

Chapter 2

Childhood and Education

“La nature ne livre ses secrets qu’à ceux qui ne reculent devant aucun effort pour les lui arracher.”

[Nature only reveals its secrets to those who do not flinch from any effort to wrest them from it.]

Jules Janssen [1]

A Family of Inventors

Although three forenames Pierre, Jules, and César were given when his birth was registered, Jules, and only Jules, is the name that should be used for Janssen, who was born at his parents’ house in Paris, 14 rue l’Évêque, on 22 February 1824, at 4 in the morning [2]. This was how he was known during his lifetime, and that is the form he used as his signature, although on most occasions he simply used the initial: J. Janssen. Jules was also to be the sole forename that was to be inscribed on his tomb. His parents were Antoine César Janssen, a musician, 42 years old, and Pauline Marie Lemoyne, his wife, aged 35. The witnesses who signed the registration of birth were Pierre Louis Puzin, a dealer in passementerie¹ of rue Saint-Denis, and Jean François Joseph Grandvalet, an upholsterer of rue de Provence. The baby was baptized the next day, at the church of Saint-Roch [3].

Let us establish at the outset that Jules Janssen’s family name should be pronounced “Jeanseine” [*French pronunciation of “Jean”+“Seine”*], and that any attempt at a Flemish or Scandinavian pronunciation is an insult to his memory. Indeed, the words of a letter that Mme Janssen sent to her husband on 13 February 1869 are particularly relevant at this point:

I read [*the following*] in *La Liberté* for 6 February: “A Dutch chemist, Janssen, according to *Le Moniteur Universel*, has just determined, by means of spectral analysis, the existence

¹ Trimmings of gold or silver lace, braid, beads, etc., for clothing and other objects.

of water vapor in the atmosphere of Mars and Saturn.” Is *Le Moniteur* already suffering from the Carnival spirit? It has turned M. Janssen, our learned French physicist, Doctor of Science at Paris University, into a Dutch chemist! [4]

The usual sources regarding Janssen’s ancestry are obituary notices, of which there are many, frequently inspired rather too freely by earlier biographical notes, and which generally copy one another. Only the astronomer Guillaume Bigourdan, from the Paris Observatory, tried to find out more by seeking proper sources, but he was not able to confirm all that he read, nor all that he had been told – not even, it would seem, by Janssen himself (“son and grandson of artists ...” [5]). In addition, it was undoubtedly because he did not want to cause Janssen’s widow and daughter any distress that he did not mention everything he learned from the documents he consulted; proof of this is shown by his notes, which have been preserved in the archives of the Académie des sciences. The result is that when various authors claim that nothing predisposed Janssen to a scientific career because he came from a family of artists (his father is described as “a talented musician” and his maternal grandfather is said to be the architect of La Madeleine and a friend of Beaumarchais), they are rather far from the truth. For a start, they conceal the fact that his father was just an ordinary second clarinet in the orchestra at the Opéra-Comique, who “never rose to be anything other than mediocre” [6], as Fétis dares to maintain in his *Biographie universelle des musiciens!* On the other hand, they do not lay enough emphasis on the fact that Antoine César invented the roller clarinet and was probably deprived of the patent by an instrument maker. Fétis mentions a favorable report about this by the mathematician Francœur [7], and Mme Beau speaks of the “Janssen key,” which “earned its inventor a silver clarinet that was presented to him by the *Société des Artistes*” [8]. In addition, something that no one knew, and which we were interested to discover, is that some of the boot makers and manufacturers of passementerie on Janssen’s paternal side possessed patents. Janssen undoubtedly came from a family of inventors, and he did not disgrace them.

Moreover, when biographers have stated that his maternal grandfather, the architect Lemoyne, who admittedly won the Prix de Rome, took part in the construction of La Madeleine, they forgot to consult the corresponding file, which tells us that he only submitted one of the 82 designs in the competition. In his *Dictionnaire des architectes français*, Lance is at least as critical as Fétis: “He produced a plan for the restoration of the vaults and great doorway at the cathedral of Sens. [...] Luckily, the Revolution affected this project, which was not one of restoration, but of mutilation” [9]. As for the link with Beaumarchais, the idea should be completely dismissed: Beaumarchais did not know Lemoyne personally before engaging him as one of the two architects for his celebrated Paris mansion, and their relationship rapidly deteriorated [10].

Janssen did not, in fact, know any of his grandparents. His paternal grandfather, Christianus Janssen, a master cobbler, who died in Paris in 1797 at the age of 60, had been born in what, at the time of his death, was known as the French department of la Dyle [11], i.e., the Brussels region. Christianus, called Chrétien or Christian on various official papers, had married a Parisienne, Louise Catherine Puzin, sister of the dealer in passementerie from the rue Saint-Denis. The children born of

this marriage were Marie Louise, who married a dealer in ladies' shoes, Jean Dufort (whose two sons became boot makers and whose daughter became a cobbler); and then Antoine César, the father of Jules, Antoine Vincent, a cobbler, as well as Noël Henry Janssen, a boot maker, who was a witness at the religious marriage ceremony of Jules' parents in 1818 [12].

On the maternal side, Janssen's grandparents were the architect Guillaume Paul Lemoyne and his first wife Albertine Pieters, widow of a man she married at Ghent in 1777. Lemoyne, who died 14 years before Janssen was born, was the son of a building contractor and a lady née Le Doux, who came from a family of craftsmen, of which a number were master gilders and other jewelers, and who had been resident in Paris since the seventeenth century.

As far as the family's fortunes are concerned, it is highly probable that Lemoyne's, despite his having won the Prix de Rome in 1775, and contrary to what is usually stated, was non-existent. In fact, his name only appears on the list of entrants to the competition that was opened on 20 December 1806 for the construction of the "Monument à la gloire des armées" that became La Madeleine because "he is not rich" and it was decided to reimburse, to the extent of 600 francs, his costs for detailed drawings for plans that he had sub-contracted [13]. After becoming a widower, in Paris in 1794 he married Marie Thérèse Lefevre. The son from this second marriage, Georges, was some 12 years old when his father died, and Janssen mentions in his notebooks how his parents gave a home to the second Mme Lemoyne in June 1842 until her death, which occurred in 1843.

On the Janssen side, it would seem that the financial situation was, at least originally, far better, because Antoine César had a private income from 1835, even though he was then just 54 years old.

The Bank Employee and Secondary Education

Jules' parents, who intended him to follow a career in painting [14], had decided that he should study drawing, but nevertheless did not neglect a classical education:

He was an only son, and as such, very pampered, even more so because an accident caused by his nurse's carelessness rendered him lame [*at the age of 8*]. So, contrary to the more-or-less general usage at the time, he was not sent to a boarding school, but carried out all of his studies as an external student. [15]

His varied abilities rapidly became apparent:

Even as a child he had a flair for observation that foreshadowed his scientific vocation, and which was accompanied by considerable dexterity. He excelled at cutting out magnificent deer-hunting scenes from paper, with huntsmen, the pack of hounds, and his daughter still preserves a small, wooden box, decorated with tacks, which he made at the age of 8, and which shows an ingenuity and patience that is extremely rare at that age. [16]

In 1840, just 1 year after Arago had described, both to the Chamber of Deputies [17] and to the Académie des sciences and the Académie des beaux-arts [18], Niepce and Daguerre's method of capturing images in a camera obscura, a photograph of

Fig. 2.1 *Jules Janssen at 16. Enfance des célébrités contemporaines.*
© Bibliothèque de l'Institut de France



Jules was taken (Fig. 2.1). We know of this portrait because it featured in the Exposition de l'enfance ["Exhibition of Childhood"], held in Paris in 1901, where it was described as: "An extremely old, and well-preserved daguerreotype, which reveals the features, at 16, of M. Janssen, the illustrious astronomer, who has become so well-known from his many discoveries" [19].

It was precisely at this period, according to all the biographies, that Jules' parents lost their fortune. Although no known document gives details of exactly what happened, we may imagine that it was as the result of some bad financial investment. It is definite, however, that Janssen had to give up his studies and turn to working to earn his living. From this time onwards, he maintained highly detailed accounts. He continued to do so throughout his life and never spent even a centime unnecessarily.

The Janssens left rue des Bons-Enfants, where they had been living since 1836 for rue Rochechouart when, in October 1840, Janssen joined the office of the bank owned by the brothers Tharaud (Bertrand, Gustave, and Léopold). He remained there until 30 September 1847, exactly "7 years less 12 days" [20]. By recording it in this way in his notebooks, we must assume that he found it tedious, even though he made good use of his time, and he had a future actor at the Vaudeville Theatre, Adolphe Dupuis, as a colleague.

Janssen told Henner² that Dupuis and he were employed in the same bank at the age of eighteen. Both were trying to find their true vocation. Even while dealing with the correspondence, one would recite scenes from Molière, while the other studied mathematics. The manager pulled a face at Molière, but looked on Janssen's books with respect. Each eventually followed their own path. [21]

²This is Janssen's great friend, the painter Jean-Jacques Henner (1829–1905).

In 1842, the Janssens settled in Montmartre, first in the rue Royale, then, in 1843, at 40 chaussée Clignancourt. On 1 October 1847, Janssen changed his employer; he worked for M. Boulet, whom he left in July 1848 to move to M. Lapelle's firm [22].

Janssen, who "learned arithmetic, algebra and trigonometry on his own, from Bezout, and then infinitesimal calculus from Lacroix" [23], followed the course at the Conservatoire on Sundays, and continued to study on his own, learning Latin and Greek. He gained his baccalaureate³ of letters in January 1849, and of mathematical sciences (for which he then became eligible) in November 1850, after having followed the course given by the physicist Paul Desains at the collège Bonaparte.

Higher Education and Early Travels

In 1851, at the age of 27, Janssen began his higher-education studies at the Sorbonne where "he followed the courses given by Cauchy, Lefébure, Le Verrier, and Sturm" [24]. He could not yet afford the "Grand Tour," the trip lasting several years that at that period young people of good family undertook, but he went to London for the month of August. He obtained his licentiate⁴ in mathematical sciences in July 1852, before staying in Switzerland for the next 2 months.

In his notebook for 1853 [25], while acting as supply teacher at the lycée Charlemagne, he recorded that he got in touch with Urbain Le Verrier, a graduate of the École Polytechnique and Director of the Paris Observatory, with a view to a possible collaboration. Le Verrier was known for "being as affable as a bulldog" [26], but Janssen does not specify whether he was ever taken on at the Observatory.

In October 1854, he was hired by the rich lawyer Jacques François Napoléon Grandidier to be tutor to his sons Ernest and Alfred, at the château de Fleury-Mérogis. The sons became great travelers and the latter of the two like Janssen became a member of the Académie des sciences as a geographer and navigator. Janssen obtained his licentiate in physical sciences in November 1855.

The following year, he finally undertook the major trip that he had undoubtedly been dreaming of making for a long time: Constantinople, Rhodes, Cyprus, Jerusalem, Alexandria, Cairo, Malta...

He had, however, decided to devote his life to research, and so the time had come for him to carry out an official scientific mission, which was to be the first in a long series of such undertakings.

³The baccalaureate (Fr. "baccalauréat") is the required qualification for university entrance.

⁴The licentiate is a degree awarded by certain European universities, intermediate between those of bachelor and master (or doctor).

Determination of the Magnetic Equator in Peru

Janssen decided to travel to South America with the Grandidier brothers “for the purpose of resolving certain questions about the physics of the globe” [27]. He intended to make magnetic observations in Peru and then in Chile, and called on the help of three members of the Institut, the physicist Babinet, and the two hydrographers Daussy and Duperrey in planning the trip. In the first demonstration of his strong will and astonishing self-assurance, on 12 October 1857 Janssen told the Minister for Public Education and Worship about his plans, and asking for a mission assignment. He wrote to the Minister: “We would therefore ask you, Monsieur le Ministre, to be so kind as to agree to our undertaking and to give it an official character, only which will guarantee its entire success” [28]. He added that he expected an answer “as rapidly as possible” because the departure was set for 19 October, that is, a week later! Janssen did not ask for money (it was undoubtedly the Grandidier family that was underwriting the finances), and on 24 October, the minister agreed to this “free” mission [29]. However, things by no means transpired as had been wished. Janssen fell seriously ill in Peru: dysentery, intermittent fevers, and hepatitis immobilized him for several months, and even his return to France had to be deferred. Treated at Lima, he was finally in a fit state to return to Paris in August 1858, without having been able to complete his scientific work.

With the Schneider Family at Le Creusot, Marriage, and His Doctoral Thesis

At the beginning of 1859, when he officially became engaged to Henriette Forestier (who remained faithful to him for 2 years, despite the snide remarks from one of her Grandvalet cousins regarding her future husband’s lack of fortune), he left for Le Creusot to work for the Schneider family. He had been engaged by Eugène Schneider, the director of the ironworks, a former Minister of Agriculture and Commerce and Deputy, as tutor to his son Henri. Janssen had to get him ready for his baccalaureate, which was, apparently, not an easy task. This was undoubtedly not Janssen’s only occupation, as he wrote to Henriette on 5 February:

At the moment, I am overwhelmed with jobs: what with the mathematical and chemical work that I give Henri, I have my personal tasks, which I am finding very difficult because of my distance from Paris. In addition, M. Schneider is thinking of establishing a school for young engineers at Le Creusot, and has asked me to draw up a programme of courses for all the different forms of science that feature in the work of the engineer. So I am forced to consider teaching methods of the principal engineering schools in France. [30]

He was lucky enough to have at Le Creusot, not only a laboratory where he could set his pupil carrying out experiments, but also a “physics cabinet” [31] to use for his personal research.

At the same time, he was also preparing Henri Le Roux, the son of his first cousin, Geneviève Éliisa Janssen (and who was 2 years younger than Henri Schneider, having been born in 1842), for his baccalaureate.

Janssen returned to Paris in August 1859 to marry Henriette the following month. The marriage contract [32] of 17 September details the property that the future couple (Figs. 2.2 and 2.3) would bring to their joint estate. The list was not very long. The clothes, linen, personal jewelry, silverware, and furniture were estimated, respectively, at 2,645 F [*francs*] for Jules and 3,210 F for Henriette. To this should be added Henriette's books, estimated at 300 F and, for Jules, "his library, scientific instruments, curiosities and collection of weapons, the whole to a value of 5,300 F." In addition to some bonds in the Chemins de fer du Nord, du Midi, and d'Orléans, Jules had at least 2,185 F in cash, but his contribution was burdened by about 2,000 F, which represented the sums that he still had to pay on income from a state loan, to which 1,060 F had to be added that he owed to his future mother-in-law. For her part, Henriette brought five shares in the Chemins de fer du Nord with a nominal capital of 500 F, and a credit note for 500 F. The settlement expected from the estate of her grandfather, who died in 1855, would bring more administrative complications than revenues.

The civil marriage took place on 19 September 1859, and the religious ceremony on the 21st at the church of Saint-Merry, in Henriette's parish. There was then no longer question that the young woman, who, until then had given lessons to support her existence and that of her mother, should continue to do so. Instead, her husband asked her to go back to school, and learn English and science. But let there be no mistake: as neither of the newly weds had a fortune, it was affinity and love that brought about the marriage. A few days before, Jules had sent these loving and rather sensual lines to Henriette from Le Creusot:

These bonbons will be kept and, when I arrive in Paris, a charming little hand that I know will pop them into my mouth, then rosy lips will fleetingly touch mine in a sweet kiss. A way of eating sweetmeats that makes them singularly agreeable; I recommend it to all those in love and whose heart no longer completely belongs to them. [33]

Once married, Henriette went to live with her husband at the Janssen home at 87 *chaussée Clignancourt*. She thus left her mother, who had been the widow of Michel Forestier since 1849. Henriette's paternal family originated in Clermont-Ferrand, where Michel Forestier was a haulage contractor. He had married Uranie Véronique Thierry in Paris, and it was there that the daughters were born, Caroline in 1823, and Henriette on 12 November 1828. Their younger brother, Eugène, was born in 1830. It was at Clermont-Ferrand, where she remained until 1852, that Henriette had her schooling, at a boarding school. Henriette's sister married the merchant Léonard Sénèque Blémont in 1842, and her brother, who was in business in Le Havre and then in the United States (where he died in 1891), did not marry until 1874.

Through her mother, Mme Forestier was a cousin not just of the Grandvalets, friends of the Janssens, but also of the mother of Eugène Labiche.⁵ For Jules and

⁵ A well-known French dramatist (1815–1888), particularly noted for his comic farces and vaudeville pieces.

Fig. 2.2 *Henriette Janssen, née Forestier. Photograph by Étienne Carjat. © Archives of the Académie des sciences of the Institut de France*



Fig. 2.3 *Jules Janssen. Photograph by H.J. Whitlock, Birmingham. © Archives of the Académie des sciences of the Institut de France*



Henriette this meant not only that they occasionally received theatre tickets, but also that they were invited by the Labiches to their property at Souvigny, in Sologne.

Because Henri Schneider was not ready to take his baccalaureate at the time of the marriage, Janssen had to stay at Le Creusot. Henriette accompanied him, but the couple were at Paris at the time of the death of Janssen's father, on 25 May 1860. Henriette, who was pregnant, did not return to Le Creusot with her husband in June, and this first long separation weighed heavily on her. She remained in Paris with her mother-in-law, while Jules continued to teach his pupils on the one hand, and to work on his thesis on the other. His research, inspired by observations that he was able to make among the workers in the workshops of the ironworks, related to "The absorption of dark heat radiation⁶ within the components of the eye"⁷: the cornea, lens, vitreous humor, and the eye as a whole. Janssen therefore devoted himself to working on spectroscopic photometry, and the conclusion that he drew from his observations and his many measurements was that the near infrared, which is absorbed by aqueous media, does not cause any damage to the retinas of higher animals. These results were not revolutionary, but the research was carried out very conscientiously, and Janssen utilized a considerable number of eyes from recently slaughtered animals (bullocks, calves, sheep, pigs, and even chickens, in his preliminary studies of the transparency of the cornea! [34]) to carry out his experiments.

Henriette expected to return to Le Creusot after the birth of her "baby" [35] (which was how she spoke of it, using the English word), once the thesis had been defended.

Unfortunately, it was not to be. Although Janssen received his science doctorate at Paris on 17 August, the little girl who was born 6 days earlier was "a child without life" [36]. Henriette had to recover from the ordeal. So she remained in Paris while Jules left, and had to deal with the first scientific controversy: a person called Cima maintained that he had carried out the same experiments earlier, and that his conclusions, published in August 1859, were very different. Janssen defended himself vigorously, and things ended to his advantage:

However, the small battle I have had with this Austrian from Turin also ended with complete victory: Monsieur Cima who, what's more, is by no means an Austrian, neither by birth nor in behavior, has written me a very generous letter saying that he has considered my dissertation with great care and that he fully recognizes that I am right, and that he accepts my results in preference to his own. He authorizes me to inform my supervisors at the Institut. I am writing to him to ask him if, by means of a letter to the Académie, he would confirm his support for my results. So that, my dear Henriette, is what you need to get printed in Le Moniteur.⁸ [37]

We learn, in passing, that the matter had gone quite far. Henriette was delighted with the outcome: "As for M. Cima, I feel that he has acted as a generous and sensible person; he ought to be French" [38].

⁶ This is what we would now call the near infrared.

⁷ This is the subject of the thesis that he was to defend.

⁸ The journal in question is *Le Moniteur scientifique*. Here, as subsequently, any passages that are underlined are as they appeared in the original quotations.

Janssen, who was 36 years old, was working without a break, and dreamt of better days, but he still had to wait a long time for them to arrive:

As for the life I live here, I am so greatly occupied with my two pupils who have to be pushed forward at a great rate that I hardly have time to do a bit of work for myself: So my second piece for the Archives Médicales has not yet been finished. I am not at all happy to find that I am always engrossed in working for my livelihood, while I feel that there are so many things to do. If only I could live, free from all such material considerations, just for my two mistresses: the one to whom I have given my heart, and the other to whom I am constantly attracted. [39]

Janssen finally left Le Creusot at the end of October 1860. Returning to Paris, he carried on with his work on physiological optics and collaborated with the doctor Eugène Follin, a renowned ophthalmologist at the Paris hospital La Salpêtrière, who became his friend. It was not long before a joint publication [40] appeared on a new form of ophthalmoscope. This was Janssen's first design of instrument.

In March 1861, the Janssens moved, and settled with Janssen's mother in rue Labat, at what was then number 21.⁹ It was there, still in Montmartre, that little Antoinette was born on 7 November.

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