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NUNCIUS 37 (2022) 175–206



## Obituary



### Paolo Brenni (1954–2021)

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Paolo Brenni's untimely passing in the night between December 3 and 4, 2021, caused such deep and widespread emotion as to make a serene reconstruction of his intense scientific career extremely difficult.<sup>1</sup> The gratitude of his colleagues for the generosity with which he always shared his knowledge exacerbates the emptiness we feel around us. In any event, it would be impossible to produce an exhaustive biography by merely offering a chronological commentary on the massive bibliography of his scholarly writings, or by describing the countless collections of historical scientific instruments that he helped to reorganize, catalogue, and restore. Paolo's intellectual qualities were truly inseparable from his physical presence. This exceptionally rare harmony between intellect and manual dexterity was the key to his unique ability to tackle the history of scientific instruments. Indeed, Paolo exercised his superb skills above all with his hands—assembling, taking apart, repairing, and restoring the most complex scientific instruments, whose origin and function he was nearly always able to figure out, as in a conjuring trick. This outstanding

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1 I wish to thank Anna Giatti, Mara Miniati, and Giorgio Strano for sharing memories and documents, and for rereading this text; Alessandra Lenzi (Museo Galileo Library), for meticulously preparing Paolo's bibliography published at the end of the obituary; Fabio Bevilacqua for providing valuable information on Paolo's years in Pavia; Jonathan Mandelbaum, Paolo's friend and translator, for translating this obituary to a tight deadline; Willem Hackmann for providing me valuable information on the SIS; Francesca Antonelli for copyediting; Elena Canadelli for immediately accepting the text for publication in *Nuncius*; at last but not least I thank Paolo's family for providing me with a suitable photographic portrait of Paolo.



FIGURE 1  
Paolo Brenni and his wife Andrea at the closing  
dinner of the 2007 SIS Study Tour to Florence  
COURTESY NEIL HANDLEY

talent reminds us of Aristotle's well-known words, which seem to have been written specifically for men like him: "[man] has hands because he is the most intelligent animal. We should expect the most intelligent to be able to employ the greatest number of organs or instruments to good purpose; now the hand would appear to be not one single instrument but many, as it were an instrument that represents many instruments."<sup>2</sup>

Paolo Brenni was born in Mendrisio (Switzerland) on March 20, 1954. After graduating from high school in Lugano, he studied experimental physics at the Polytechnic School in Zurich, obtaining his degree with a dissertation on nuclear magnetic resonance entitled *<sup>13</sup>C- und <sup>81</sup>Br- Kernresonanz Untersuchungen im  $K_2Pt(CN)_4Br_{0,3} \cdot 3,2H_2O(KCP)$* .

In an interview to the *Gazzetta Svizzera* of April 2017, Paolo explained that his choice was guided by interests that had developed far earlier:

The theoretical physicist creates universes and theories with a writing pad and pencil (and today with computers). The experimental physicist performs experiments, measurements, and observations using apparatuses and instruments. Ever since my youth, I've loved this fascinating discipline and the history of scientific instruments.<sup>3</sup>

2 Aristotle, *De partibus animalium* 687a (translated by A.L. Peck).

3 Annamaria Loreface, "Il lavoro 'nascosto' di un illustre ticinese: Paolo Brenni e la Scienza Sperimentale," *Gazzetta Svizzera*, April 4, 2017, 6.

As he often told me, Paolo had become acquainted with technology, science, and collecting also thanks to the interests of some of his family members. In 1928, his paternal grandfather had founded Tannini Ticinesi in Melano, on Lake Lugano. The company produced tannin extracts, which are essential for dyeing hides and treating leather. Accompanied from a very early age by his father and uncle, Paolo had been fascinated by the technical-experimental processes at the plant. The factory closed in 1964, its buildings were torn down in 1987 and—to Paolo's great disappointment—the very tall chimney stack met the same fate in 2003. I believe that this event, so closely tied to his family memory, made Paolo particularly sensitive to the beauty and historical importance of the industrial landscape. Like his maternal uncle Claudio Capelli, a surgeon and enthusiastic practitioner of stereoscopic photography, Paolo also showed a precocious taste for collecting and nineteenth-century figurative arts, which persisted into his later years. The breadth of his pursuits was well reflected in the magnificent collection of books and artifacts that, over time, turned his Mendrisio villa into a small, precious museum that he loved to share with his family, friends, and guests.

Shortly after obtaining his university degree, Paolo was appointed part-time teacher of physics at the Scuola Tecnica Professionale (a vocational institute) in Lugano Trevano (1981–1982) and of mathematics at the Liceo (high school) of Bellinzona (1982–1983).

In 1981, the Italian Society of Historians of Physics and Astronomy (SISFA) was founded in Pavia. To mark the occasion, two congresses were held—one in April, the other in October—and Paolo took part in the second. He had learned of the gathering from a brief announcement in the Milan daily, *Corriere della Sera*, which listed the organizers' phone number. Thanks to Fabio Bevilacqua, one of the event's main organizers, he also met Gerard L'E. Turner, then the world's foremost expert on scientific instruments. Their meeting—facilitated by Bevilacqua and his colleagues in Pavia—proved to be crucially important, for Paolo would come to regard Turner as his mentor. In recognition of his interests and his already proven skills, Paolo was invited to reorganize and restore all the instruments of the Physics section of the Museum of the History of the University of Pavia<sup>4</sup>—the first major assignment about which he published a brief report.<sup>5</sup>

4 Fabio Bevilacqua, "Ciao Gianni," in *Storia, Didattica, Scienze Pavia 1975–2010*, ed. Fabio Bevilacqua and Patrizia Contardini (Pavia: Pavia University Press, 2010).

5 Paolo Brenni, "Gli strumenti scientifici della collezione universitaria di Pavia," in *Atti del III Congresso nazionale di storia della fisica* (n. pl. 1983), vol. 1, 176–179.

In this initial phase of his career, Paolo had already adopted his characteristic approach to collections: “in the same room that housed the instruments, which immediately underwent an initial cleaning, a small restoration workshop was set up, in which every instrument was taken apart, carefully cleaned, serviced, and reassembled.”<sup>6</sup> This physical examination was followed by the preparation of a catalogue description, consolidated in a more detailed scientific study in 1990.<sup>7</sup> Paolo’s work in Pavia proved essential not only because of the results obtained but also for the lasting friendships developed with Bevilacqua, Giuliano Bellodi, Pasquale Tucci, and so many other specialists. In later decades, these friendships produced major scientific projects such as the cataloguing of the Volta collection, the reorganization of the instrument collections at the Specola in Brera, and a collaboration with the Leonardo da Vinci National Museum of Science and Technology in Milan.

Paolo’s abiding love of Italy stemmed from his early awareness of the country’s exceptionally rich historical-scientific heritage but also from his encounters with people with whom he bonded immediately.

It was in Florence—a city that remained both a human and professional reference point for his entire life<sup>8</sup>—that his career took a decisive turn. There, he met Mara Miniati and Paolo Galluzzi, then respectively curator and director of the Istituto e Museo di Storia della Scienza (now Museo Galileo). These meetings gave rise to a series of initiatives that, within just a few years, helped to establish an uninterrupted scientific and personal cooperation. Admittedly, their paths did not cross by chance: ever since Maria Luisa Righini Bonelli’s directorship, the Florentine Museum had developed a pioneering approach to its collections that envisaged restoration as an integral part of historical analysis. The importance of this tradition had been consolidated at international level after the tragic flood of 1966 and had gained strength with a series of key publications, most notably the *Annali dell’Istituto e Museo di Storia della Scienza*. In 1986, the *Annali* became the international journal *Nuncius*. Paolo was personally involved as a member of the editorial committee from the very first issue, going on to publish numerous articles, reports, and reviews. By com-

6 Maria Carla Garbarino, “La catalogazione degli strumenti scientifici del Sistema Museale di Ateneo,” in *Storia, Didattica, Scienze Pavia 1975–2010*, ed. Fabio Bevilacqua and Patrizia Concardini (Pavia: Pavia University Press, 2010), 174.

7 Gianni Bellodi, Paolo Brenni, and Maria Teresa De Luca, *Strumenti di misura elettrici del Museo per la Storia dell’Università di Pavia*, Collana di Storia della Scienza dell’Università di Pavia (Pavia: La Goliardica Pavese, 1990).

8 Significantly, to sum up his institutional activities in the brief biography submitted to Brill for the book on Lavoisier that we are publishing together, Paolo wrote: “He worked in Florence for the CNR, the Museo Galileo and the Fondazione Scienza e Tecnica.”

binning history of science and history of scientific instruments into a coherent whole, *Nuncius* was perfectly in tune with Paolo's vision.

In 1984, thanks to funding from the Province of Florence, Paolo was tasked by the Museo Galileo with restoring and cataloguing the collection of old scientific instruments held at the Istituto Tecnico Salvemini (formerly Istituto Tecnico Toscano), which became the Fondazione Scienza e Tecnica (FST) in 1987.<sup>9</sup> This important collection, centered on nineteenth-century experimental physics, became a full-scale scientific laboratory for Paolo. Until his death, he worked with Anna Giatti on cataloguing, restoring, and reinstalling the collection, as well as on launching innovative projects focused on educational experiments and on training experts in scientific instrument conservation. The first result of this long-term commitment was the publication of the catalogue of acoustical instruments as early as 1986, followed by volumes on optics (1995) and electricity and magnetism (2000).<sup>10</sup>

In 1987, with the sponsorship of the Museum in Florence and the Italian Ministry for Cultural Heritage, Paolo took part—with Mara Miniati and other instructors—in the first, pathbreaking practical and theoretical course on the identification, restoration, and cataloguing of old scientific instruments. The course was attended by 15 registered students and 12 auditors, many of whom would turn what they had learned into their profession.

In 1985–1986, with Mara Miniati, Paolo began a census of the scientific collections of historical interest in Tuscany. The project revealed the extraordinary richness of a heritage scattered across schools, institutions, private collections, and other locations where instruments unused for centuries had been miraculously preserved nearly intact.

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9 Paolo worked for this institution for over 30 years, providing a highly valuable scientific and cultural contribution that gave the Fondazione unprecedented visibility. Its President is appointed by the Board of Directors and the Mayor of Florence and, in recent years, choices have been dictated by political considerations more than by scientific criteria. In 2015, the appointment of a person with no connection to the history of the institution and its instruments entailed its gradual decline and, in January 2020, the end of cooperation with the Italian National Research Council (CNR), leading to Paolo's departure. This incomprehensible break, underscored by the resignation of Mara Miniati, then Chairwoman of the Scientific Board, generated bitterness and disappointment. Fortunately, Paolo was immediately welcomed back to the Museo Galileo, a friendly institution that had never ceased to value his exceptional scientific and human qualities.

10 Paolo Brenni, *Gli strumenti del gabinetto di fisica dell'Istituto Tecnico Toscano. 1. Acustica* (Florence: Tipografia Giuntina, 1986); id., *Gli strumenti di fisica dell'Istituto Tecnico Toscano. Ottica* (Florence: Giunti, 1995); id., *Gli strumenti di fisica dell'Istituto Tecnico Toscano. Eletticità e magnetismo* (Florence: Giunti, 2000).

Also in 1986, and again with Mara, Paolo organized the VI Scientific Instrument Symposium under the aegis of the Scientific Instrument Commission. In this same extremely active period, he took part in two exhibitions also curated by the Museo Galileo (*Dal cembalo scrivano alla scrittura elettronica* (1985)<sup>11</sup> and *Occhiali da vedere* (1985)<sup>12</sup>), in the restoration and cataloguing of the instruments on display at the *Misura d'uomo* show (1986),<sup>13</sup> and in the cataloguing of the lenses, prisms, and optical games exhibited at the *Letà di Galileo* exhibition (1987).<sup>14</sup>

In 1987, Paolo was also involved in the reinstallation of the Museo Galileo, a project completed two years later. He helped to catalogue lenses, prisms, and optical games; mechanical instruments; meteorological instruments, with Stefano Casati; and weights and measures, with Mara Miniati.<sup>15</sup> Twenty years later, he contributed to the new reinstallation inaugurated in 2010, curating five rooms of the section devoted to the Lorraine collection.<sup>16</sup>

This intense activity crammed into a very short period channeled Paolo's interests in directions that remained constant in later decades: the interest in instrument collections and in showcasing their historical significance; a prosopographic attention to instrument makers; an emphasis on instrument restoration as a complement to cataloguing; the production of exhaustive catalogues of high scientific quality; a focus on exhibition projects that could provide a historical and narrative dimension to often technically complex artifacts; the interaction between history of instruments and history of science; and, last but not least, an abiding concern to share with colleagues and young researchers all the skills he had acquired in the field. In all of these areas, Paolo—from the late 1980s on—developed a personal profile that soon made him an eminent figure in the international history of science community.

11 Franco Soresini and Mara Miniati, with the collaboration of Paolo Brenni, eds., *Dal cembalo scrivano alla scrittura elettronica: più di un secolo di macchine per scrivere* (Florence: Istituto e Museo di Storia della Scienza, 1985). A year earlier, Paolo and Mara had also worked together on the exhibition devoted to Nobili, *L'eredità scientifica di Leopoldo Nobili: dibattito teorico e ruolo degli strumenti nella fisica del primo Ottocento* (Reggio Emilia: Comune di Reggio Emilia, 1984).

12 *Occhiali da vedere. Arte scienza e costume attraverso gli occhiali* (Florence: Istituto e Museo di Storia della Scienza, 1985).

13 *Misura d'uomo. Strumenti, teorie e pratiche dell'antropometria e della psicologia sperimentale tra '800 e '900* (Florence: Istituto e Museo di Storia della Scienza, 1986).

14 Mara Miniati, ed., *Letà di Galileo. Il secolo d'oro della scienza in Toscana* (Florence: Istituto e Museo di Storia della Scienza, 1987).

15 Mara Miniati, ed., *Museo di Storia della Scienza. Catalogo* (Florence: Giunti, 1990), 78–89, 148–173, 286–301, and 354–366.

16 Rooms XII–XVI; see <https://catalogo.museogalileo.it/>.

Paolo's stay in Florence sharpened his historiographical and museological approach, which matured in the following decades. Another crucial step was his appointment by the French National Center for Scientific Research (CNRS) to the Centre de Recherche en Histoire des Sciences et des Techniques at the Cité des Sciences et de l'Industrie in Paris (1988–1991). This experience put him in contact with institutions and colleagues that broadened his research horizons and deepened his interest in the history of electricity and French makers of precision instruments. From the late 1980s on, Paolo incorporated Paris and France into his sphere of action. In the 1990s and 2000s, he worked on major projects with the Musée des Arts et Métiers; in 2006, he became a member of the scientific advisory board of the national project for the conservation and promotion of France's scientific heritage of the second half of the twentieth century. However, these important collaborative ventures never took Paolo away from Florence and Italy. Between 1992 and 2000, with funding from the Italian National Research Council (CNR), he served as research fellow at the Museo Galileo and, from 2001 to his retirement in May 2021, as CNR research fellow appointed to the Fondazione Scienza e Tecnica, also in Florence. These research positions had two benefits: first, they gave him academic recognition for scientific expertise that was hard to classify in the conventional categories of disciplines recognized in European university systems; second, they gave him a very broad freedom to conduct his work wherever he was attracted by the presence of collections or relevant projects.

It would certainly be most useful—as with his bibliography—to compile a complete list of all the collections and projects in which he was involved during his career, but they are so numerous and their documentation is still so fragmentary that I cannot provide a full account of them. In addition to formal contracts for the study and restoration of collections, Paolo was often contacted by auction houses, antique dealers, private collectors, and government agencies for advice on collections or single instruments. While this activity generated some highly interesting discoveries, its history is extremely hard to reconstruct. As with his official research, Paolo prepared detailed accounts of these investigations and, whenever possible, photographing the instruments submitted to his scrutiny.

What follows is merely a description of the projects that Paolo mentioned in a résumé sent to the University of Bologna in late 2019 ahead of the planned reorganization—completed a year later—of the Augusto Righi collection in the Physics and Astronomy Department.

In the 1990s, Paolo restored and catalogued many Italian collections including the Liceo Prati in Trento, the Liceo Foscolo in Pavia, the University Museum in Pavia, and the Liceo Visconti in Rome. He studied old instruments of spe-

cial note such as the Jesse Ramsden circle at the Astronomical Observatory in Palermo<sup>17</sup> and the Angelo Secchi meteorograph in the Astronomical Museum at Monte Porzio. At the international level, he partnered with the Conservatoire des Arts et Métiers in Paris, the Museum for the History of Science at Oxford, the Museum Boerhaave in Leiden, the Museo de la Ciencias in Madrid and, from the early 2000s, with the French astronomical observatories of Lyon, Haute Provence, and Nice. Paolo was also one of the founders of the UNIVERSEUM association, an assiduous participant in ASEISTE (Association de Sauvegarde et d'Études des Instruments Scientifiques et Techniques de l'Enseignement), and a generous provider of answers to historical queries submitted to the RETE mailing list.<sup>18</sup> This dense network of high-level working relationships led to Paolo's election as President of the Scientific Instrument Society (from 2005 to his death), President of the Scientific Instrument Commission (2003–2013), and Vice-President of the International Union for History and Philosophy of Science—Division of History of Science and Technology (2009–2013).

Between 1999 and 2003, Paolo helped to catalogue Volta's instruments in two locations: the University of Pavia and the Tempio Voltiano in Como. Also in 2003, he oversaw the restoration of the instruments at the Liceo Volta in Como and of a group of devices at the Ufficio Centrale di Meteorologia Agraria (UCEA) in Rome and the Liceo Paolo Sarpi in Bergamo.

Between 2009 and 2011, he disassembled, restored, and reassembled the large refractor telescope built by Joseph von Fraunhofer in 1823, used by the astronomer Friedrich Georg Wilhelm Struve, and kept at the Tartu Observatory (Estonia).

In 2016, he began restoring a series of instruments at the Museo Caffi in Bergamo and cataloging and reorganizing the scientific instrument collection of the Museo Civico in Modena.

In 2011, Paolo's work at the Fondazione Scienza e Tecnica in Florence and the new displays there prompted him to produce a series of historical-educational videos to explain the functioning of old scientific instruments. The series was prepared with Anna Giatti and the video maker Antonio Chiavacci. Released on YouTube,<sup>19</sup> it proved an instant success, winning attention and praise not only from the Foundation staff but also from schools and students.

17 And in 2012, he also restored the Merz refractor telescope on the same site.

18 The mailing list, administered by the History of Science Museum at Oxford (<https://www.hsm.ox.ac.uk/mailling-list>), received the earliest moving and intense reactions to Paolo's passing.

19 <http://www.youtube.com/user/florencefst/videos?sort=dd&view=0&page=1> See Paolo



Paolo's educational creativity was unleashed whenever he was invited to give a lecture or a course. He showed and shared his knowledge without ever acting professorial, and he would invite attendees to take an active part in the event. Indeed, his university courses were almost always accompanied by experimental demonstrations that illustrated the topic in a novel and participative way. His university career included the appointment to the Sarton Chair of History of Science at the Ghent University (Belgium) for the academic year 2000–2001. His attention to the young had made him aware of the institutional difficulties they face when choosing such an uncertain career. In 2017, for example, he wrote:

Today it is very hard to find career opportunities in Italy. Cuts in research funds and the niche status of history of science make it difficult for a young researcher to embark on a rewarding career. I know young and extremely able researchers who are forced to spend their time looking for research grants or fixed-term contracts in order to survive.<sup>20</sup>

I am sure that he would have viewed the Museo Galileo's decision to give his name to a post-doctoral fellowship in the study and restoration of scientific instruments as a fitting recognition of the attention he consistently devoted to training young people.

Back in 1999, Paolo and I, under the auspices of Dominique Ferriot, had developed a project to catalogue the instruments that had belonged to the French chemist Antoine-Laurent Lavoisier, most of which are held at the Musée des Arts et Métiers in Paris. However, it was only in 2015, thanks to Catherine Cuenca, that the right circumstances came together to make the project possible. As we both used to say, this became our most demanding task. We began in 2017 and consigned the final, revised version of the catalogue in late November 2021, just days before Paolo's death. The Lavoisier collection poses an especially difficult challenge because, as is well known, he commissioned the making of instruments—many of which he personally designed—that are unique and cannot be compared with other contemporary productions. This challenge, relating to so prominent a figure in history of science, came to us at a time when we had both perhaps acquired enough experience to take it up with some hope of success. Given the number of difficulties and obstacles

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Brenni, "Filming Nineteenth Century Physics Demonstrations with Historical Instruments," in *Historical Scientific Instruments in Contemporary Education*, ed. Elizabeth Cavicchi and Peter Heering (Leiden: Brill, 2021), 34–49.

<sup>20</sup> Lorefice, "Il lavoro 'nascosto' di un illustre ticinese," 7.

encountered, we were all the more relieved to have been able to complete the project. Our inability to celebrate its publication together will be a source of deep and permanent sorrow for me.

These years of working together gave me a first-hand opportunity to appreciate Paolo's exceptional talents. In his hands, pieces and fragments of all sorts—previously inventoried and described without a clear understanding of what they were—became recognizable instruments. Clumsy tampering and previous restorations (not always satisfactory) were rapidly put right, bringing the Lavoisier collection gradually back to life. I believe I am not mistaken in stating that the famous gasometers built by Mégnié in 1788 are now in their best condition since their acquisition by the Conservatoire National des Arts et Métiers (CNAM) in 1866. Other instruments, whose purpose long remained a mystery, have now been positively identified. The assurance and ease with which Paolo handled these instruments were such as to surprise even the most experienced curators, while the younger ones, more than once, feared that his handling would cause breakage. Not only did this never happen, but, in Paolo's hands, the instruments came back to life; whenever he could, he demonstrated this by making a device work again with surprising speed. For him, the repetition of an experiment had to be as quick and spectacular as those of Jean-Antoine Nollet, an author on whom he was one of the foremost experts. The enthusiasm that prevailed in these wonderful reconstructions spread to the Museum's curators and restorers. From the outset, this created an exciting atmosphere that we shared with many staff members at the professional and human level. We conducted much of our research at the Museum's reserves in Saint-Denis outside Paris. With its tens of thousands of instruments, machines, and artifacts of all kinds sitting on open shelves, the facility was, for Paolo, an enchanted place. Our lunch breaks would turn into guided tours, either to focus on a single instrument that interested him or to lose ourselves in an entire collection. His inexhaustible curiosity was backed by an extremely solid scientific training that, over time, was enhanced by a surprising close attention to the cultural history underlying the production of instruments and machines. This working method effectively revealed his personality as a nineteenth-century *savant*—as he often liked to define himself—a learned and enthusiastic admirer of scientific and technical achievements. However, this nostalgic sympathy for the Belle Époque was more a personal taste than an actual personality trait, for Paolo was a man fully immersed in his time, who could feel at ease in conversations with people regardless of age, background, social class or gender. Indeed, beyond his manual dexterity, Paolo was a most delightful conversationalist, capable of addressing a wide variety of topics with a rare blend of seriousness and humor.

His multifarious scientific career earned him many prizes and awards, most notably the Paul Bunge Prize from the H. Jenemann Stiftung for studies on scientific instruments and material culture (2002), the Scientific Instrument Society Medal (2005); and the Marc-Auguste Pictet Medal from the Committee of the Société de Physique et d'Histoire Naturelle in Geneva for his contributions to history of science and instrument restoration.

While the study of scientific instruments was his passion, it did not rule out many other interests, for which he displayed equal curiosity and—in a good many instances—expertise. Art history, technology, industry, museums and universal exhibitions, cinema, and industrial archeology were all subjects that captivated him deeply.

Paolo was also a gifted draftsman, and on several occasions he showed me watercolors of industrial landscapes drawn with precision but always with a style that revealed his characteristic vision of the world.

Notwithstanding his fondness for Italy, Paolo loved Switzerland and in particular his native town, Mendrisio. Like many of his fellow citizens, he celebrated August 1 by flying the red flag with the white cross from the window of his villa. During our conversations, he proudly reminded me that Mendrisio had been, in the late nineteenth century, one of the first towns in the Ticino to be electrified—hence its possibly apocryphal nickname of *ville lumière* of the Ticino—and that, a few kilometers from the town center, stood one of Europe's largest gold refineries. For me, with my Milanese roots, these displays of affection for his native land offered opportunities for good-natured bantering that drew on the vast repertoire nurtured by the historical, linguistic, and cultural ties between the Lombard capital and the neighboring Swiss Ticino. Despite a friendship of over thirty years, we would still refer to each other as “il Brenni” and “il Beretta”—a typical form of self-identification in an idiom that was and still is very popular in our part of the world.

While his passion for his work was a characteristic trait of his personality, Paolo had no shyness in expressing deep love for his family—his wife Andrea, his daughter Camilla, and his son Oliver. To them go my thoughts of heartfelt affection.

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