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INVITED REVIEW

Great Discoveries in Bryology and Lichenology

Simon Schwendener (1829–1919) and the Dual Hypothesis of Lichens

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On September 10, 1867, the Swiss Natural History Society held its annual general meeting in the small city of Rheinfelden. The botanical session was presided over by the taxonomist and palaeobotanist Oswald Heer, Professor of Botany at the University of Zürich. The first speaker was Simon Schwendener (Fig. 1), newly elected Professor of Botany at the University of Basel. Schwendener, a former student of Heer, had an astonishing career. Born on February 10, 1829 in Buchs at the Austrian border in northeasternmost Switzerland as the only son of a farmer, he was expected to take over the family farm. However, Simon proved to be an excellent student who became increasingly attracted to science rather than to farming. The financial situation of the family did not allow him to be sent to the university, as he desired. From age 18 onwards, Schwendener made a living as a school teacher, first at an elementary school near his home village and later in a private high school. In between, he went to the French speaking part of Switzerland and attended science classes at the University of Geneva where he met Alphonse de Candolle. A small inheritance and probably the ability to live on almost nothing allowed Schwendener to matriculate at Zürich University in 1853 where he studied science and wrote, under the auspices of Oswald Heer, a Ph.D. Dissertation on ''Periodic features in nature, especially in the plant kingdom'' that was completed in 1856; this topic was originally proposed by de Candolle.

From 1855–1857, Carl Wilhelm Nägeli had the chair of botany at the Polytechnic (now Swiss Federal Institute of Technology) and at the University of Zürich. Nägeli was an outstanding, multi-talented Swiss botanist with a strong interest in light microscopic research techniques. Under his guidance, Schwendener started microscopic studies. In 1857, Nägeli was nominated as a professor of botany at the University of Munich. He offered Schwendener a position as an assistant, which was gladly accepted. ''It was a beautiful time'' wrote Schwendener in a short autobiographic note (published in Zimmermann 1922), ''here (in Munich) I became a botanist in the strict sense.'' Schwendener greatly appreciated the contact and exchange of ideas with other young scientists. He had to work half time for Nägeli and the rest was devoted to his own projects. Already in Zürich he had decided to investigate lichens. Nägeli's herbarium and numerous specimens donated by Philipp Hepp (*Heppia* Nägeli ex A. Massal.), and careful light microscopic studies by Nägeli himself were the stimulus for Schwendener's own investigations on the functional anatomy, especially on growth and development of lichen thalli, which culminated in a series of publications (Schwendener 1860, 1862, 1863*a*,*b*, 1864, 1866, 1868*a*). These contain a wealth of interesting observations e.g., on cell and ''tissue'' dimensions in growing and mature thalline areas, intercalary (hyphal) growth as an important element in thallus development and the presence of a gas-filled zone in the thalline interior. The first publication on fruticose lichens was Schwendener's habilitation thesis; from 1860 onwards he was admitted as a so-called Privatdozent at the University of Munich and thus was eligible as a professor. In cooperation with Nägeli, Schwendener published two standard works on the theory and practice of the light microscope and their application in botany (Nägeli & Schwendener 1865, 1867), which were held in high esteem by Ernst Abbé, the world leading expert in optics in the company of Carl Zeiss, Jena. Nägeli and Schwendener were among the best microscopists of their time and thus had access to new dimensions. In early 1867 Schwendener was offered a chair in botany at the comparatively small University of Basel (founded 1460) in northern Switzerland, which he readily accepted.

On this memorable September 10, 1867, Heer was certainly interested to hear what his talented former student had to tell, and Schwendener, on the

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