him from early on. As kids of the age of five or six, Fritz and his friend from grammar school, Hansi Lindauer, would constantly be on the move in this river landscape, exploring the forests and learning to swim in the ponds. These experiences of the nature of the Danube Au was contrasted by yearly trips to Buchberg am Schneeberg in lower Austria, where his family, together with a number of other families from Fischamend, usually spent their summer vacations. For Fritz, these stays at the Schneeberg also led to lasting impressions of the agricultural life and the nature of spruce mixed forests.

My father attended grammar school in his hometown and then went to the gymnasium Hagenmüllergasse in the third district of Vienna. He was a so-called "Fahrschüler", a daily commuter by train between Fischamend and Vienna. His high school days started quite early, with the train leaving from Fischamend at 6:28 in the morning. During the train rides back to Lower Austria after school, Fritz and his colleagues would decide on their af-

Fig. 1: Fritz as a high-school student with a nice catch. – Abb. 1: Fritz als Schüler mit einem schönen Fang.

ternoon activities while passing by the Au. Fritz was overall a good student but complains about his bad teachers in Latin and mathematics in the last two years of high school.

During this phase in high-school, it became clear to my father that he would go on to study at the university, but he had not decided on what to study by then. One loose idea he never pursued more concretely was to study shipbuilding in Hamburg. Another, far stronger interest concerned his surrounding nature of the Danube Au. Already at the age between fourteen to sixteen, this landscape has made a lasting impression on Fritz, also as a potential field of proto-scientific investigation. It was at this time that he started his career as a "Tümpler" by taking water samples in the standing waters. Fritz also bought his first folboat which greatly enhanced his mobility and gave him considerable freedom to move and explore the small Fischa stream and also to cross the Danube river. His emerging interest in biology was not only stimulated by his surroundings, but also by his reading of popular(ized) science literature. Two sources seem noteworthy here. First, Fritz, like many adolescents at the time, was fascinated by the scientific curiosity and lust for adventure expressed in the popular writings of Hans Hass, e.g. by books such as *Among Corals and Sharks* (1941). The approach to study so far unstudied "white spots" in maritime nature was directly transferrable in Fritz's mind to the exploration of the Danube landscape. A second influence at the time were the popular science journals "Kosmos" and "Mikrokosmos" that he read regularly and that motivated his first experiments. Fritz decided to study biology after graduation from high-school in 1959, a choice for a (in his own words) rather esoteric study field that his mother generously accepted.

Student years in Vienna and at the Biological Station in Lunz (1959–1968)

Fritz enrolled as a student of biology (zoology and botany) at the University of Vienna in October 1959. He spent his student years until graduation mostly in Vienna and at the Biological Station in Lunz, Lower Austria. His working days in the first semesters were quite busy and filled with course work. In the winter semester in 1959, the schedule for obligatory courses at the main building of the University looked as follows: between 8 and 9 am, there was the lecture of Karl Höfler on plant physiology; then, from 9 to 10 am, a lecture on systematic botanics; 10 to 11: morphology of animals; and from 11 until noon, the lecture by Wilhelm Marinelli on the anatomy and morphology of vertebrates. As Fritz recounts, Marinelli's style of lecturing was highly eloquent but at times difficult to understand. Students therefore sometimes skipped the lecture to continue their discussions in the canteen of the university. In this beginning phase of his studies, Fritz made friendships with fellow students, including Bernd Lötsch and Wolfgang Sterrer. In the first semester, Fritz had to decide in which of the two zoological institutes, "Zoology 1" and "Zoology 2", he should continue his studies. Given his interest in aquatic ecology, he chose to work in the second institute, then directed by Wilhelm Kühnelt, but remained in close contact with members of the other institute. He started working in the "Zoological Lab" and was provided with a working space there.

In summer 1960, Fritz participated at several summer courses held at the Biological Station of the Austrian Academy of Sciences in Lunz. One was a lecture organized by Agnes Ruttner-Kolisko, who was to become Fritz's later dissertation supervisor. The other courses attended by him were a course on terrestrial ecology organized by Kühnelt and the "37th course on hydrobiology" held by Ingo Findenegg, the head of the station at the time. These courses had roughly twenty participants, including most of Kühnelt's assistants and several PhD students. The participants lived and worked in the station, mainly in the boat house on the lake which also contained the course room. The Biological Station in Lunz was certainly a hotspot in freshwater biology in the 1960s and soon became the "scientific home" of my father. It had an excellent open-access scientific library and was the center of an international scientific activity, with frequent external visitors and guest speakers (including leading limnologists such as Tommy Edmundson and Richard A. Vollenweider). The house rules were quite strict, especially for younger researchers like Fritz. At the same time, students received a very close supervision in a friendly and informal atmosphere.

During the time spent in Lunz, Fritz met with many colleagues, some of which became long-term collaborators and life-long friends. He is proud to have made personal acquaintance with the late Franz Ruttner at the summer course in 1960 (a year before Ruttner's death in 1961). Another colleague to mention here is Otto Siebeck, at that time a postdoctoral fellow in Lunz coming from LMU Munich. Fritz worked as an assistant for him in June 1961. Siebeck's research, in particular, his approach to combine field studies and the study of morphological patterns in nature with a physiological explanation of their underlying mechanisms, was inspiring to Fritz and had a lasting influence on his own research. Other colleagues first met in Lunz include Max Tilzer, Hans Sampel, Gertrude Pleskot, Roland Pechlaner, and Stjepko Golubic. Gernot Bretschko, at that time a PhD student and organizer of the "Limnological Circle" at the University of Graz, was also

a frequent guest at the station in Lunz. With him, Fritz shared an interest in the "modern" American research literature on freshwater biology, in particular, the work of G. E. HUTCHINSON, the founder of modern limnology, and of his students (e.g. Raymon LINDEMAN). BRETSCHKO and Fritz jointly organized an internal seminar on freshwater ecology (called the "Limnologisches Kolloquium") with roughly 20 participants which was first held in Lunz in 1962.

In fall 1961, Fritz settled on a research topic for his dissertation, suggested to him by RUTTNER-KOLISKO, namely the ecology of macrophytes in the Lunzer lake. Over the next years, he spent considerable time with field work on this topic in Lunz. This included taking water samples at the Lunz Untersee and chemical measurements to study the structure of the underwater meadows and its corresponding fauna (with a focus on nematodes and chironomids). One motivation for him to study this rather complex topic was that the station had a strong competence in hydrochemistry. On the initiative of BRETSCHKO, Franz BERGER offered several winter courses in hydrochemistry and hydrophysics in snow-covered Lunz in 1961 which Fritz attended. Between 1963 and 1968, Fritz would work in Lunz during the week and return to Vienna only on weekends. During this time, he also had several smaller employments at the station, including as the head of library.

Fritz also enjoyed the intellectual stimulus in his academic context in Vienna. In particular, he had many contacts with the "Vienna School" of marine biology and regular informal discussion groups with student colleagues (e.g. with Klaus RÜTZLER and Helmut FORSTNER) on phylogenetics and other topics at the "Gasthaus Rieder" (behind Vienna's town hall) or at a Heuriger.

While working on his dissertation project in Lunz, Fritz had several important research stays abroad. He spent three months as a visiting scholar of the Freshwater Biological As-

Fig. 2: Participants of the hydrochemistry training course led by Prof. BERGER in Lunz, 1961. – Abb. 2: TeilnehmerInnen des Hydrochemie-Kurses unter der Leitung von Prof. BERGER, 1961.

sociation at Ferry House, Windermere in England in summer 1961. This stay at the leading center for aquatic ecology in England was initiated by Ruttner-Kolisko and had a significant impact on Fritz's later scientific career. In particular, it allowed him to get in first-hand contact with an international community of limnologists and to meet with several renowned English scientists, including Geoffrey Fryer, David Sutcliffe, Winifried Frost. During his stay at Ferry house, Fritz was an intern to Thomas Townley Macan, the secretary of the international society of limnologists by then, who assigned to Fritz the task to investigate the spatial distribution of two types of isopods in the Esthwaite water. A couple of years later, in February 1964, my father made a two-week long research trip to the University of Budapest on invitation by Istvan Andrassy, then the world's specialist on the taxonomy of nematodes. Traveling to Hungary meant crossing the Iron Curtain, not an easy endeavor at the time. Nevertheless, from a scientific point of view, the stay in Budapest was highly rewarding for Fritz. In particular, Andrassy's invitation led him to prepare for the stay in terms of extensive work on the collection and specification of nematodes collected in Lunz. Fritz attended a number of international conferences in the last years of his PhD studies: for instance, the SIL congress in Warsaw in 1965 as well as the second international symposium on chironomids in Helsinki (together with Bretschko) in 1967. He was promoted to a Doctor in Philosophy at the University of Vienna in January 1968 with his dissertation "Contribution to the ecology of fauna of the phytal of an oligothrophic lake, the Lunzer See".

Early scientific career: Lake Neusiedl, Bermuda, Sri Lanka (1969–1986)

After graduation, Fritz received several job offers, including an offer from the University of Winnipeg, Canada. One position he considered seriously came from Lunz. Fritz was asked to work as an assistant to Otto Siebeck who, in turn, was offered the job of the new director of the Biological Station in 1967. (In a last-minute change of plans, Heinz Löffler took over the direction of Lunz and Fritz's assistant position did not work out.) A second honorable offer was to work as an assistant with Wolfgang Wieser on topics in experimental ecophysiology at the University of Innsbruck. Nevertheless, Fritz eventually made the choice to stay at his *alma mater*, the University of Vienna. When Heinz Löffler was appointed extraordinary professor for limnology at the Institute of Zoology, Fritz became his assistant. Löffler was then the head of a project to study the lake Neusiedl within the framework of the IBP program ("International Biological Program") (1968-1973), funded by the UNESCO and the Austrian Academy of Sciences. The IBP was a globally connected research program with a focus on a synoptic approach to the study of terrestrial and aquatic ecosystems. In Austria, there were two IBP projects: one on high mountain lakes led by Roland Pechlaner in Innsbruck. The second project was the "Ecosystem study Neusiedler See" with three research groups. Fritz became the project coordinator of the limnology group and built up a research team to investigate the benthos of that shallow lake. (The other two groups, led by Gerhard Imhof and Karl Burian, studied aspects above the reed belt). These field studies were conducted at the field station "Vogelwarte" in Neusiedl in the north of the lake until 1973. The results of the IBP studies were then published in a collection edited by Löffler 1979.

Overall, the IBP project was of great importance for the development of ecology in Austria and led to many international conferences and conference participations of Austrian

Fig. 3: Field work for the IBP Ecosystem Study Lake Neusiedl, 1968–1973. – Abb. 3: Feldforschungen für die IBP Ökosystemstudie Neusiedlersee, 1968–1973.

scholars (see Schiemer et al. 2015). Noteworthy in this respect are the international IBP "Shallow Lake" meeting in Lunz organized by Fritz as well as the IBP Synthesis-meeting in Reading, both in 1972. For Fritz and his colleagues, the IBP was also significant in creating an "East-West bridge" between ecologists working in the United States and Western Europe on the one hand and biologists in Eastern countries, including the former UdSSR, on the other hand.

Beside the system-oriented ecological approach characteristic for the IBP project on lake Neusiedl, Fritz's research at the time had also an ecophysiological and later niche-oriented perspective. This included bioenergetic studies that eventually led to his habilitation thesis. One could say that these two research strands ran parallel throughout Fritz's scientific career. Work in ecophysiology focused mainly on the study of nematodes with the method of Cartesian divers and led to long-term cooperations with Wolfgang Wieser, Nan Duncan, Jörg Ott, and others. In 1969, Fritz attended an important conference on bioenergetics in London, organized by the British Ecological Society. He registered for the event at short notice with funding from the Academy of Sciences. During this trip to England, he also visited Annie (Nan) Duncan (who he learned to know some years ago through the IBP program) and John Lewis at Royal Holloway College. Lewis had informed Fritz and Löffler about the use of a Cartesian diver at Royal Holloway College some years before during a visit in Vienna. Impressed also by the recent work of Wolfgang Wieser on the

Fig. 4: Work with Nan Duncan and Romek Klekowski at the Royal Holloway College, 1972. – Abb. 4: Zusammenarbeit mit Nan Duncan und Romek Klekowski am Royal Holloway College, 1972.

metabolic characterization of nematodes by using Cartesian diver micro-respirometry, Fritz became very interested in this method and saw the visit to London as a chance to become more acquainted with it. Nan Duncan, together with Roman Klekowski, had recently offered a particular course on the use of Cartesian divers at the University of London. Fritz invited Nan to visit Lunz for a couple of weeks in fall 1970, where they jointly organized a similar course at the Biological Station titled "Cartesianische Taucher Mikrorespirometrie".

Following that first stay in Lunz, Nan and Fritz continued their work with Cartesian divers during several research stays at the University of London in 1970, in spring 1971, and then again in 1972 after the IBP Synthese meeting in Reading. A result of this collaboration (including also Romek Klekowski) are the joint studies on the complex bioenergetics of benthic nematodes, e.g. in the journal *Oecologia* (Duncan et al. 1974, 1979, 1980). (A personal note: Fritz and Nan would become life-long collaborators and Nan also a close friend of our family. Nan was the godmother of my sister Lucie and I remember many Christmas holidays where Nan would stay at our apartment in Vienna as a guest.)

In 1970, Wolfgang Wieser, who was ordinary professor at the recently founded Institute of Zoophysiology at the University of Innsbruck at that time, organized a student excursion to the Biological Station in Bermuda and invited Fritz to come along. This event marked the beginning of a long phase of marine biological research that would continue until the mid-1980s. Fritz, who had first become acquainted with the use of Cartesian divers through Wieser's work, had the aim to make these instruments robust enough to allow for travelling and for on-site use during excursions. He used a "travel diver" at his first trip to Bermuda for the study of the ecophysiology of marine meiobenthos of sandy beaches. There

was a second research trip to Bermuda in 1973 (based on a research program funded by the Austrian Science Fund). The director of the Biological Station at the time was Wolfgang Sterrer. The group of colleagues working on the project in Bermuda in 1973 consisted of Jörg Ott, Wolfgang Wieser, Rubert Riedl, and Erich Gnaiger. Research in Bermuda led to joint papers with Wieser on the bioenergetics of meiobenthos (see Wieser et al. 1974, Wieser & Schiemer 1977). It was the beginning of a long-term scientific collaboration with Jörg Ott, e.g. on the respiration of free-living nematodes from marine sediments (Ott & Schiemer 1973). Fritz and Jörg presented the results of this paper at a conference in Texel in 1972. Their work then continued in 1989 during an excursion to the field station in Carrier Bow Caye, a small and pictoresque coral island in the reef of Belize.

Fig. 5: The team of the research project in Bermuda, 1973: Wieser, Schiemer, Gnaiger, Sterrer, and Ott. – Abb. 5: Das Forschungsteam in Bermuda, 1973: Wieser, Schiemer, Gnaiger, Sterrer und Ott.

Based on his research on the ecophysiology of meiofauna in Bermuda, Fritz had an important research stay as a senior visiting scientist at the School of Oceonography of the University of Washington in Seattle from October 1977 until September 1978. The stay was funded in terms of a prestigious *Max Kade* Fellowship of the Austrian Academy of Sciences. Fritz's official host at the University of Washington was Karl Banse, but there was a close interaction with members of other institutes as well, in particular, with Tommy Edmundson of the Department of Zoology. From a scientific point of view, the research stay in Seattle was highly productive for Fritz. His work again focused on comparative bioenergetics studies of meiobenthos, the topic of his later habilitation thesis. He spent the year at the institute with the breeding of nematodes and their study with Catersian divers. The stay in Seattle was also a happy time for personal reasons. Fritz had met my mother Maria (known as "Ainusch"), a high-school teacher in chemistry, at a party while visiting Gernot Bretschko in Graz in 1973. They married two years later and my mother ac-

companied Fritz during his stay at the University of Washington. Both greatly enjoyed the social life in Seattle and had several trips to the West and East coast of the United States during the stay.

In 1979, Fritz returned to Vienna to complete his work on the habilitation thesis which was accepted by the University of Vienna in 1982. In retrospect, he considers the articles resulting from this thesis on the energetics of free-living nematodes to be among his strongest scientific results (Schiemer 1982a, b, 1983).

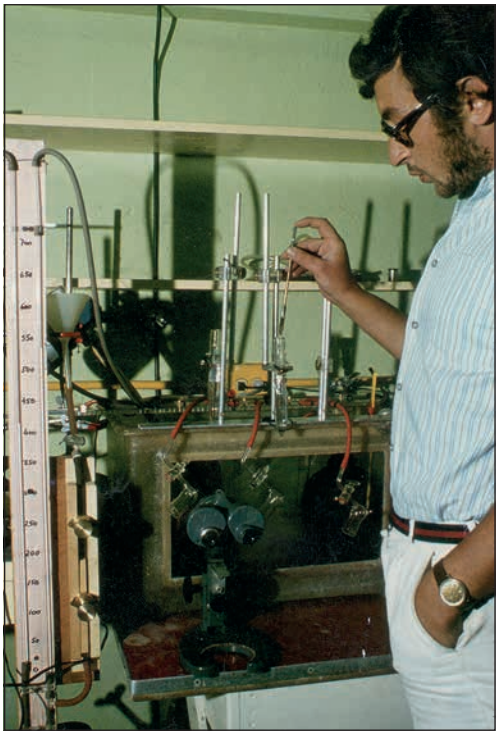

Fig. 6: Fritz working with a Cartesian Diver, 1970. – Abb. 6: Fritz mit einem Kartesischen Taucher, 1970.

A third important strand in Fritz's research activities between the late 1970s and 1980s concerns tropical limnology. In 1974, the University of Vienna initiated a (still running) postgraduate course on limnology for students from developing countries, funded by the UNESCO and the Austrian government. The course was initiated by Heinz Löffler and coordinated by Gerhard Imhof. Fritz's engagement in it set the starting point for his interest in system-oriented tropical research in South-East Asia. Together with George Ganf and Amara Gunadilaka, one of the participants of the course in 1975, Fritz developed the project idea of a management-based and synoptic limnological study of lakes in Sri Lanka that should combine the study of the producitivity of algea, zooplancton, fish, etc. In the winter holiday 1976/77, Fritz made the first trip to Sri Lanka (together with my mother Ainusch) to further develop this project and to get in contact with local researchers. These preparatory steps eventually led to the *Parakrama Samudra* project, the study of an antique reservoir in Sri Lanka (1979-1986). Fritz was the scientific coordinator of an international team including the following people: Heinz Löffler, Kurt Bauer, Gernot Bretschko, Martin Dokulil, Nan Duncan, Ramesh Gulati, Amara Gunatilaka, Rainer Hacker, Rudi Hofer, Peter Newrkla, Eugen Rott, Hartwig Dobesch, and Hans Winkler. This project led to research stays in Sri Lanka in 1979, 1980, and in 1982 (see Schiemer 1983). During the *Parakrama* project, Fritz also started to work on the ecology of tropical fish fauna and its feeding ecology. Together with Roland Hofer from the University of Innsbruck, he published several studies on this topic (Hofer & Schiemer 1983a, b, c).

Fritz's motivation to initiate the *Parakrama* project was twofold: first, there was the theoretical interest in tropical limnology, specifically, in the ecosystems of large reservoirs. The general idea was to transfer the methodological approach of a synoptic study of aquatic ecosystems developed during the IBP project at lake Neusiedl to the study of tropical lakes

Fig. 7: The Parakrama Samudra Project, Sri Lanka, 1979–1982. – Abb. 7: Das Parakrama Samudra Projekt, Sri Lanka, 1979–1982.

and reservoirs. With the exception of the IBP-based study of Lake George in Uganda, little research had been done in this direction in the tropics. Fritz's second motivation was clearly development cooperation. His aim was to gain local scientists and universities in developing countries as long-term cooperation partners. The *Parakrama Samudra* project was a starting point for a long period of research on tropical ecosystems and for several subsequent projects with Nan Duncan and many others.

Hainburg, fish physiology, and restoration programs in the Danube-Auen

In 1984, Fritz was actively involved in the discussions on the barrage in the Hainburg Au and contributed several reports on its potential ecological effects. He also participated in the public protests against further impoundments of the Danube and in the occupation of the Hainburg Au wetlands the same year. After the federal government stopped the land clearances in December 1984, an ecology commission was initiated in early 1985. The discussions in this commission continued for several years, eventually leading to the constitution of the national park Danube-Auen. Fritz's personal and professional involvement in Hainburg was quite consequential for his later research, mainly for two reasons. First, the public debate directly motivated further ecological investigations of the Danube landscape, a field which had not been studied extensively before. This eventually led to Fritz's general work on the ecology of floodplains, a dominant research theme from the 1980s onward. Second, the discussions in the ecology commission made clear to him the importance of a transdisciplinary approach in ecological research and of the need of close cooperation with different groups of experts, including water engineers, social economists

and political decision makers. Regarding the later point, the "Forum Österreichischer Wissenschaftler für den Umweltschutz" was founded on Fritz's initiative and in cooperation with Peter Weiss and Gerhard Imhof in 1985. Rubert Riedl and Helmut Kinzel acted as the first directors. The *Umweltforum* was established mainly in reaction to a letter of complaint signed by more than hundred scientists and addressed to the Austrian ministry of agriculture and forestry. The central point of criticism expressed in the letter concerned the fact that, in the case of Hainburg, scientists were largely ignored in the political and management decisions underlying the planned construction of the power plant. Thus, the founding motive of the Forum was to lobby for the general importance of scientific results in political decision processes.

Fritz's research in the 1980s and in the two decades to follow focused on three thematic fields: first, his research on fish physiology that started with his work on tropical cyprinids in Sri Lanka. Back in the Althanstrasse, Fritz and Wolfgang Wieser initiated the idea of a cooperative study of local cyprinids that would combine work from several research groups at Austrian universities. This led to the "priority research program" (the S35 program) on the ecology and ecophysiology of European cyprinids, funded by the FWF between 1983 and 1989. The theoretical aim of the project was to investigate the process of niche differentiation for large groups of closely related species in the case of local cyprinids. The S35 program integrated research by the physiologists from Innsbruck (Wieser, Hofer,

Fig. 8: The FWF S35 Program, 1983–1989: Fritz and Wolfgang Wieser. – Abb. 8: Das FWF S35 Programm, 1983–1989: Fritz und Wolfgang Wieser.

Forstner), a group from Salzburg focusing mainly on eco-morphological aspects (Goldschmid, Kotrschal), Hans Winkler from the Institute of Limnology at the Mondsee, and Fritz's team from Vienna.

Fritz's contributions to this project consisted in field-biological studies of the habitats of local cyprinids, mainly in the Danube river (both in free-flowing and in impounded sections). At a subsequent stage, this research was complemented by physiological studies on the bio-energetics of cyprinid larvae. His students working on the S35 project included Hubert Keckeis, Josef Wanzenböck, Thomas Spindler, Hannes Filka, Wolfang Vockner, and Robert Konecny. Central results on this physiological work are Wanzenböck & Schiemer (1989), Keckeis & Schiemer (1990), and Schiemer et al. (2003a). Work on the "critical phases" of fish, i.e. on fish larvae and their critical ecological context, was continued after the S35 program in a subsequent FWF project. This research on fish physiology combined field work and more experimental studies (e.g. on the bioenergetics of fish larvae), conducted in the Althanstrasse with a group of roughly ten students (see Schiemer et al. 2003, and the book Schiemer & Keckeis 2001). Some years later, it also led to much-cited articles written with Hans Pörtner on niche dimensions in fishes (Schiemer & Pörtner 2006, Pörtner et al. 2010). Another important insight first gained in the studies related to the S35 program was that fish function as important indicators of the ecological integrity of large river systems. Work on the "bioindication of fish" dominated Fritz's research from the later 1980s onwards and led to important publications (e.g. Schiemer & Spindler 1989, Schiemer & Waidbacher 1992, and the book Schiemer & Keckeis 2001).

By the mid-1990s, Fritz started working on a new research field, namely large river ecology. This can also be viewed as a thematic extension of the research on local fish fauna initiated in the S35 program. The aim now was to gain a deeper, synoptic understanding of the ecology of river landscapes and floodplains. Fritz started to collaborate with his students Thomas Hein and Gudrun Heiler on the limnology of river systems that led to important results on the concept of "hydrological connectivity" (Heiler et al. 1994, Heiler et al. 1995). This research was funded over longer periods through monitoring programs and complemented by project funding from the FWF. The studies of the integrity of floodplain systems also form the theoretical background for Fritz's ecological contributions to river management and his work on restoration programs. In particular, since 2003, Fritz has been involved in the scientific planning of several large-scale restoration programs at the Danube as well as in the international consultation on large river restoration programs.

Two long-term projects in the Danube area have to be mentioned here. The first one is applied research in the lower and upper Lobau commissioned and funded for many years by the city of Vienna. Fritz, G. Imhof and G. Janauer scientifically coordinated this project between late 1980s and early 2010s. The general aim was to analyze the effects of the great regulation of the Danube from a limnological perspective as well as to study the possible ecological effects of renaturation measures in the Lobau. The second renaturation project concerns the Hauslau Au east of Vienna. The discussions in the ecology commission in the 1980s eventually led to the establishment of the Danube-Auen national park commission for which Fritz and his collaborators developed the ecological criteria needed in the planning process. At the same time, the idea of a first Danube restoration project in the Au Haslau-Regelsbrunn was born. Fritz acted as the scientific coordinator of the program

from the early 1990s onward until he handed over the direction to Klement Tockner. Similar to the Lobau project, the central task here was the development of an ecological concept for the river restoration of the Hauslau Au. This work on the conservation of biodiversity in floodplain river ecosystems was extremely interesting (also from a theoretical point of view) and led to extensive pre- and post-studies after the park was opened (Schiemer et al. 1999, Schiemer 1999a).

Beside Fritz's work on fish physiology and on large river ecology, a third focus from the 1980s onward was his continued research in tropical limnology. Fritz continued to supervise students from African and South-East Asian countries at the University of Vienna and initiated a number of training programs on tropical aquatic ecology in Asia, Africa and Central America over the years. Several limnological studies on tropical streams should be mentioned here, including various excursions to the "Tropical Research Station La Gamba" at the Piedras Blancas National Park in Costa Rica in 2004, 2007, and 2009. Also related to his continuing interest in tropical limnology was the EU-funded FISHSTRAT program (1998-2003), jointly organized with David Simon. Pre-meetings of this program took place at the Royal Holloway College in 1996 and Ceske Budjevice in 1997. The topic of this program was to develop a scientific basis for the management of economically used lakes and reservoirs in south-east Asia. Similar to the Parakrama project a decade before, this work was again strongly interdisciplinary in character and included the work of limnologists, socio-economists, aqua-culturalists, etc.

Fig. 9: Student excursion to La Gamba, Costa Rica: Bernd Pelster, Leo Füreder, Fritz, Johann Waringer, 2009. – Abb. 9: Exkursion nach La Gamba, Costa Rica: Bernd Pelster, Leo Füreder, Fritz, Johann Waringer, 2009.

Academic career, the IECB, and nature conservation

My father's academic career is closely tied to the University of Vienna. When Heinz Löffler was appointed extraordinary professor for limnology within the Institute of Zoology, Fritz started as an assistant in 1968. After a year spent in the main building of the university on the Ringstrasse, Löffler's group moved to an apartment in the Berggasse 18 in the ninth district. The institute in the Berggasse expanded considerably over the next years and became a lively research environment. With additional funding from the Austrian Academy of Sciences, the group was able to acquire equipment and set up its own infrastructure, in the beginning on the first two floors of the building and later on also in the back sections of the house. By the mid-1970s, the group consisted of roughly thirty scholars (roughly half of them financed by the Academy) that worked in "splendid isolation" from the biology department. Then, in 1982, an important institutional separation set in: Fritz and Löffler moved to the new building in the Althanstrasse. The researchers in the Berggasse funded by the Academy, in turn, found a new institutional home to the newly founded Limnological Institute of the Academy at the Mondsee, Salzkammergut.

Fritz's engagement with political decisions in the faculty of biology as well as on university level started at the time when has was an assistant (i.e. Austrian academic jargon, a "Mittelbauler") in the late 1970s. A possible starting point for his political activities was the active involvement in the formulation of a memorandum of the assistants that led to the constitution of an academic mid-level staff committee in the faculty. After the move to the Althanstrasse, Jörg Ott became a close political ally and discussion partner of Fritz. An anecdote from their time as assistants nicely illustrates Fritz's and Jörg's shared critical views regarding the overly hierarchical, top-down structure of the university at that time. The architecture of the new building strongly reflected this structure. The facilities for the ordinary professors were located on the top level of the building. Laboratories were situated below that, on the second floor. Jörg made the suggestion to keep the facilities of the extra-chairs in limnology and marine biology on the second, not on the third floor, in order to gain further independence of the ordinariates. Fritz wholeheartedly agreed with this. During this early phase in the Althanstrasse and for the next two decades, there has been a close interaction between Fritz and his institutional "neighbor" Jörg. Together with Heinz Splechtna, the head of the Institute of Zoology, the three had weekly *jour fixe* meetings in which they discussed strategic matters in institute politics over a glass of calvados.

In 1993, Fritz was awarded extraordinary chair for limnological ecology. Four years later, he became ordinary professor in limnology at the Institute of Zoology after the retirement of Löffler in 1995. A few years before, another important milestone in Fritz's activities in university politics was his involvement in the establishment of a "Curriculum Ecology" at Austrian universities. The idea of such a uniform curriculum was originally born in 1981, but not realizable at first. It was successfully implemented only ten years later, based on discussions in the national study commission in which, next to Fritz, the following colleagues supported the step: Helmut Forstner and Roland Pechlaner (both Innsbruck), Karl Burian, and Helmut Kinzel (both Vienna). Ecology was first introduced as an independent field of study with a separate curriculum at the Universities of Innsbruck and Vienna in the winter semester 1990/91.

Fig. 10: The Institute of Zoology (Fritz, Heinz Splechtna, Jörg Ott). – Abb. 10: Das Institut für Zoologie (Fritz, Heinz Splechtna, Jörg Ott).

Fritz's most significant academic achievement was the formation of the Institute of Ecology and Conservation Biology (IECB) in 2000. The IECB can be considered as the culmination point in the history of the institutional integration of ecology-oriented research at the University of Vienna (see Schiemer et al. 2015). It was also the result of a reorganisation process that set in the late 1990s and was motivated by the "Universitäts-Organisationsgesetz 1993" (that came into force in 2000). The political guideline codified in the UG93 was to form large institutes by the integration of existing smaller units. Against this background, an extensive discussion started whether a new institute for ecology should be formed. The plan was to merge the Institute of Plant Physiology with several subunits of the Institute of Zoology (namely Vegetation Ecology, Marine Biology, Limnology, and Terrestrial Ecology). The aim was to create a new institute with a strong orientation both in ecology and conservation issues. While Fritz was clearly the driving force behind the new institute, other important colleagues in the preparation process were Jörg Ott, Marianne Popp, Andreas Richter, Roland Albert, Rudolf Maier, Georg Grabherr, Karl Sänger, Irene Lichtscheidl, and Harald Bolhár-Nordenkampf.

After a "preparation year" in 1999 with intensive discussions and regular informal and official meetings (for some of which a mediator was consulted), the new institute was finally founded in 2000. As a consequence, the classical Zoology institute was divided into units with an ecological focus and those without. It should be noted here that the IECB was the only institute founded at Austrian universities in reaction to the UG93. Between 2000 and 2004, Fritz acted as the director of the IECB. In this period, the institute turned out to be a great success: around hundred people were affiliated with its eleven subunits (including

Fig. 11: The IECB headquarter: Fritz with Gabi Kaindl and Barbara Nemez. – Abb. 11: Das IECB Zentrum: Fritz mit Gabi Kaindl und Barbara Nemez.

terrestrial, freshwater, and marine ecology, microbiology, etc.). The members of the institute were able to receive external funding for several research projects from the FWF. The institute was evaluated very positively and an international report in 2003.

Nevertheless, the IECB came to a sudden end with the new university organization law UG2000 which reversed the political agenda regarding the desired format of institutes of the UG93. With the new law in action, the new rule was to de-integrate larger units back into smaller organizational departments. Following the order of the rectorate, the IECB was finally disbanded in 1995. Fritz's subsequent efforts, together with Marianne Popp (then the dean of the faculty), to set up a "Faculty Center for Ecology" as a way to keep some unity between the different ecologically-oriented units was successful. In 1995, he was elected head of the Department of Freshwater Ecology as well as Vice-Dean of the Faculty of Life Sciences, a position he agreed to hold for a year before handing over to Michael Wagner. During this period, he was involved in a great number of internal and external appointment committees (often as the chair). The most significant in-house committee was arguably that for the professorship in physiology at the Institute of Zoology. Fritz strongly supported Hans Pörtner's application for this position, also in direct negotiations with the rector. While Pörtner's appointment in Vienna did not work out in the end (after several years of budget negotiations and concrete planning), Pörtner and Fritz became friends and scientific collaborators with joint papers on niche dimensions in fishes. My father also served as a member of the senate of the University of Vienna from 2004 until his retirement from the University of Vienna in 2009.

As an emeritus professor, Fritz's long-term engagement in nature conservation continued in the form of his involvement in several non-university organizations and NGOs. He

served as the president of the "Forum of Austrian Scientists for Nature Preservation" (now "Forum Umwelt & Wissenschaft") for several years. He is the chair of the scientific advisory board of the National Park Danube-Auen until the present day. Since 2010, he has also served as the president of the ZooBot, the "Zoological-Botanical Society Austria", a non-profit society with a strong emphasis on interdisciplinary research in zoology, botanics, and ecology. Since 2012, Fritz has acted as the chairmen of "RiverWatch - Society for the Protection of Rivers", an international association of NGOs with a focus on the protection of the Balkan rivers.

In the past years, the central focus of Fritz's work with RiverWatch was the Vjosa project in Albania, the largest remaining wild river in Europe. The "Save the Blue Heart of Europe" campaign aims to cooperate with local scientists in order to prevent the existing plans for the construction of two hydropower plants in the river's lower part. A key step towards this goal was the Vjosa science petition, signed by over a thousand international scientists, which eventually led to a moratorium of the planned construction work. In 2017, Fritz was part of a science week spent at the Vjosa that led to the publication of Schiemer et al. (2018), a first comprehensive study of its riverine ecosystem, first presented at a press conference in Tirana in 2018. Fritz's involvement in this campaign to save the Vjosa will continue in the future. A decisive step towards the permanent protection of the river system was taken in the fall of 2020. In the midst of the Covid-19 crisis, Fritz and Ulrich Eichelmann travelled to Tirana on the invitation of the Albanian president Ilir Meta to meet for a roundtable discussion on the future of the Vjosa. On behalf of over 50 scientists, Fritz and Prof. Aleko Miho of the University of Tirana presented their critical evaluation of the environmental impact assessment (EIA) of the projected Kalivaç dam. On the next day, President Meta, together with representatives of the Universities of Tirana and

Fig. 12: Conference "Scientists for Vjosa", Albania 2017 ©jens-steingaesser.de – Abb. 12: Konferenz „Scientists for Vjosa", Albanien 2017 ©jens-steingaesser.de

Vienna, inaugurated the "Vjosa Research Center Fritz Schiemer" at the banks of the river in the small Albanian town of Tepelena. Fritz was deeply humbled by this gesture of his Albanian colleagues to honor his merits for the research and protection of the Vjosa river. The Albanian president also used this opportunity to explicitly promote the idea of a Vjosa National Park. Moreover, in response to these events, Albania's prime minister Edi Rama announced that his environmental minister has officially rejected the EIA for Kalivaç, and also expressed his general support for the National Park.

Personal & Family Life

Beside his scientific career, Fritz enjoys an active family life and many personal friendships within and outside the academic context. He has been happily married to my mother Ainusch for more than forty years. Ainusch and Fritz have two children, Georg (born in 1979) and Lucie (born in 1981), as well as three grandchildren, Leo, Anna, and Lotti, who currently occupy most of Fritz's attention. My parents spend most of the academic year in Vienna in the ninth district, where they engage in Vienna's cultural life in terms of frequent visits to the state opera (Fritz's favorite opera is Mozart's *Le nozze di Figaro*), the Musikverein, as well as to art exhibitions, e.g. in the Albertina or the Art history museum. Besides his interest in classical music and the fine arts, Fritz has always been an ad-

Fig. 13: Opening of the "Fritz Schiemer" Vjosa Research Center, September 2020. Photo: Martin Wolf. – Abb. 13: Eröffnung des „Fritz Schiemer" Vjosa Research Centers, September 2020. Foto: Martin Wolf.

mirer of fiction, in particular, of the modern American and English literature, including the novels and short stories of John Steinbeck, Ernest Hemingway, and William Somerset Maugham. My parents enjoy an active social life in Vienna, with regular meetings with their long-term friends, the families Lenz, Kratky, Magometschnigg, Gross, Mahringer, and many others. For dinner parties in the Ferstelgasse, my mother Ainusch usually cooks for a day (often preparing a "Tafelspitz" with various side dishes), and Fritz takes good care of the wine selection for their guests. Since his official retirement from the University in 2009, my father frequently takes a day off from his professional activities and family obligations in order to go fly-fishing in Lower Austria or to hike up his favorite trail, the "Nase" on the Leopoldsberg, in the north of Vienna. I should add that Fritz is an excellent and very experienced fly-fisher, a passion which he has passed on to me. His only precious material possessions are two vintage "Brunner" spilt fly rods, a short "Cheri" and a longer "Gebetsroither" rod.

Fig. 14: Training the next generation: a field excursion with granddaughter Anna to the Haslau Au, 2020. – Abb. 14: Training der nächsten Generation: Feldexkursion mit Enkeltochter Anna in die Haslauer Au, 2020.

Fritz and Ainusch usually spend the summer months together with their children and grandchildren at their residence in Seeboden on the Millstättersee. In the early morning, Fritz regularly goes fishing on the lake with his rowing boat in the hope to catch whitefish. Usually, he returns home for breakfast without a catch. In August, Ainusch and Fritz often visit the Salzburg Festival and take short trips by car to Venice or to the Croatian coast. Together with their friends Dagmar and Christoph Kratky, they greatly enjoy travelling to exotic destinations each fall. These trips have led them to Marocco, Jordan, Thailand, Cuba, Peru, Oman, India, and Tunesia in the past couple of years. Fritz's plan

for the next destination is Australia, one of the very few places he has not yet visited in his exciting life.

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