public life was unstinting. And this in fact was Einstein's greatest achievement, when the flow of his science abated. He remains an example to all of us, even when we are not in the position where our views are solicited, as Einstein's (the mystical embodiment of wisdom in the 20th Century) were. We have an obligation as human beings to speak out.

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The "Rocky" Road to Literary Fame: Marcel Proust and the Diamond Synthesis of Professor Moissan

Otto Krätz*

"Diamond: Many argue that it is nothing more than simply carbon. Someday man will even prepare it artificially! If a diamond were to be discovered in its original form one wouldn't even bother to pick it up." Gustave Flaubert, Dictionary of Received Ideas.[1]

Introduction: Observations Regarding an Altogether Too Pleasant Place

It has been said about the French literary figure Charles-Augustin Sainte-Beuve that with his expression "tour d'ivoire"—ivory tower—he provided a label for the true abode of a great many intellectuals. In any event, the latter quickly adopted the new term, and with gratitude. Gustave Flaubert, in particular, never tired of extolling through vivid images the fragility of this imaginary structure, threatened as it always is by the fierce storms within our world.[2]

Chemists, too, have gladly sought refuge here. Far from the tumult of the evil world, behind protective ivory walls, it became fashionable to complain bitterly about the ingratitude of the masses in the face of the endless benefits conferred by chemistry. In this isolated state relatively little attention was directed to how often the reverse has applied as well. With surprising frequency chemists remained—and remain still today—unappreciative and too often utterly disinterested in the face of cultural and social consequences of their research. Admittedly, Henri Moissan's early death prevented him from reflecting deeply on cultural effects resulting from his fluorine chemistry, as well as his improvements in the recovery of the element chromium and the revolution in lighting technology attributable to acetylene. However, this still does not explain the astonishing fact that the consequences of Moissan's life's work have apparently never been examined by the chemical scientific community with respect to Art Nouveau interior design and the dramatic ascent of chromium, which has

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caused it to rise to a status comparable to that of a "guide fossil" for the art of design in the 20th century. The fact that art historians are almost completely oblivious of such abstruse subjects as hydrogen fluoride and high-temperature chemistry almost goes without saying.

Marcel Proust and the Glass Artistry of Emile Gallé

A true Proustian not only indulges in the peculiar-tasting linden blossom tea—nearly obligatory for a Proust fan—and simultaneously nibbles on incredibly crumbly madeleines,[3] he or she also views the world around through the eyes of the admiring master (Figure 1). Snow and ice remind him (or her) of Art Nouveau glass as it would have emerged from the atelier of Emil Gallé, adorned with the enveloping snow effects that inspired the poet in "Search for A Lost Era" to an image filled with emotional appeal: "Soon winter; in the corner of the window a solidly frozen vein of snow, as on a glass by Gallé".[4] Proust probably knew relatively little about the ingenious techniques—the complex interplay of glass and enamel fluxes and entrapped air bubbles, the incorporation of colored oxide particles, overlaying with other colored glasses, and the various abrasive and etching techniques—with which the great glass artisans of the day, Gallé and Lalique, created such wonderful works. Proust was in fact closely acquainted with the glass artists Gallé and Lalique. Both were frequent visitors to the house of the writer Robert Comte de Montesquiou-Fezensac, who wrote the stylistically instructive essay "Orfèvre et verrier. Gallé et Lalique" (1897). Montesquiou made a significant contribution to the popularization of Art Nouveau glass, at the same time influencing Proust's understanding of art.[5] Strangely enough, the technique of etching glass, which results in a matte surface more reminiscent of snow, had a significant impact on Proust's life, albeit by way of several detours. Etching glass with the aid of gaseous hydrogen fluoride had actually been known for about a hundred years, but the procedure was time-consuming and awkward.[6] Since hydrogen fluoride is a highly toxic gas, it was necessary that the glass surface in question be secured with wax to the mouth of a developing vessel, which was filled with fluorspar and sulfuric acid. After the etching process was complete the wax seal was once again melted, as was wax that had been laid down on the glass surface to protect areas which were to be left unetched. Much more convenient were newer procedures perfected in the last decade of the 19th century whereby a liquid mixture of anhydrous hydrofluoric acid and fluorine-containing salts such as ammonium fluoride was either spread directly on a glass object or applied to a glass plate in a process rather like flexographic printing, to be washed off after etching was complete.[7] However, extensive application of such procedures presupposed the availability of an efficient chemical industry capable of supplying sufficient quantities of fluorine compounds. This was also the technique that permitted participants in the Art Nouveau movement to overrun extensive glass surfaces with meandering matte ornamentation. Window panes, glass doors, and mirrors etched with hydrogen fluoride soon became important stylistic features of the architecture of that period.[8]

Figure 1. Marcel Proust in about 1895. The photograph is reprinted with permission from Suhrkamp Verlag.

Henri Moissan

The singular blossoming of fluorine chemistry around 1900, especially in France, was a consequence of research by Henri Moissan (1852 – 1907), who subsequently was awarded the Nobel Prize.[9] The son of a clockmaker, he began his studies at the venerable National Museum of Natural History in Paris. Moissan later became a professor at the École supérieure de Pharmacie, and ultimately had a chair in chemistry at the Sorbonne. In 1884 he observed that certain fluorine salts dissolve in anhydrous hydrofluoric acid—the important prerequisite for the new method for etching glass. He succeeded for the first time in 1886 in preparing elemental fluorine, an extremely aggressive gas, by the electrolysis of anhydrous hydrofluoric acid in a platinum vessel. On the basis of this discovery, which broke new chemical ground and made Moissan world famous, he established a broad research program in the area of fluorine compounds and their properties which, in 1900 (roughly 100 years ago) culminated in the publication of his monograph "Le Fluor et ses composés".[10]

Moissan's appearance bore only a crude resemblance to the public vision of a chemistry professor (Figure 2). He loved to carry out his experiments on a pilot plant scale—almost an industrial scale. Accordingly, he wore to work not a laboratory coat, but instead, like a factory worker, a set of utterly unbecoming, tattered old clothes over which he fastened a

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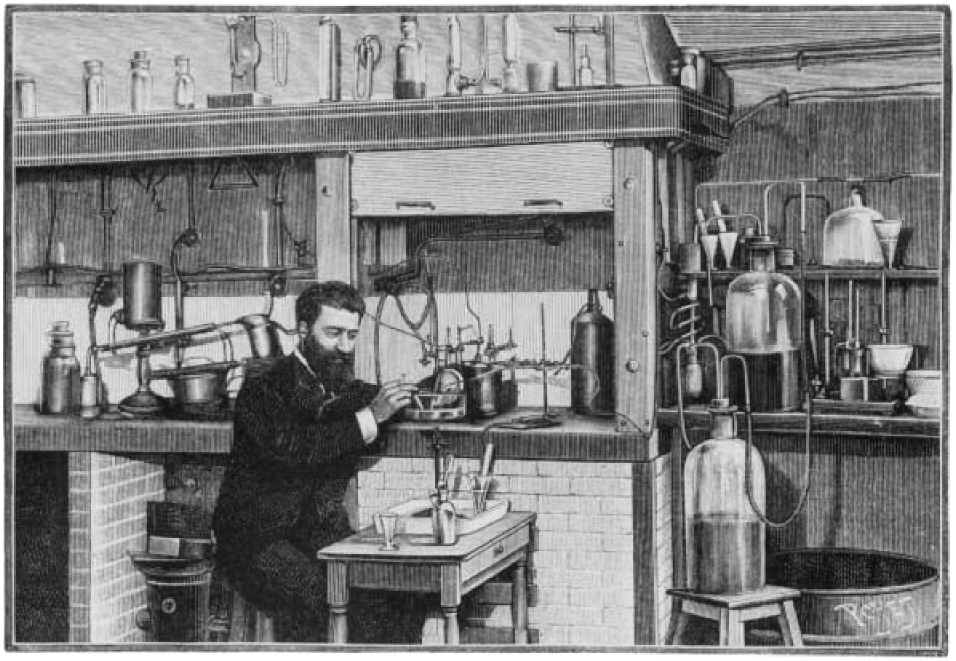

Figure 2. This illustration of Henri Moissan in his laboratory at the École supérieure de Pharmacie in Paris was published in the journal *La Nature* in February 1890. The picture is reprinted with permission from the Deutsches Museum in Munich.

high pressures generated in the interior, have caused amorphous carbon to crystallize in the form of diamond. Nevertheless, he failed even at the 1500 °C temperature of an oxyhydrogen torch to induce sufficient carbon to dissolve in his molten iron. The only logical course of action seemed to be increasing the temperature of the melt. To this end he developed a simple, but extremely successful, device: Moissan's high-temperature kiln (Figure 3). Even before Moissan, attempts had been made—initially with only modest success—to take industrial advantage of the energy released by Siemens' and Edison's electric generators. But it was Moissan who first succeeded in harnessing the high temperatures associated with an electric arc for use on a laboratory scale in scientific ex-

leather or rubber apron. German visitors found it strange that he never—even while carrying out chemical experiments—removed the leather sash of the Legion of Honor.[11] This outfit was crowned by a once noble—but now worn out and dirty—medium-high, round cap, which conferred an oriental look upon his remarkable southern French looking head with its shaggy, bifurcated full beard.[10]

Moissan's Pursuit of a Way to Make Diamonds

Scientists enjoy trying to convince the public that their research is always conducted in an absolutely rational way and subject only to the laws of the strictest logic. However, even the brains of researchers are plagued by will-o'-the-wisp irrational yearnings for recognition and wealth. Moissan's fluorine chemistry seduced him to partake of an academic fad of his day: the quest for a diamond synthesis, a way of preparing artificial diamonds. One of his chemical triumphs had been the synthesis of the unstable fluorocarbon CF_4. Shouldn't this material, under extreme reaction conditions, be capable of undergoing explosive decomposition to crystalline carbon, namely, diamond? The only things Moissan managed to harvest in this way, however, were soot and shattered apparatus. However, at the same time he contracted a passion for the hunt.[12]

In 1891 a nickel–iron meteorite was discovered in Devil's Canyon in Arizona, and it was alleged that it contained diamonds. Moissan managed to acquire a fragment of this meteorite and actually succeeded in confirming the presence of diamonds, although the largest was only 0.7 mm across. The chemist in him thereupon constructed a theory. The cooling of a very hot sample of carbon-containing molten iron, essentially a solution of carbon in liquid iron, must, because of the

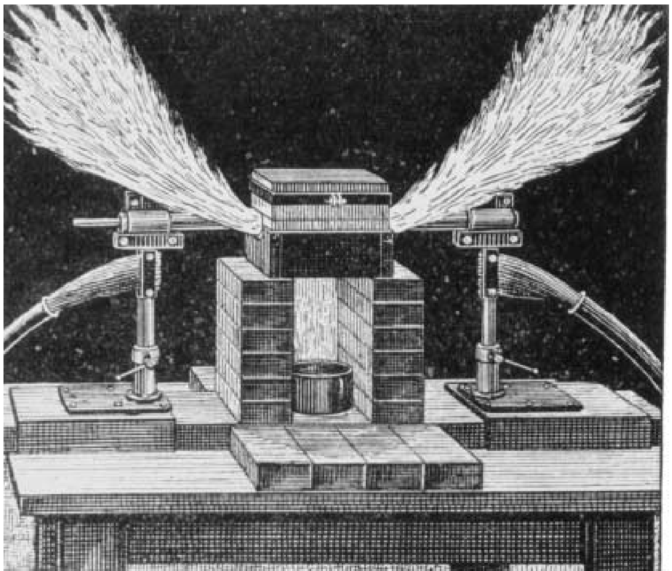

Figure 3. In his attempts to synthesize diamonds, Moissan used an electric furnace made of limestone, in the base of which there was a cylindrical opening; the anode was hollow and contained a cylindrical channel with a diameter of 18 mm in which an iron rod could easily be moved back and forth. The oven rested on two supports, and below it there was placed an iron kettle containing a 10 cm layer of mercury and a layer of water twice that deep. Moissan directed an electrical current of 1000 amps and 60 volts to this oven, and when the appropriate temperature had been reached, that is, when the lime began to distil, the iron rod was slowly pushed forward. As the metal approached the arc it melted, became saturated with carbon, and fell in the form of drops out of the oven, through the water, and into the mercury, where they cooled. This granulated mass, now floating on the surface of the mercury, contained numerous flattened ellipsoids displaying considerable regularity in form and a completely homogeneous character, but with a maximum diameter of 1 cm. From these Moissan was able to isolate transparent diamonds in the form of very tiny crystals 0.016 mm in length (see ref. [10]).

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perimentation, thereby opening the way to new lines of research.

Moissan's "Four Électrique"

Moissan first demonstrated his famous "four électrique" at the Académie des Sciences on 12 December 1892. Inside it there was a small combustion chamber with walls constructed from firebricks, within which an electric arc could be struck between two adjustable carbon electrodes to give temperatures between 2000 and 3500 °C depending on the current applied. This device, powered by a large generator built by Edison, permitted Moissan to make a number of singular discoveries, which led to his being regarded as the founder of high-temperature chemistry. Thus, he managed to evaporate materials that previously had been considered incapable even of melting. Several elements heretofore classified as heat-resistant or refractory were found at arc temperatures to undergo reactions with oxygen. Moissan vaporized silicon, copper, silver, nickel, cobalt, manganese, iron, uranium, gold, and the platinum metals, and he also developed the technique of preparing ultrapure metals by distillation.[13]

The Triumphal March of Chromium

Moissan worked especially diligently on the production of chromium, which through his work was transformed from a laboratory curiosity into a commercially exploitable raw material,[14] the senseless mass incorporation of which into jewelery and furniture (later also automobiles) elevated it by the mid-20th century to the stature of a typical guide fossil for everyday culture. It was Lalique who had the remarkable brainstorm to devise artistic etched glass ornamentation for automobiles.[15] This particular innovation failed to make a significant impact—for obvious reasons!—but starting in the 1930s decorative chrome-plated radiator emblems such as the veil-waving "Emily" of Rolls-Royce and the trademark Mercedes star acquired the status of cherished collector's items (the earliest examples were instead plated with nickel). Chrome-plated steel-tube furniture evolved into a symbol of modern living in the 1940s.[16]

Acetylene: A New Source of Light

Despite the inventive genius of men such as Edison, it proved difficult at first to build any substantial market for electric current. The light output provided by the first bulbs was too meager, and the bulbs themselves were too fragile and had too short a lifetime. For this reason, two additional discoveries by Moissan attained enormous significance. In 1892 he observed the formation of calcium carbide in his oven, and he quickly recognized that he had encountered a new class of chemical compounds. In order to obtain pure, homogeneous calcium carbide (CaC_2), Moissan in 1894 heated an intimate mixture containing 12 parts marble lime and 7 parts sugar charcoal for 15 minutes in a carbon crucible in his electric oven, with a current of 1000 amperes at 60 volts. Further experimentation over the course of many years enabled him to extend the procedure to use ordinary commercial quarried limestone and coal directly from the mine.[17]

Among the host of chemical reactions he found calcium carbide to undergo, one promised to be especially interesting from a commercial standpoint: treatment of CaC_2 with water, which led to calcium hydroxide with the evolution of pure acetylene. The latter was found to burn with a bright, luminous flame.[18] This finding initiated a triumphal journey to find a new source of illumination. Electric current could be used in an electrochemical facility to produce calcium carbide and acetylene, two commodities that in those days were more readily transportable than electricity itself. Acetylene lighting gained rapid acceptance, especially for automobiles, which, like the earlier carriages, were initially illuminated using thick candles.[19]

Marcel Proust[20] created an oft-cited monument to this marvelously brilliant illuminating gas in 1907 in his essay "Days in an Automobile,"[21] even though in this context the significance of acetylene had never previously been acknowledged. The author had rented a car from the firm Taximètres Unic de Monaco, operated by his friend Jacques Bizet, a son of the composer, which he allowed his own chauffeur to drive. In the course of an evening visit at Château Glisolle, the hostess invited him to come the next morning in daylight to see her famous rose garden. Instead, Proust told his chauffeur immediately to light the lamps in his car. From a photograph we know that this awe-inspiring heavy vehicle was equipped with four massive, detachable acetylene lamps.[22] Thus, the Marquise de Clermont-Tonnerre was probably the first knowingly to observe her roses by artificial illumination, and she was delighted. "They looked like beauties one has awakened from their sleep," she wrote.[23]

In another excursion with his taxi, Proust arrived at his destination, the Cathedral of Notre Dame in Lisieux, only after nightfall, a consequence of an untimely breakdown. Despite the darkness, he attempted nevertheless to view the famous stone seedling forest of the cathedral's entry portal. "But as I was feeling my way forward, it was suddenly flooded with brightness; trunk by trunk, columns emerged out of the darkness, and from the background shadows there appeared in full light the generous modeling of the stony leaves. It was my chauffeur, the imaginative Agostinelli, who conferred upon these ancient sculptures a greeting from the present, an illumination that only permitted lessons from the past to be read more precisely. Once he realized what it was I wanted to see, he pointed the car's headlights at all the various segments of the portal, one after another."[24]

It must be noted, however, that working with such acetylene lamps was not easy. First, carbide needed to be introduced, and the flow of water had to be regulated. In wind and bad weather it could be difficult to light the flame, even with the aid of storm matches. If too much unburned acetylene were already present, the was a high risk that an explosive flame would result. The resulting heat often caused windows and lenses of the lamps to burst. After use, it was necessary that one cleaned such a burner with a steel brush, removed the calcium hydroxide solution, and much more. Acetylene devices for the illumination of rural ballrooms had a disturbing habit of suddenly exploding. It is thus no wonder

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that in the late 1920s it was electric lighting that ultimately displaced all competitors.

The Engineer Lemoine and the Diamond Affair

In fact, Moissan actually did manage to synthesize diamonds in his oven.[25] Unfortunatelly, they remained as small as their precursors from Devil's Canyon. Nevertheless, Moissan acquired a great deal of fame. In 1906 he became the first Frenchman to be awarded the Nobel Prize in chemistry. However, his chemical activities with the aggressive gas fluorine had undermined his health. Aged and weakened prematurely, he succumbed a year after the Nobel Prize ceremony to a rather mild inflammation of the appendix. He was thus able to experience only from the sidelines how his diamond procedure figured in one of the most sensational swindles of the day, thereby acquiring a certain measure of fame.[26]

This swindle which involved the engineer Lemoine, who was allegedly one of Moissan's assistants, together with his supposed discovery of a method for preparing large artificial diamonds also had its effects on Marcel Proust. In fact it cost Proust a significant share of his wealth, so it is not surprising that he was tempted to exploit the scandal related to the synthetic diamond process in a literary way. "One evening I selected this rather meaningless legal affaire, which at the time nevertheless aroused so much public opinion, as a general theme for a series of prose pieces. Here my intent was to try to imitate the styles and manners of a certain number of other authors." Thus did Proust express himself with some understatement in 1919 in the preface to the book edition of "Pastiches et Mélanges."[27] These "pastiches" (derived from the Italian *pasticcio* (pastry) and employed in French in the sense of parody) consisted of a series of nine precious examinations of the Lemoine Affair, each composed in the style of one of Proust's great and revered predecessors, examples, and sources of inspiration: Balzac, Flaubert, the man of letters and critic Sainte-Beuve, the poet Régnier, Edmond de Goncourt, the historian Michelet, the critic Faguet, Ernest Renan, and Duke Saint-Simon. The set of parodies first appeared in the literature supplement to *Le Figaro* in 1908. These pastiches were eminently significant in Proust's development into a great novelist. He "found himself" as an unbridled stylist for the first time in the course of this literary jest. "For me, the whole thing was a matter of hygiene," he admitted to a friend surprisingly drastically in 1919, "one must purge oneself of the natural burden of mimicking."[28]

The Diamond Maker Lemoine

Back to the chemical and historical background to the affair: In the summer of 1905 the engineer Henri François Lemoine met together with Sir Julius Charles Wernher, president of the company De Beers. De Beers Consolidated Mines Ltd., founded in 1880 by Cecil Rhodes in Kimberley, South Africa, retains even today a near monopoly position in the international diamond market. Lemoine contended that he had improved the Moissan process, which until then had produced only diamond dust. Unfortunately, for further development of his apparatus and the production of significantly larger diamonds, he needed additional capital. Sir Julius and Lemoine met in the basement of a Paris department store. Presumably this was the site of a generator capable of providing the necessary high level of electric current. Much to Wernher's surprise, Lemoine carried out his experiment in the nude—as proof that he wasn't hiding any diamonds on his person. He introduced his reaction mixture into a large Moissan electric furnace, and when he removed the formless mass somewhat later it was found indeed to contain 25 relatively large diamonds![29] One must of course bear in mind that the value of a diamond increases far more than proportionately as its carat count rises.[30]

The stones were genuine. The De Beers people were worried that some competitor might license this process and thereby break their monopoly. Consequently, a contract was signed with Lemoine according to which he would place a sealed copy of the process in the vault of a London bank, to be opened only in the event of his death. In exchange, a laboratory was outfitted at Argelès in the Pyrenees, perhaps because it was assumed that enough water power would be available there to run the generator, but it may also have been regarded as a secure location with respect to curious spies. Lemoine submitted huge expense reports to De Beers, culminating in one for more than £64000—roughly half a million Euros in present-day terms. Gradually the company became suspicious. Secret inquiry revealed that Lemoine was primarily engaged in running a generating plant and selling electricity. This prosaic activity seemed singularly inconsistent with the secretive flair of a diamond maker. It was agreed that another demonstration experiment should be carried out in the presence of an especially shrewd manager from De Beers. The latter flicked into the oven, immediately before the current was switched on, a small South African diamond that he had concealed in his hand. According to Lemoine—who was an engineer, not a chemist—the oven temperature was so high that a normal diamond, in contrast to a synthetic one, would decompose to ash. However, when Lemoine's back was turned, the manager fished his original diamond out once again. It had survived the heat untouched. The De Beers manager thus came to the conclusion that his company was the victim of an out-and-out swindle.

Lemoine was arrested and taken to court. He was released later on bail, and escaped to Constantinople. Wernher managed to inspect the contents of the envelope set aside for safekeeping, which supposedly provided a description of the secret process, but it proved to be fraudulent. Lemoine in the meantime returned secretly but quite calmly to France, where he was again arrested and the trial resumed. It eventually turned out that his "process" was nothing more than sleight of hand. He had acquired some natural diamonds from De Beers through a dealer, hidden them in crevices in the oven walls, and then smuggled them into the reaction mass as he removed it from the oven. On 6 July 1909 he was sentenced to six years of hard labor for fraud.[31]

The world enjoyed a good laugh over Wernher and his company. Perhaps unjustifiably so. A rumor persisted around the stock exchanges that Wernher and De Beers had in fact

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detected the fraud very early on, in order to take such advantage of the rapidly and steeply fluctuating stock values during the four-year affair and trial that the millions squandered by Lemoine in the Pyrenees would be insignificant. The fact is, that among the stockholders who lost a bundle in this speculative venture was Proust. He was actually related to successful stockbrokers on his mother's side of the family, who had left him an impressive legacy, but—consistent with the old saying that the third generation loses what the first generation earns—the writer had apparently not inherited the family mercantile skills.

Proust with Others' Pens

For Proust, confronting the literary styles of those who were to serve as his models was of course more important than chemical principles underlying the scandal described above. Nevertheless, the first pastiche, in the style of Honoré de Balzac,[32] provides insight into the low regard in which the natural sciences were—and perhaps still are—held by the upper reaches of society. In the world of Balzac, chemical knowledge would not be viewed with disgust exactly, but it certainly was not something one chose to display: "'Madame, the secret of producing diamonds has just been discovered.' … 'But I would have thought people had always made some,' replied Léontine naively. As a lady of taste, Madame de Cadignan was careful not to make any comment, where ladies of the middle class would have plunged right into the conversation as a way of bragging in the silliest way about their chemical knowledge."[33]

The ironic pastiche in the style of the famed diaries of Edmond de Goncourt[34] is especially imaginative, a work in which Proust actually brings himself into the scene: "21 December 1907" … And in the course of dessert, Lucien (Daudet, a friend of Proust) tossed out to us the fact … that a certain Lemoine had discovered the secret of making diamonds. In view of the potential loss in value of stocks of unsold diamonds, a single raging agitation held sway in the business world, eventually infecting the judicial system as well, which might have led to this Lemoine's having spent the rest of his days in some dungeon for having offended the brotherhood of jewelers."[35] Proust's fictitious Edmond de Goncourt—the real one had been dead twelve years when this pastiche was devised—decides to write a theatrical work based on this singular situation. Goncourt's somewhat prickly vanity was captured in a delightful way: "As a final bouquet, Lucien brings the news that provides me with the solution for the previously sketched piece: her friend Marcel Proust has committed suicide as a consequence of the slump in diamond prices, a slump that has destroyed part of his fortune. 'A remarkable being, this Marcel Proust,' observed Lucien, 'a man who should live in complete ecstasy, in the sacral trashing of certain landscapes … '"[36] Apparently there were moments in which Proust in true greatness was able to laugh about himself and his ecstatically described hawthorn hedge with its red and white blossoms—a typical example of the cult of entwined flowers in the Art Nouveau and Jugendstil eras—also with its "sexual odor," its "bittersweet almond scent."

But the real point of the Goncourt pastiche is yet to come. "22 December … I awake from my four o'clock nap with a premonition of bad news, because I had dreamed that the tooth that caused me so much pain five years ago when Cruet extracted it had grown back (Cruet was in truth a physician whose work in hygiene had been published by Proust's father, also a physician). And at that moment Pélagie (Goncourt's actual housekeeper) entered with this piece of news brought by Lucien Daudet, news that she had not delivered earlier so as not to disturb my nightmare. Marcel Proust had not committed suicide, Lemoine had in fact discovered absolutely nothing and was supposed to be only a conjurer, and not a particularly gifted one at that, a sort of one-armed Robert Houdin (a very famous magician of the day). That is our misfortune!"[37]

Proust presumably never imagined as he drafted this pastiche that, at the suggestion of Léon Daudet (brother of Lucien, mentioned above), he would in 1919 be awarded the "Prix Goncourt" endowed by Edmond de Goncourt. Proust's financial losses did indeed correspond to the facts. Nevertheless, it should be noted (as a consolation for the reader) that the poet salvaged enough, despite frequently recurring money problems later, to present his chauffeur and friend Alfred Agostinelli in 1914 with an airplane worth 27000 Francs. But Agostinelli died in a crash before he was able to take possession of the gift—the fuselage of which was inscribed with Mallarmé's sonnet "The Swan."[38]

In another pastiche, "VIII. By Ernest Renan", Proust offers a prophecy: "Patience, mankind, patience! Fire up again tomorrow the furnace that has already been extinguished a thousand times, the furnace from which a diamond may someday emerge! In high spirits perfect that crucible in which you will be able to raise carbon to temperatures unknown to Lemoine and Berthelot, so that eternity may envy you."[39] Actually, Moissan's name belongs here rather than Berthelot's. However, Marcelin Berthelot (1827–1907),[40] arguably the greatest French chemist of that era, was a close friend of Ernest Renan, a student of religious history and economics. Berthelot was among the regular guests at the salon of Princess Mathilde Bonaparte, a cousin of Napoleon III,[41] as was Proust himself at a later date. Here Berthelot advised the Goncourt brothers,[42] as he also did Flaubert concerning chemical matters, particularly with respect to Flaubert's last novel: "Bouvard et Pécuchet".[43]

It should be noted here that Proust's prediction proved not quite accurate. An increase in pressure, not temperature, ultimately provided the crucial breakthrough in synthesizing diamonds by the Moissan approach. It was not until 1953 that the Swedish firm Almanna Svenska Elektriska Aktiebolaget successfully synthesized diamonds in molten metal at 2760 °C and 90000 atü, a feat also later accomplished by a group from General Electric at 100000 atü. Both processes were bought up by De Beers and merged with the company's own research efforts into Ultra High Pressure United Inc. It is now possible to prepare diamond crystals several centimeters in size in this way.[44]

In the hope that something like a great beyond exists, from which one is enabled to look down upon this world, and in view of Proust's complicated aestheticism, there may be reason to take special note of the claim on the part of De Beers that synthetic diamonds are used only for technological purposes (for example, in saws, drills, and milling machines for rocks and minerals), and that the only diamonds cut for the jewelry market are natural stones.

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[1] G. Flaubert, *Wörterbuch der Gemeinplätze. debatte 12*, Matthes & Seitz, München, **1985**, p. 41.
[2] G. Flaubert, *Ivan Turgenev. Briefwechsel 1863–1880*, Friedenauer Presse, Berlin, **1989**, p. 63. See also: Flaubert to Louise Colet, 22 November 1852; 20 June 1853, and 29 January 1854; included in: G. Flaubert, *Die Briefe an Louise Colet*, Haffmanns, Zürich, **1995**, pp. 549, 714, and 918.
[3] J.-B. Naudin, A. Borrel, A. Senderens, *Zu Gast bei Marcel Proust. Der große Romancier als Gourmet*, 4th ed., Wilhelm Heyne, München, **1992**, the chapter "Der Wohlgeschmack der Kindheit", p. 15.
[4] M. Proust in *Auf der Suche nach der verlorenen Zeit 3. Guermantes. Frankfurter Ausgabe* (Ed.: L. Keller), Werke II, Bd. III, Suhrkamp, Frankfurt am Main, **1996**, p. 551.
[5] M. Proust in *Essays, Chroniken und andere Schriften. Frankfurter Ausgabe* (Ed.: L. Keller), Werke I, Bd. 3, pp. 192, 287, and 582. Based on the chapter "Orfèvre et verrier—Gallé et Lalique" in R. Comte de Montesquiou-Fezensac, *Les Roseaux pensants*, Paris, **1897**.
[6] J. Bersch, *Chemisch-technisches Lexikon*, 3rd ed., A. Hartleben's, Wien and Leipzig, no date, p. 55. For the complex history of the discovery of techniques for etching glass, see "Aus der Kindheit des Glasätzens. Die Glashütte": O. Vogel, *Das Emaillierwerk* **1942**, *72*, 37–42; "Neue Aspekte zur Entdeckung des Ätzens von Glas": H. Cassebaum, *Silikattechnik* **1983**, *34*, 213–214.
[7] With respect to the difficulties, see "Arbeiter- und Nachbarschutz in Glasätzereien": Gutmann, *Glastech. Ber.* **1926**, *4*, 394–395. For an illustration of the breadth of application of this technique, see "Beitrag zur Eisblumierung": H. Freytag, *Glastech. Ber.* **1942**, *20*, 71–75.
[8] a) G. Fahr-Becker, *Jugendstil*, Könemann, Köln, no date, for example, p. 146; b) J. P. Midant, *L'Art Nouveau. Jugendstil in Frankreich*, ECO, Köln/Eltville am Rhein, **1999**. Especially attractive examples: c) F. Borsi, E. Godoli, *Pariser Bauten der Jahrhundertwende. Architektur und Design der französischen Metropole um 1900*, Nikol, Hamburg, no date. Regarding etched window panes in the Parisian street scene: d) E. Atget, *Paris 1857–1927* (Ed.: H. C. Adam), Benedikt, Köln, **2000**. Particularly fine examples among those included here: Café à l'Homme Armée, p. 169; e) E. Atget, *Paris*, Schirmer/Mosel, München, **1998**; f) R. Toman, G. Zugmann, A. Bednorz, *Wien. Kunst und Architektur*, Könemann, Köln, **1999**. Otto Wagner Hauptpavillon der Stadtbahn, p. 283. Numerous examples in: g) P. Roberts-Jones, *Brüssel. Fin de Sie̊cle, EVERGREEN*, Benedikt, Köln, **1999**.
[9] J. R. Partington, *A History of Chemistry*, *Vol. 4*, MacMillan, London, **1964**, p. 911.
[10] a) "Zur Erinnerung an Henri Moissan": A. Gutbier, *Sitzungsber. Phys.-Med. Soz. Erlangen* **1907**, *39*, 298–560. b) "Das Leben und Wirken Henri Moissans": A. Gutbier, *Verhandlungen des Vereins zur Beförderung des Gewerbefleißes* **1910**, *89*, 95–130.
[11] See ref. [9], p. 912.
[12] A. Alter, P. Testard-Vaillant, *Guide du Paris Savant*, Edition Belin, Paris, **2000**, p. 230.
[13] K. Hoffmann, *Glitzerndes Geheimnis. Gauner, Gaukler, Gelehrte und Großmachtpolitiker. Ein Kriminalreport über parawissenschaftliche Hochstapeleien*, Urania, Leipzig, Jena, Berlin, **1988**, p. 88 and ref. [16].
[14] H. Moisson, *Le Four e̊lectrique*, Paris, **1897** and ref. [10].
[15] René Lalique often attempted to combine his glass artistry with the most modern techniques of the times. Thus, in 1929 he outfitted the Cote d'Azur Pullmann Express cars of the famous Train Bleu, Paris–Nice with tryptiches that depicted bacchants through the application of etching and cutting techniques on white matte glass: Jean de Cars u. Caracalla, *Train Bleu und die großen Riviera-Expresszüge*, *Edition Denoel Paris*, Orell Füssli, Zürich und Wiesbaden, **1989**, pp. 78, 86, and 87.
[16] J. Fiedler, P. Feierabend, *Bauhaus*, Könemann, Köln, **1999**, pp. 320, 329. See also: C. Fiell, P. Fiell, *Design des 20.Jahrhunderts*, Benedikt, Köln, **2000**. For an example related to the keyword International Style, see p. 344.
[17] See ref. [10] as well as ref. [9], p. 913.
[18] Ref. [10a], p. 410.
[19] Ref. [9], p. 920.
[20] Concerning Proust's life in general: a) R. Hayman, *Marcel Proust. Die Geschichte seines Lebens*, Insel, Frankfurt am Main and Leipzig, **2000**. b) R. Wiggershaus, *Proust. Leben und Werk in Bildern. insel taschenbuch 1348*, Insel, Frankfurt am Main and Leipzig, **1992**. c) A. de Botton, *Wie Proust Ihr Leben verändern kann. Eine Anleitung. Fischer Taschenbuch 13734*, Fischer, Frankfurt am Main, **2000**.
[21] The complete title is: Marcel Proust, *Zum Gedenken an die gemordeten Kirchen, I. Die geretteten Kirchen. Die Kirchtürme von Caen. Die Kathedrale von Lisieux. Tage im Automobil.* ref. [29], pp. 87–95, 335.
[22] N. Beauthéac, F.-X. Bouchart, *Auf den Spuren von Marcel Proust. Normandie, Ile de France, Genfer See*, Gerstenberg, Hildesheim, **1999**, p. 108. Regarding the problems associated with acetylene illumination for automobiles of the day: a) A. Stukenbrok Einbeck, *Illustrierter Hauptkatalog 1912*, Nachdruck, Olms, Hildesheim, **1979**, pp. 22–29. b) A. Stukenbrok Einbeck, *Illustrierter Hauptkatalog 1926*, Nachdruck, Olms, Hildesheim, **2000**, pp. 36–40.
[23] See ref. [20a], p. 334.
[24] See ref. [21], p. 91.
[25] See ref. [10a], p. 473.
[26] S. Kanfer, *Das Diamanten-Imperium. Aufstieg und Macht der Dynastie Oppenheimer*, Carl Hanser, München, Wien, **1994**. See the chapter: "Gespenster, Gaunereien und Satjagraha", p. 211 as well as ref. [20], p. 88.
[27] See ref. [29], p. 11.
[28] See ref. [29], p. 306.
[29] See ref. [39], p. 219.
[30] *Le Diamant. Mythe-Magie-Realité* (Ed.: R. Maillard), Flammarion, Paris, **1979**, p. 192. See also: *Diamanten, Faszination, Mythos und Technik* (Ed.: C. Weise), München, **1994**.
[31] See ref. [13], p. 222.
[32] See ref. [18], p. 11.
[33] See ref. [18], p. 16.
[34] See ref. [18], p. 34.
[35] See ref. [18], p. 35.
[36] See ref. [18], p. 35.
[37] See ref. [18], p. 37.
[38] P. Michel-Thiriet, *Das Marcel Proust Lexikon*, *suhrkamp taschenbuch 3049*, Suhrkamp, Frankfurt am Main, **1999**, p. 37.
[39] see ref. [18], p. 51.
[40] a) J. Jacques, *Berthelot. Autopsie d'un mythe. Un savant*, *un époque*, Belin, Paris, **1987**. b) D. Langlois, *Berthelot. Un savant engagé*, J. C. Lattüés, no location, **2000**.
[41] J. des Cars, *La Princesse Mathilde. L'amour*, *la gloire et les arts*, Librairie Académique Perrin, no location, **1996**.
[42] See the in-part word-for-word agreement in the characterization of chemistry by Berthelot on 5 December 1873 "Devant le feu … de fumoir chez la Princesse …" in E. de Goncourt, J. de Goncourt, *Journal. Mémoire de la vie littéraire. II. 1866–1886. Robert Lafont*, Fasquelle and Flammarion, Paris, **1956**, pp. 556, 557, on the one hand, and a scene from "Juliette Faustin" in: E. de Goncourt, *Die Brüder Zemgano. Juliette Faustin. Zwei Romane*, Dieterich'sche Verlagsbuchhandlung, Leipzig, **1989**, p. 298.
[43] It greatly displeased Flaubert when Berthelot was subjected to public attack. See: Flaubert's letter to Maupassant of 23 July 1876 in G. Flaubert, *Der Briefwechsel mit Guy de Maupassant*, Haffmans, Zürich, **1997**. In addition, the frequently common references to Berthelot and Flaubert in the journals of the Goncourt brothers as well as Flaubert's delightful description of a disastrous explosion in a chemical laboratory: G. Flaubert, *Bouvard und Pécuchet. insel taschenbuch 373*, Insel, Frankfurt am Main, **1979**, pp. 101, 102.
[44] a) "Juwelen aus der Retorte": K. Bachmann in *Geo. Das Neue Bild der Erde* **2000**, *7*, 88–106. b) G. van der Schrick, *Le diamant synthétique et le diamant industriel*, ref. [43], p. 276.

