

differ, could be approximately brought into line and order. This period was filled by the development of the chemistry of organic compounds. The chemical substances which make up the framework and numerous tissues of all living beings, the juices and products of vegetable, the food and the excreta of animal organisms, consist mostly of a few elementary bodies, combined according to numbers which are highly complex and unintelligible. Most of these compounds, if removed from the organism which contained them, proved to be subject to rapid decomposition. An increasing number of stable compounds, however, were in course of time prepared from these residues, and these formed especially the subject of organic analysis. Already Lavoisier had indicated how some system might be brought into the apparent complexity of these organic bodies; and this view was adopted by Berzelius and incorporated in his dual or binary system.¹

17.
Organic
chemistry.

¹ Kopp's account of the development of Berzelius's views on organic compounds is most interesting and instructive. As late as 1814 he could not reconcile the composition of organic acids, such as oxalic acid, with the atomic theory; but renewed efforts and improved methods of analysis taught him in the following years how to apply the atomic formulæ to the description of such compounds. "He was the first to show the only right road to inform ourselves regarding the constitution of these bodies, the method, namely, of analysing their combinations with inorganic substances of known atomic weight. . . . He had also a great share in establishing the view that the ratios of combinations in organic compounds are analogous to those of inorganic substances, and that

theories of the former must begin by comparing them with the latter" ('Geschichte der Chemie,' vol. i. p. 398; cf. also 'Die Entwicklung der Chemie,' p. 532, &c.) To Berzelius is thus due more than to any other man the breaking down of the barrier which had before his time divided the chemistry of organic from that of inorganic substances. For a considerable time Berzelius did not look upon organic compounds as binary—in fact, in 1814 he assumed that the difference between organic and inorganic compounds lay in this, that the latter were all binary, whereas the former were ternary or quaternary. The French chemists, under the influence of Lavoisier's oxygen theory, favoured the binary view, and this was much strengthened by Gay-Lussac's researches on cyanogen (in