Rediscovery of the Elements

VISITING THE LAND OF THE CURIES.

Part 2. Inside the Museum



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In the 2001 Spring issue of *The Hexagon of Alpha Chi Sigma,* the first issue of the Rediscovery of the Elements series appeared, and since then 57 articles appeared to cover the entire project, culminating in the 2016 Summer issue, shortly after the unfortunate passing of Jenny in 2014. These articles can be found on the Rediscovery website: www.chem.unt.edu/~jimm/REDISCOVERY

Many curious readers have queried, "Why did you take on this grand project? What was it like to actually be the first to revisit all of these sites of discovery of the elements?" In an attempt to answer these questions, a new series of articles have been written, starting in 2017. So far, 14 articles have appeared (these may be found at alphachisigmahexagon.com). Within this new series, a critically important site has been Paris, which was, among other things, the location of Lavoisier's revolutionary studies recognizing the true elements.

This is a continuation of the previous Rediscovery article, visiting the Curie Museum (Summer 2022 issue). Because of the city-wide strike of all transportation, Jenny and I had walked 8 kilometers from our lodgings to visit the Curie Museum in the Latin Quarter, wondering if the museum also might be closed.



Figure 1. The Curie pavilion (former Radium Institute) now holds the Musée Curie on the ground floor.

We mounted the stone steps to the museum door of the Curie Museum (Figure 1). "Here's hoping," said Jenny. She turned the door knob. It rotated, then opened. "Whew!"

We walked up to the desk where a prim lady in a black suit was seated.

"Bonjour!" we chorused.

"Bonjour," she responded.

"Nous sommes James et Jenny Marshall, de le Université de Nord Texas."

She took off her reading glasses and opened her eyes wide. "What??! "We didn't expect you at all!" … "Because of the strike. How did you get here?"

"We walked."

"Mon Dieu!" She got up and walked around the desk to shake my hand. "You walked from where?"

"Rue de Clichy, la Fourche."

"Merveilleux! Very impressive!" With a smile, "I am Barbara. We are so glad to see you!"

Barbara turned to another lady by the book shelves, "Lucille, Monsieur et Madame Marshall des États-Unis, ils sont arrivés. Ils ont marché à pied de Clichy."

Lucille, a middle-aged blonde in a smart red suit, came over and shook our hands. "You walked all the way from the 17th Arrondissement? Very impressive!" With a wry smile, "I didn't know that Americans could walk so far."

I grinned, understanding the light humor. Jenny gushed, "We couldn't take the Metro, so we walked the streets. But we saw so much we wouldn't have seen if we were underground… And I wanted to come so much!"

"Well, we can make it worth your while! You certainly deserve a reward! Please, come with me. Let me show you something." She opened a drawer and pulled out a dark blue smock. "This is Madame Curie's laboratory gown. She had two like it. They're very old. If you wish, you



Figure 2. Jenny holds the smock worn by Madame Curie.

may hold it up, and Monsieur can take a photograph of you."

"Oh!" Jenny squealed, and her eyes misted up. She took the plain cotton fabric garment and held it delicately, reverently, in her hands. Then she unfurled it and held it up against her own body. "She was tiny, like me!" (Figure 2)

"Two scientists, both pretty," said Barbara, with a pleasant smile. "That's the first time I've allowed anyone to hold it," said Lucille. "But you seemed to be special. I think you have Marie Curie in your heart."

"Oh, thank you, thank you!"

"I can't believe our luck," I whispered to Jenny.

She looked directly at me with her big brown eyes, "It wasn't luck!"

"You're right. All this is because of the strike. Paulo Coelho was right when he said that if you wanted something badly enough, the universe would conspire to make it so."

"And here is Julie," said Barbara. A young student-type had arrived, black flowing hair and black horn-rimmed glasses, casually dressed with jeans and a red sweatshirt advertising "Université de Paris."

"Julie has little to do today, since nobody showed up. After she shows you around the museum, I am sure she has time to take you on a special tour around the Latin quarter, if you wish. She can tell you all about Madame Curie."

Julie inspected us with a critical eye. "So you are from America." She spread a map on the desk. "Attendez. Marie Curie was a most brilliant scientist. Probably the most important scientist in Paris. I can take you to the following places." She glanced at her watch, "We have plenty of time yet today." She bent over the map and pointed, "Here is the Latin Quarter. And here we are in the Musée Curie. And over here is site of their original laboratory, which is at the École supérieure de physique et chemie industrielles, a 5-minute walk from here. That is where they discovered radium and polonium. They have the original laboratory equipment there that they used to discover radium and polonium. Some of the equipment is still radioactive, so we cannot spend much time there. Très dangereux."

She then moved her finger to another spot on the map. "Then I can take you to her new laboratory, after Pierre was killed, on Rue Cuvier. That is where she prepared weighable amounts of radium. And then, across the street, in the Jardin des Plantes—the old Jardin du Roi, where the King gathered plants from around the world to discover new naturally occurring medicines—is where Beequerel discovered radioactivity in his physics laboratory. Becquerel's laboratory was right here," pointing to a building just across Rue Cuvier. "You may know he called the Curies over to observe this new phenomenon. …The Curies came to understand just what this phenomenon was—not storing the sun's energy, as Becquerel originally thought, but a special, almost magical life of the atoms. In fact, she created the word radioactivité. She looked up at Jenny, who nodded vigorously, "Yes, yes! I have read many books on Marie Curie."

Being trained by years in the academic world to be scientifically correct, I had impulse to comment, but I only whispered to Jenny, "But the Curies really didn't understand what radioactivity was, but Ernest Rutherford in Manchester, England, did—he was the first to realize these were actually exploding atoms" — but I had learned earlier that when someone is telling you that her countryman made an important discovery, you never tell them they didn't tell the whole story. That would have cut off the spigot of rich information flowing from this cornucopia of Gallic history.

Julie's finger moved across the Jardin des Plantes to another spot, "And here is the amphitheater, where Rouelle did his demonstrations. He was the instructor, you know, who taught and inspired Antoine Lavoisier." Here Jenny was nodding, "He was the father of modern chemistry, I read."

I monotoned in my theatrical voice I used in lectures, "'La chimie est une science française. Elle fut constituée par Lavoisier d'immortelle mémoire.'"

Julie stood up straight, surprised. "Yes! Where did you hear that?"



Figure 3. The laboratory of Madame Curie and Marguerite Perey in the Musée Curie.

"Charles Adolphe Wurtz; he prepared the first sample of metallic gallium in Paris—named, of course, from the historic Latin word for France."

Julie said, "Oui, c'est vrai! Tres bon!" She bent back to the map and pointed again. "We can then visit the Sorbonne, where Marie Curie became professor. We can see the large auditorium there with the famous murals." Then moving her finger again, "But we start here, this building. This is where Marie had her last laboratory."

Julie then pointed to rooms adjacent to us in the museum, "And here, in this building, was Madame Curie's office, and in an adjacent laboratory is where Marguerite Perey, one of her students, discovered the element francium in 1939. And her daughter and her husband (Irène and Frédéric Joliot-Curie) continued many of studies of radioactivity."

She folded up the map. "And Monsieur, you seem to admire Madam Curie, would you like to sit in her chair? It's right there, beside the desk. Madam can take a picture of you in it." (Figure 3)

I sat and Jenny pushed the button on her camera. Click, whirrrrrrrr. . . .

"What's that noise?" asked Julie. "Is your camera broken?"

"It's a digital camera. It's recording on floppy disks. That's the motor sound you hear, of the disk rotating."

"Before we leave the museum, let me show you, let me show you around our museum." (Figures 4–5)

Touring the Latin quarter. After taking us about the museum and describing the various exhibits, Julie said: "OK, time for a walk about the neighborhood. Are you ready?"

"Yes!" Jenny and I said together. Jenny whispered to me, "You mean she was serious? She's going to take us on a grand tour to see all these places she was talking about?"

"Apparently so… Incredible, isn't it?"

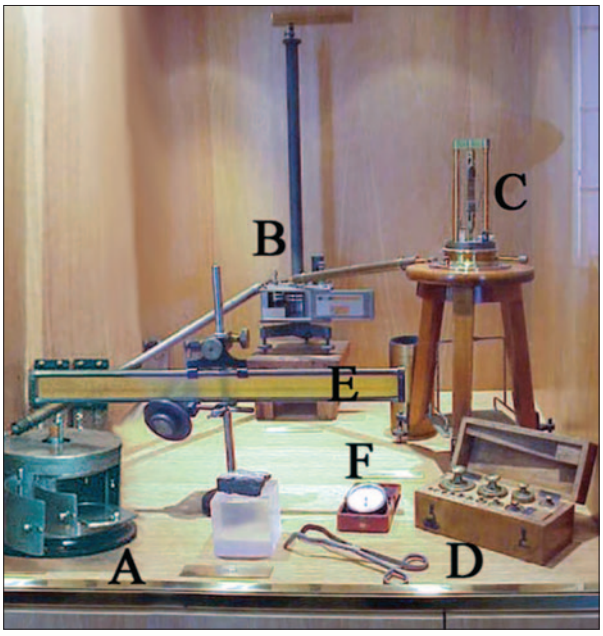


Figure 4. The original device of the Curies to measure radioactivity. A = ionization chamber; B = electrometer; C = piezoelectric quartz; D = weights; E = screen; F = chronometer. The piezoelectric effect—the electric charge created by pressure on a crystal—was discovered by Pierre and his brother Jacques and was calibrated in terms of the radioactivity of the sample. (The Geiger counter was not invented until 1908, 10 years after the discovery of radium and polonium).



Figure 6. The laboratory of the Curies (1903–1913), where radium was fully characterized after the original discovery of the element (Pierre Curie died in 1906. In 1914, Marie moved to the Radium Institute).



Figure 5. The original notes of the Curies are still radioactive (verified detected by the authors' Geiger portable counter, which they always carried during their travels).



Figure 8. The municipal school of physical and chemical industry, where radium and polonium were discovered in 1898 by the Curies.



Figure 7. Maison de Cuvier in the Jardin du Roi, where Henri Becquerel discovered radioactivity in 1896, inspiring Madame Curie to pursue her studies of this new phenomenon.



Figure 9. The "shed" was the laboratory where radium and polonium were discovered. It has since been removed because of radioactive contamination. Its location is identified by the white lines at this site beside the school, now a motorcycle parking area.



Figure 10. Appearance of the "shed" used by the Curies (1899–1904). The "shed" was formerly a dissection room for medical students.

(continued . . .)

We all marched off together, to spend the whole day in the Latin Quarter, tracing the history of Madame Curie, visiting all of her sites—and with a free lunch thrown in as well. What a day! (See Figures Figures 6–12).

Much later: back to our apartment. It was nine o'clock, but still light. Jenny and I limped back to Rue de Clichy—exhausted, but happy. We entered the apartment and tumbled into bed.

"And now I know why there was a strike today," said Jenny.

"Spooky, isn't it? Almost providential."

"I've got so many pictures!"

"We saw so many things today that few people even know about…and we were told so many things that I don't think has been chronicled anywhere."

Jenny said, "It's working. Our project is working."

Silence, darkness. Just the tick-tock of the grandfather clock in the next room.

"Jimmy?"

"Mmmmmmmm."

"Who was Wurtz?"

"Mmmmmm? Oh, Charles Adolphe Wurtz. French chemist. Got an organic reaction named for him. Reacted organic radicals together to make bigger molecules. Born in Strasbourg, disputed territory for years between France and Germany. He studied in Germany, but returned to Paris for his career. Totally French, through-and-through, and chauvinistically so."

"And what was it he said about Lavoisier?"

"La chimie est une science française. Elle fut constituée par Lavoisier d'immortelle mémoire.' … It means: 'Chemistry is a French science. It was established in immortal memory of Lavoisier.' The statement, as crafted in French, makes it clear that the narrator means modern chemistry was founded in France. And in Lavoisier's time, France was arguably the center of chemistry."

"And in Germany, for example, what would you say?"

I snickered, "Oh, I'd say: 'Chemistry is a German science…It was established in immortal honor of…' Let's see?…Maybe Martin Klaproth?" (see Spring 2022 *HEXAGON*)

"Golly, no wonder Julie treated us nice. … and I gave a donation of $100 to the Curie Museum today. Is that okay?"

"Good idea. We'll always be friends with them."

"Have you forgotten about tomorrow? We're supposed to visit the Museum of Moissan and his discovery of fluorine. Do you think the Metro will be on strike tomorrow?"

"I hope not. Let's cross our fingers."

No response. All was quiet. She was already asleep.

Tick, tock, tick, tock, tick, tock. ⬡



Figure 11. Amphitheatre of Verniquet in the Jardin du Roi, where Guillaume Rouelle gave chemical demonstrations, inspiring the young Antoine Lavoisier. The gardens were renamed Jardin des Plantes after the French revolution.



Figure 12. The inside courtyard of the Sorbonne. In the distance are statues of Victor Hugo (left) and Louis Pasteur (right). The authors were fortunate to have free access to the hallways and lecture auditorium of the university—after the September 11, 2001, terrorist attacks in the U.S., entry to the university was severely restricted.