

THURSDAY, OCTOBER 12, 1893.

THE CORRESPONDENCE OF BERZELIUS  
AND LIEBIG.

*Berzelius und Liebig.* Ihre Briefe von 1831-1845. Mit erläuternden Einschaltungen aus gleichzeitigen Briefen von Liebig und Wöhler. Herausgegeben mit Unterstützung der kgl. bayer. Akademie der Wissenschaften von Justus Carrière. (München und Leipzig: J. F. Lehmann, 1893)

THIS most interesting, and, for the historian of chemistry, most valuable little book owes its origin to a sentiment akin to that which prompted the publication of the no less interesting and valuable collection of the letters of Liebig and Wöhler. How important the correspondence of Berzelius and Liebig is to him who essays to write the history of the chemistry of the nineteenth century will be obvious from the fact that this exchange of letters occurred during one of the most eventful decades of the century. It began at the period of the epoch-making work of Liebig and Wöhler on the radicle of benzoic acid, and extended over the time when Liebig was devoting himself, with characteristic ardour and enthusiasm, to the study of animal chemistry and to the applications of chemistry to agriculture. Frequent reference, as might have been expected, is made to these and the many other matters which during that time engaged the energies and occupied the thoughts of Liebig at what was the most active and the most fruitful period of his career. Nor was Berzelius less communicative concerning his own work. Nothing, however, is more characteristic of the difference in temperament of the two men than the manner in which each speaks of what he has done, is doing, or means to do. With Berzelius it is nearly always concerning what he has accomplished, seldom of what he is doing, and still more rarely of what he is going to do. The sanguine, ardent character of Liebig is reflected in almost every letter. He is terribly in earnest on the matters of the moment, and full of enthusiasm and confidence concerning the plans of the future. The philosophic calm which pervades every letter of the great Swedish chemist is a source of wonder and envy to his correspondent.

"I envy you," writes Liebig, "the priceless tranquillity of mind with which you do your work. Pray tell me it is always so with you. Has not the keen desire for discovery not even once made your heart beat quicker? With you there is an ever present intellectual calm."

Liebig wrote as he thought and spoke. "I cannot, like others of cooler blood," he wrote to Wöhler, "keep myself apart from and unidentified with my work: what I do I do with all my faults and shortcomings, but also with all the energy that actuates me."

The letters, therefore, are valuable not only as sidelights on matters which are now regarded as classical in the history of chemistry, but also as evidence of the character and temperament of the two men; and from this point alone they will have a special interest for the historian of science.

The correspondence begins with a new year's letter from Liebig in the January of 1831. The two chemists

had made one another's personal acquaintance at Hamburg during the summer of the preceding year, and Berzelius had already expressed to his friend and former pupil Wöhler, the pleasure it had afforded him to meet Liebig. Liebig had perfected his method of organic analysis, and the Giessen laboratory was busily engaged in determining the elementary composition of whole series of organic substances, and he gives in his first letter a brief account of the main results to which he and his pupils had arrived. Berzelius in his acknowledgment congratulates him on his work:—

"It is quite incomprehensible to me how you can have accomplished so much in so short a time."

He tells Liebig of the discovery of a new metal by Sefström, which the discoverer had named Vanadium:

"It is an interesting thing. It will take its place between chromium and molybdenum. Wöhler had well-nigh lighted upon this body. He undertook to analyse lead chromate from Zimapan. He discovered that the substance hitherto regarded as chromic acid was not so in reality, but gave himself no further trouble to determine what it actually was."

Wöhler has himself told us the story, and let the world see the characteristically humorous letter in which Berzelius "chaffed" him for being too lazy to open the door when the goddess knocked.

There is the customary Teutonic contempt for most things Gallic:

"It gives me a real pleasure to read your writings by reason of the love for truth which pervades them—in striking contrast with Dumas, who seems to do everything for show."

In the second letter Berzelius writes:—"Die Unzuverlässigkeit der französischen Analysen. . . ist eine verdammt curiose Sache," and again Dumas and his pupils are somewhat severely handled. Berzelius is "so satt" with Vanadium that he is constrained to tell Liebig all he knows about this "sehr interessanter Körper." He has just finished his memoir for Poggendorff "in welcher die viele Salzbeschreibungen gewiss manchen Leser einschlafen machen werden." The letter was written with the so-called "vanadium ink," made by adding extract of gall-nuts to a solution of ammonium vanadate. "It flows," says Berzelius, "so extraordinarily well that it is preferable to all iron inks, and fades less easily." Unfortunately Berzelius's expectations respecting the new ink have not been fulfilled: the writing of this particular letter, the editor points out, has become quite yellow, and is difficult to decipher. Liebig does not altogether share Berzelius's opinion respecting Dumas:

"Small as is the confidence I have in Dumas' work, the calculations of this rope-dancer seldom fail in their object: I have assured myself by a direct determination of the vapour density of the non-inflammable gas [phosphuretted hydrogen] that he is right. I am continually annoyed that the fellow, in spite of his wretched and slovenly style of work, should shake masterpieces, so to say, out of his sleeve."

In 1831 Liebig's position at Giessen, in spite of his growing fame, was pecuniarily very poor. He writes to Berzelius:—

"I have latterly taken upon my back a big burden in yoking myself with Geiger as co-editor of his magazine,

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and all for the sake of filthy lucre. At the small university where I am, where the dullest pedantry sits enthroned, and where natural science is learnt from the Greek authors or from Wilbrand's writings, I should otherwise die of hunger."

However much Liebig may share Berzelius's opinion of French chemical work in general during the thirties, he will hear of no word of disparagement of his old master Gay Lussac, for whom he had the most genuine respect and esteem. A captious remark by Berzelius respecting Gay Lussac at once rouses Liebig, and his impetuous pen dashes off a panegyric which is almost eloquent in the warmth and intensity of its feeling. The only thing to his discredit that Liebig will allow is that, in common with his countrymen, Gay Lussac is not sufficiently attentive to what is done outside France:

"A certain mental indolence prevents the French, to their shame be it said, from making themselves acquainted with foreign work. Gay Lussac shares this failing, and feels that it will gradually effect the ruin and extinction of all scientific growth in France: all his letters to me are filled with complaints on this score, and principally as regards himself. However that is no fault in his character, and can well be forgiven him when one takes his other good qualities into account."

A letter from Liebig, dated December 28, 1831, announces the discovery, and describes the properties of chloral, a "Substanz welche ich, da ich keinen besseren Namen weiss, Chloralkohol nennen will." Berzelius, in his reply, gives an account of his work on tellurium. In May, 1832, Liebig writes that he has begun to work on amygdalin.

"I am on the point of becoming Wöhler's enemy: I see that Fate will not allow either of us to do anything that the other has not already done or is on the point of doing: all originality goes to the devil. He suggests that we should do a joint investigation on bitter almond oil—and just before I got his letter I had written to all the apothecaries I knew of to procure me bitter almond oil, because I too had the matter in view."

What came out of that memorable investigation on oil of bitter almonds no chemist needs to be reminded of. On July 2, Liebig writes that he has been engaged in determining the composition of an "ether-like substance," sent to him by Döbereiner, who had named it "Sauerstoffether."

"Oxygen-ether is no name for this substance. I am, however, very stupid at naming things. What think you of acetal (acetum and alcohol)?"

In more than one of his letters Liebig held out the hope to himself that he might be enabled to visit Berzelius in Stockholm, and do some research in common with him, and he sends to Wöhler for a Swedish grammar. The terrible pressure of his work at Giessen at this time is beginning to tell upon him. He writes to Berzelius:

"I am always ill, and fear my life's thread will not spin out much longer. Each work I undertake makes me worse, and the slightest effort excites me as if I were in a fever. Wöhler and my family tell me daily what a fool I am; however, we shall see. If the journey to Stockholm does not mend me, then I shall never be cured."

Berzelius answers:—

"The pleasure which your news of matters scientific gave me, great though it was, is as nothing compared

with that of your promise to spend some months with me and to do a piece of work with me. I have seldom had such a pleasant surprise, but now comes the question: When is this good fortune to befall me? You do not need to speak a word of Swedish to come here. If you wish to learn it, may it be my privilege to be your teacher. Come soon and spend the winter months with me. A Swedish winter is healthier than a German one. Your depressed nervous system will right itself here. We will work, joke, and skate, and not over-fatigue ourselves, and yet labour to good purpose. You will find my laboratory far below your expectation. It is small and badly furnished. But it is just in such a place that one learns to do with little."

The visit, unfortunately, was never made. Wöhler lost his wife in the summer of that year, and in his dejection sought the society of his friend at Giessen. Moreover, the outbreak of cholera at various ports in North Germany made travelling irksome and dangerous. As it was, the two never met again. The correspondence was maintained, with intermissions, down to 1845—that is, until about three years before the death of Berzelius. Little by little misunderstandings arose which eventually ended in coolness, despite the most persistent efforts by Wöhler to preserve friendly relations. The conservatism of Berzelius, who clung, with the obstinacy of age, to views which the rest of the world regarded as obsolete, reacted painfully on the strong-willed, impulsive nature of Liebig, who could as little brook contradiction. There was more than one sharp passage of arms, and at length open rupture. Berzelius made his *Jahresbericht* the vehicle of many bitter attacks on the work of the Giessen school, to which Liebig, restrained by Wöhler, and to some extent swayed by mixed feelings of reverence and pity, seldom replied.

His sentiments towards the great master will be evident from the following excerpt from a letter to Wöhler, with which this most interesting volume closes:

"The opinions and theories of Berzelius were a clear and formal expression of the ideas of his time, and therefore of great value; but they went no further. I will not say that this was a fault, but it would have been a virtue had he possessed a larger measure of that creative thought which I may term the poetry of natural philosophy."

T. E. T.

#### BACTERIOLOGY FOR THE STUDENT.

*Manual of Bacteriology for Practitioners and Students, with especial reference to Practical Methods.* By Dr. S. L. Schenk, Professor Extraordinary in the University of Vienna; translated from the German, with an Appendix by W. R. Dawson, B.A., M.D. (Univ. Dublin). 8vo. 310 pp. (London: Longmans, Green and Co., 1893.)

THE bacteriological library has recently been enriched by yet another text-book which, although only published in German a few months ago, has already appeared in an English translation. In this work we have the responsibility divided between the author and translator, for the latter has not merely acted as interpreter, but has added numerous foot-notes, besides an appendix intended to bring the book as far as possible up to date, all of which additions are signed by the translator. It does not