lar bud lateral and the primary root bud often internal.

As regards the genetic relations of the various groups into which the two classes are divided, Professor Balfour believes that there is "no evidence to sanction the belief, or even the expectation, that there is extant any family of Dicotyledons or Monocotyledons which represents, even approximately, a primitive type in either class. The stem in each has gone. We have the twigs upon a few broken branches."

The list of papers presented to the Section was somewhat extensive and mention can be made of only a few. Professor Letts and Mr. John Hawthorne submitted a report on some observations they had made upon the absorption of ammonia by *Ulva latissima*. They found that this sea-weed could absorb within twenty-four hours all the ammonia from a sample of rather highly polluted sea-water (containing 0.046 parts of ammonia per 100,000) and suggested the possibility of this characteristic of the *Ulva* being turned to practical account. Professor Marshall Ward presented the results of his observations on the brown rust of the brome grasses. The seeds of the grasses could be treated antiseptically and sown in nutritive solutions and when inoculated with uredospores would give rise to pure cultures of the rust. The results gave no support to the idea that there might be an internal or seminal infection and it was found that although the uredo was in all morphological respects the same in all species on which they were grown, the spores grown on *B. sterilis* would never infect a plant of *B. mollis*, although they could be readily transferred to other plants of *B. sterilis*. Spores from *B. mollis* would infect its allies such as *B. secalinus* and other species of the *Serrafalcus* group, but failed on members of the *Stenobromus* group and so with other cases.

Mr. A. C. Seward described some sections of jet from Yorkshire which he had studied in the British Museum. Sections cut from specimens which consisted partly of petrified wood and partly of jet showed a gradual transition from Araucarian wood to pure jet lacking all indications of ligneous origin. It would seem from these sections that the Whitby jet was formed by an alteration of coniferous wood.

Other papers presented were on 'The Structure and Morphology of the Flowers of *Cephalotaxus*,' by Mr. W. C. Woodsell; 'The Histology of the Sieve-tubes of *Pinus*,' by Mr. A. W. Hill; 'A Contribution to our Knowledge of the Gametophyte in the Ophioglossales and Lycopodiales,' by Dr. W. H Lang; 'The Vascular Anatomy of the Cyatheaceæ,' by Mr. D. T. Gwynne-Vaughan; 'The Anatomy of *Danœa* and other Marattiaceæ,' by Professor Brebner; 'Spore Formation in Yeast' by Mr. T. Barker; and on 'A Diplodia Parasitic on Cacao and on the Sugar Cane,' by Mr. A. Howard.

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SCIENTIFIC BOOKS.

Monographieen aus der Geschichte der Chemie herausgegeben von George W. A. Kahlbaum, IV. and VI. Hefte. CHRISTIAN FRIEDRICH SCHÖNBEIN, 1799–1868. Ein Blatt zur Geschichte des 19. Jahrhunderts von Georg W. A. Kahlbaum, Ed. Schaer und Ed. Thon. Leipzig. 1899 and 1901. 2 vols. 8vo. Portraits.

The previous volumes of this series of 'Monographs' have dealt with 'Lavoisier's Theory and its Acceptance in Germany,' 'Dalton's Theory of Atoms in Modern Light,' 'Berzelius' Growth,' and the 'Correspondence of Liebig and Schönbein,' by divers writers; the volumes before us deal with the scientific labors and personal character of the eminent chemist and physicist Schönbein by one who enjoyed superior opportunities for his undertaking, occupying a chair in the University of Basel analogous to that held by the famous man, and favored with the friendship of his living heirs.

Through the liberality of the daughters and numerous correspondents of Schönbein, Dr. Kahlbaum had the privilege of handling and studying between 1,500 and 1,600 letters, as well as 350 printed papers from the brain and hand of the man he sought to portray. These letters were carefully catalogued and partially indexed to make them readily available. While occupied with his manuscript, he learned that Professor Ed. Schaer, a pupil of Schönbein was also at work on a biography of him, and correspondence led them to produce a joint work.

Such is the origin of these volumes, which contain more than 550 pages.

The scientific labors of Schönbein comprise his discovery of the passivity of iron, that of ozone, of guncotton and of collodion, besides the many lesser points which in his indefatigable studies of these bodies he encountered. He discovered the remarkable behavior of iron with nitric acid shortly after he had begun his duties as professor of chemistry and physics at the University of Bâsle, in 1835. Dr. Kahlbaum notes that Schönbein's discovery had been anticipated by James Keir in 1790, but entirely forgotten and neglected. Schönbein's researches on electrical topics were continued many years until 1849, but meanwhile the study of that illusive substance, ozone, discovered in embryo in 1839, absorbed much of his energy. The early history of the enormously difficult problems connected with ozone and the fallacy of 'antozone' are detailed in a satisfactory manner.

No one of the discoveries made by Schönbein made him more popularly known than that of guncotton, destined to play so important a rôle in international, as well as industrial, enterprises; this dates from 1846. Its value as a substitute for gunpowder was at once perceived, and experiments with firearms were instituted as early as May of the same year. It is a sad commentary on the unprofitableness of pure science from the money point of view that this prime discovery brought to Schönbein only eighteen to twenty thousand dollars, while Alfred Nobel gained through it more than ten million dollars!

The discovery of collodion has been claimed for several Americans and Dr. Kahlbaum has made a careful study of these claims; it appears that Dr. Charles T. Jackson discovered the solubility of gun-cotton in January, 1847, and two of his students (Bigelow and Maynard) in February of the same year found the solution useful in surgical cases. The name collodion was given to it by Dr. A. A. Gould in 1848, by which time it was well known to American practitioners. The exact date of Schönbein's discovery is uncertain, but in February, 1847, De la Rive wrote from Geneva inquiring as to the nature of Schönbein's discovery 'here much discussed.' So it is clear that the invention was made on both sides of the Atlantic almost simultaneously and quite independently.

After pursuing studies at the Universities of Erlangen and Tübingen, Schönbein secured in 1825 the position of teacher in an institute at Epsom, England, and the two years he spent there had a marked influence on him through life. He attended at that time a lecture by Faraday, but did not seek his acquaintance; ten years later, having discovered the passive nature of iron in nitric acid, he addressed a letter describing this to Faraday, and this was the beginning of a correspondence and friendship lasting twenty-six years and only broken by the death of the Englishman. The 'Letters of Faraday and Schönbein' have been edited by Drs. Kahlbaum and Darbishire, and published in a handsome volume (London and Bâsle, 1899). Schönbein's correspondence with Liebig forms Heft V. of these *Monographieen*.

Notwithstanding the arduous labors of Schönbein in his university duties and in the chemical laboratory, he found time for conducting a large correspondence with his brother scientists, and also for writing to the secular daily press; from 1831 to 1832 he was associate editor of the *Basler Zeitung* on a salary of sixty dollars per annum; he was a frequent contributor to the columns of Stuttgart newspapers, and to the *Schwäbische Mercur* from 1833 to 1848.

The portrait in the first volume shows a heavily built, thick set man, smooth shaven and with full head of hair; his physiognomy is singularly earnest, without being so charming as that of Bunsen. The volumes contain indexes of names of persons and brief tables of contents.

Henry Carrington Bolton.