

THE PERSONALITIES OF PROFESSOR AND MADAME CURIE.

BY DANIEL BELLET.

The attention of the entire scientific world is at present directed to the grand discovery of radium and the immense domain that seems to be opening up to science from the detection of those mysterious radiations which, according to M. Curie, we may now expect to find in almost all substances, but doubtless to a much less extent than in radium. The two physicists to whom we are indebted for the discovery are attracting the notice of every one, and the more so in that they afford an example of a most interesting and touching collaboration, since it concerns a husband and wife, both of high scientific attainments, who aided one another with their efforts and knowledge in the arduous path that finally led to the production of pure radium, and the discovery of the phenomena that are now engrossing the minds of most of the physicists of the world.

Under such circumstances, it may prove of interest if we give a few details of the life of these two coadjutors, of their past, and of the manner in which they came to associate their existences, each finding in the other that love of science that forms the basis of all their labors. Let us say at the outset that what dominates the personality of these scientists is a modesty and simplicity that would amaze any one who should pay them a visit in the simple little house that they occupy in the outskirts of Paris.

Since M. Curie's name figures so prominently in all high-class scientific publications as well as in the daily press, we might expect on a visit to him to be confronted by a man alive to the importance of his labors and showing a very natural pride in the distinction conferred upon him by the award of one of the Nobel prizes, after that which had already been accorded him by the French Academy of Sciences. But, on the contrary, the man who receives us is a bashful individual who seems to be actually astonished that any one should take the trouble to come to visit him in the somewhat obscure quarter in which he dwells. This is along the fortifications of Paris, upon a boulevard which is traversed by but few pedestrians, and upon which carriages are very rarely seen, and very far back of the Observatory. The house has but a single story above the ground floor with only three windows in it. We are received in a very plainly furnished parlor, and perceive that the two occupants of the house live exclusively for science and attach but slight importance to material enjoyments, at least at present; for although one of them is a functionary of the State and the other of the city, they receive but quite a small salary, since even the most learned professors are not usually paid much in France.

Mme. Curie and her husband are two workers who have traveled life's pathway in toiling with untiring energy; and if we look backward at their career we shall perceive at every point of it that perseverance in labor which was to lead them to the renown that they now enjoy.

M. Curie is a Parisian and the son of a physician, and for this reason evidently he must early have had instilled into him a love for science; for physicians constitute a class of people in France who are distinguished by the breadth of their views and their learning. M. Curie was born in 1859, and is consequently about forty-five years old.

After M. Curie had finished his preparatory studies, he immediately began scientific researches on his own account. He states that his personal labors were begun in 1879, when he was twenty, while ordinarily a young man of that age has neither the maturity nor volition to do anything but learn. In stating this fact to me, M. Curie preserved his modest and somewhat timid demeanor, just as he did when he said to me that he had really "not many scientific titles," but was merely a licentiate and doctor of sciences.

M. Curie remained *chef de travaux* until 1895, when he was made professor of physics. But the man who had begun to make original scientific researches while he was but a simple preparator at the Sorbonne lost none of his ability.

In 1895 M. Curie was made professor of physics and chemistry, the epoch at which he met her who was to be to him not only a companion, but a valuable coadjutor, and whose personal work was even to lead M. Curie to partially abandon his researches and enter upon a new path.

Mme. Curie is a Pole. Marie Sklodowska was born at Warsaw in November, 1868, and is therefore a very young woman. She has a sweet and intelligent face, which has not become forbidding through the dry-

ness of scientific things. It must be said, indeed, that she is not only of a race, but of a family in which science and learning prove forbidding to none. Her father, Ladislas Sklodowska, was a professor and at the same time an excellent naturalist, while her mother, Bronistawa Boguska, was principal of a boarding-school. Mme. Curie, moreover, has a sister who married Doctor of Medicine Dlurski, and who is herself a physician. The two conduct a sanitarium at Zakopane in Galicia; and here again we find a scientific collaboration between husband and wife. Marie Sklodowska exhibited, even in her girlhood, a high order of intelligence, keen perceptive faculties, and a great capacity for work. She completed her ordinary studies at the age of sixteen at the gymnasium or lyceum for young ladies at Warsaw, and upon her graduation received a gold medal. At the outset, she had to live in the country, a circumstance that necessarily interfered with her studies; but afterward she went to live at Warsaw, and there found time to work in the laboratory of physics of the Industrial Museum, which was presided over by one of her relatives. Finally, in 1891, she went to Paris, where she took but two years to obtain a first licentiate's degree in the mathematical sciences. She did not yet feel satisfied, however, and two years later on, took a degree in the physical and chemical sciences. M. Pierre Curie, finding himself in the presence of a charming young girl in whom he met



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with the same love for science and the same inclination for study that he himself possessed, soon became smitten with her and finally married her.

It will be seen that two workers of this kind were made for a thorough understanding of each other and for an intimate collaboration. Mme. Curie had become professor of physics at the High School of Sevres, where her researches upon radium were the subject of a thesis that obtained for her the title of Doctor of Sciences. Very naturally, the presentation of memoirs to the Academy of Sciences and the publication of papers in scientific journals became more and more frequent under the name of Curie that we have had to mention so often, although in most cases the name included that of Mme. Curie. It is impossible for us to follow step by step the researches made by the two scientists in the laboratory of the School of Physics and Chemistry. In the first place, Mme. Curie entered the path marked out by her husband, and we may mention especially a memoir by her upon the magnetic properties of steel of known composition tempered under determinate conditions. But, owing to a study upon the conductivity of air under the influence of the rays of uranium and thorium, she was led into the domain in which she and her husband were to make most important discoveries, and after that occupied herself particularly with the rays emitted by the compounds of these two metals. Finally, toward the end of 1898, the Academy of Sciences received a communi-

cation that may be considered as marking an epoch, and in which M. and Mme. Curie positively confirmed what they had already announced as to a new and strongly radio-active substance contained in pitchblende. In the first place they found a new element to which they gave the name of polonium, evidently in remembrance of the country of Marie Sklodowska, and afterward discovered another element having the chemical appearance of nearly pure barium, but nevertheless very different therefrom. This was radium, the well-named substance that was to revolutionize modern chemistry. Following this success, the communications of the two scientists began to multiply, all of them relating more or less to this very surprising substance and its diverse properties. They showed especially that the rays emitted by polonium and radium are capable of communicating radio-activity to naturally inactive substances, a fact that led M. Becquerel, whose labors had prepared the way for those of the Curies, to demonstrate the importance of the new discovery. We ought not really to separate the name of M. Becquerel from that of the two scientists under consideration. M. Curie, however, has more particularly investigated the action of the magnetic field upon the Becquerel rays, a subject that belongs to the domain of his favorite studies.

The great importance of the discovery under consideration was appreciated as far back as 1901, when the Academy of Sciences awarded the La Caze prize of 10,000 francs to M. Pierre Curie, while associating with his name that of his wife. A short time afterward, Mme. Curie put chemistry in possession of a relatively large quantity of radium, she having, by very troublesome fractional crystallizations, obtained a decigramme of perfectly pure chloride, which allowed her finally to determine the atomic weight of this body. A little later on, M. Curie, aided by M. Laborde, made some very curious observations upon the heat continually disengaged by the salts of radium.

M. and Mme. Curie are certainly not going to stop here, especially now that a chair has been created for M. Curie at the Faculty of Sciences. Since they have succeeded in ascertaining the very nature of the radiation emitted by radium, they will evidently endeavor to solve the second part of the problem—the cause of such mysterious radiation. At present they have no definite opinion, and it will be the great interest of their coming researches to ascertain finally whether the energy discharged by radio-active bodies is created in themselves or is borrowed from external sources.

BENBOW'S AIRSHIP FLIGHT.

Benbow's airship made what is considered a successful trial at the World's Fair on October 27. Benbow's airship weighs about 600 pounds without an operator. The gas bag is seventy-five feet long and about twenty feet wide at the center, tapering at the ends. The bag contains 16,000 cubic feet of gas when inflated, and on this gas the ship depends for maintenance of equilibrium. The frame of the ship is of aluminium and wood, and the power is derived from a ten-horse-power gasoline motor.

Momentum is given to the airship by means of two large side wheels, or fans, each consisting of four blades, so constructed that

they automatically fold after completing the stroke against the air, and do not expand until again in position to force the airship ahead.

ONE HUNDRED AND FIFTY MILES AN HOUR ON ELECTRIC ROAD.

It is expected to reach a speed of 150 miles an hour in the new tests which will be made on the high-speed electric line near Berlin. It will be remembered that the last experiments which were made on the specially-laid track from Berlin (Marienfeld) to Zossen resulted in a speed of over 130 miles an hour. It is now proposed to increase this speed, according to recent reports. It appears that the project which has been laid before the Prussian Minister of Public Works for constructing a high-speed electric line between Berlin and Hamburg is not considered as sufficiently practical in the present state of experience. The authorities do not wish to allow such a road to be built without making a further series of trials on a smaller scale. Accordingly it is proposed to carry on a new set of experiments on the Berlin-Zossen line and if all is satisfactory to the authorities they will grant the concession for the Hamburg road. It is expected to begin the tests within a few months, but as the designers have already profited by their previous experience they expect to increase the speed of the electric trains considerably and run them as high as 150 miles an hour.