

"Sir Humphry Davy in a letter to the managers recommending him for the place, wrote that he 'had found a person who is desirous to occupy the situation in the Institution lately filled by William Payne. His name is Michael Faraday, a youth of twenty-two years of age. His habits seem good, his disposition active and cheerful, and his manner intelligent.'

"The youth of twenty-two years had made a marvellous use of his time previous to the appointment under Davy. He had read everything he could lay his hands upon, and in a note book wrote down the names of the books and subjects that interested him. This he called 'The Philosophical Miscellany'—being a collection of notices, occurrences, events, etc., relating to the arts and sciences, collected from the public papers, reviews, magazines, and other miscellaneous works, intended to promote both amusement and instruction, and also to corroborate or invalidate those theories which are continually starting into the world of science. Collected by M. Faraday, 1809-10.'

"Fortunately this book has been preserved and can serve as a model for all young men of humble origin and slender means. We are astonished at the extent and variety of his reading at that early day, as gathered from that collection, and as displayed in a correspondence with Mr. Abbott, a Quaker clerk. The letters to Abbott, commencing when Faraday was twenty years of age, are often verbose, inflated, and abounding in big words, but nevertheless display the early training, study, reflection, and anxiety to learn, of the book-binder's apprentice. Abbott had been educated at a good school, and hence Faraday looked upon him as greatly his superior.

"There is a great temptation to quote from these letters, as they cover a period of Faraday's life hitherto wholly unknown to the world. In his first letter he gives an account of some galvanic experiments, and of a pile he had constructed out of disks of malleable zinc (a great curiosity in those days), copper coins, 'and pieces of paper soaked in a solution of muriate of soda.' He was surprised to find that with seven pairs of plates he could decompose the sulphate of magnesia. In another letter he has a good deal to say about chlorine, and gives the theory of bleaching as maintained by scientific men of the present day. 'Pure chlorine has no effect upon vegetable colors; but when water is present it decomposes it, and the oxygen causes the change of color.' He writes to his friend some admirable ideas on the subject of lectures, how they should be prepared and how delivered, which show the foundation upon which he afterwards built up his name as the best lecturer in England. Here is a choice passage, written when Faraday was twenty-one years of age:

"A lecturer falls deeply beneath the dignity of his character when he descends so low as to angle for claps and asks for commendation. Yet have I seen a lecturer, even at this point. I have heard him dwell for a length of time on the extreme care and niceness that the experiment he will make requires. I have heard him hope for indulgence when no indulgence was wanted, and I have heard him declare that the experiment now made cannot fail from its beauty, its correctness, and its application, to gain the approbation of all. Yet surely such an error in the character of a lecturer cannot require

pointing out, even to those who resort to it; its impropriety must be evident, and I should perhaps have done well to pass it.'

"In reference to the choice of a friend he writes: 'A companion cannot be a good one unless he is morally so; and however engaging may be his general habits, and whatever peculiar circumstances may be connected with him so as to make him desirable, reason and common sense point him out as an improper companion or acquaintance unless his nobler faculties, his intellectual powers, are, in proportion, as correct as his outward behavior.'

"And in the same letter he adds: 'In every action of our lives, I conceive that reference ought to be had to a Superior Being, and in nothing ought we to oppose or act contrary to His precepts.'

"We have thus a picture of Michael Faraday before he went to act as an assistant to Sir Humphry Davy. The son of religious parents, himself a thoroughly conscientious man, endowed with good health and indomitable industry, his start in life was such as to inspire his friends with every confidence in his ultimate success. As soon as he entered the Royal Institution he continued the researches he had begun with humble means while working as an apprentice, and, with such a teacher as Sir Humphry Davy, was soon able to overcome all defects of early training. Davy and Faraday were two widely different characters. The former was also of humble birth, and had been aided by Mr. Gilbert, who heard that the "boy was fond of making chemical experiments," and had by his remarkable discovery of the metals of the alkalies, rendered his name famous, and had won knightly honors. He had become Sir Humphry Davy, and it was not long before he gave up further original investigation, and retired to Geneva in Switzerland, where he died in 1829. He was always seeking for honors and eternally pining for rank, and in his early treatment of Faraday displayed unworthy traits of character. For example, while traveling on the continent, he declined to accept an invitation to dine because Faraday, his Secretary, was also invited. The host, De la Rive, of Geneva, sent back word, 'then I shall be obliged to give two dinners.' And Davy opposed Faraday's election to the Royal Society. But Faraday uttered no word of complaint, and never ceased to feel and express gratitude to his early benefactor.

"It is probable that no man of science ever lived whose whole life could better serve as a model than Faraday's. Although born poor he never coveted riches, but on the contrary gave up all remunerative occupations in order that he might devote himself exclusively to scientific research. Of humble birth he never sought social distinctions, but declined the offer of knighthood, and utterly refused to accept the office of President of the Royal Society which was pressed upon him. The humility, simplicity, singleness of purpose, and liveliness of disposition never deserted him even in the height of his prosperity. He was ever ready to help a beginner, and seemed never to forget how he had been aided at a critical period of his life. He was indeed a perfect contrast to Sir Humphry Davy.

"In 1821 Faraday was married, and having been appointed superintendent of the house and laboratory, took his wife to reside in the Royal Institution. He never was blest with children, but lived for forty-seven years of perfect happiness with the choice of his

youth; the only change being, as he said, 'in the depth and strength of its character.'

"When Faraday first went to the Royal Institution, he took up the study of chemistry with great zeal, and among other important discoveries made by him was that of benzole, to which we virtually owe the whole aniline industry. His researches on the condensation of gases, in which he proved them to be the vapors of volatile liquids; also on regelation, on glass, on steel, on alloys, were among his earliest works; but the crowning glory of his life was the publication of his 'Experimental Researches on Electricity,' which he commenced at the age of forty and continued during a period of twenty-six years. The value of these discoveries to the world cannot be easily overrated. We can trace them into practical life, in the electric light, in magneto-electric machinery, in electro-metallurgy, in the applications of electricity to medicine, in telegraphy, and in the success of the submarine cable, and yet the work was carried on in penury; he made himself poor that others might be rich, and he has left a name without parallel in the annals of science.

"The Queen of England, no doubt instigated by Prince Albert, assigned a house for Faraday's use in the royal park, at Hampton Court, and had it put in thorough repair for his occupancy. Here he spent the declining years of his life, surrounded by affectionate relatives and devoted friends, and in the summer of 1867, while sitting in his arm chair at his study window, was suddenly summoned to his eternal rest.

"The same year of his marriage Faraday joined the Sandemanian church by profession of faith, and he afterwards became an elder and used to preach; but in his sermons there was wanting that clearness and precision, that familiarity with the subject, that characterized his lectures on scientific topics. He never adopted the same course of reasoning in religious matters that he did in scientific. In science he believed nothing without the facts or experimental demonstration; but in religion he accepted everything with the humble faith of a Christian."

Miscellaneous, &c.

Action of Shellac upon some Aniline Colours.

M. Labouret.—When a salt of rosaniline is added to a solution of any resin, that solution is red-coloured, if the salt of aniline is soluble in the solvent used to dissolve the resin; the colour has, however, a tendency to turn violet as soon as the solution is heated or evaporated to dryness. An alcoholic solution of shellac, to which fuchsine has been added, turns, on evaporation, to a most magnificent blue colour. This material is insoluble in ether, but soluble in alcohol and acetic acid, the solutions exhibiting a blue colour. The product is however, very unstable; and the only use this reaction could be turned to is, according to the author, the detection of shellac among other resins, since a very minute quantity of the last-named resin may by this means be detected. —*Moniteur Scientifique. in Chem. News.*

Detection and Estimation of Arsenic in the Rosaniline (Fuchsine) of Commerce.

Dr. Riecker.—This very lengthy paper is essentially devoted to the testing of the correctness of the methods for the quantitative estimation of arsenic, and the possibility of