http://geology.19thcenturyscience.org/books/1906-Merz-HistEurThot/README.htm

semblance[1] of an explanation of organic structures and forms, they have in reality done as little as Boscovich's centres of force and curves of attraction and repulsion in mathematical physics to establish a firm basis for actual research; for nowhere have they been capable of exact determination such as has been applied to the angles and figures of crystals.

22. Morphology on a large scale.

Simultaneously with the science of crystallography there came into being the science of minerals on a larger scale of study, through actual observation in definite localities of the formation and stratification of rocks; of the traces of the influence of the great

arrangements of Schimper, became known under the term "Morphologie végétale," through Auguste de Saint Hilaire in his 'Leçons de Botanique' (1840). To the spiral theory, although strongly opposed in course of time by Wilhelm Hofmeister, one of the founders of the genetic conception of plant life, Sachs, the historian of botany, nevertheless assigns an important historical influence, "as through Schimper's theory the morphologically so important relative position of the plant organs was for the first time placed in the foreground of morphology" (*loc. cit.*, p. 180). See, however, on this subject the paper by A. H. Church on "Phyllotaxis" in vol. i. p. 49 of 'The New Phytologist,' 1902.

[1] The early propounders of the cellular theory of organic structures adopted the view that cells were formed in a surrounding liquid in the manner of crystals in a mother-liquor. When it was established that organic structures grow by intussusception, not by juxtaposition and accretion, like crystals, and that cells multiply by division, the discoveries of Graham, who divided bodies into crystalloids and colloids, were utilised for the purpose of explaining or illustrating organic processes. On this distinction is based the celebrated "micellar theory" of Nägeli, who, in his 'Mechanisch-physiologische Theorie der Abstammungslehre' (München und Leipzig, 1884), works out a complete mechanical doctrine of the constitution and formation of organic structures. The ideas contained in this elaborate treatise have been much used in Germany by various writers, but mostly only as convenient illustrations. See O. Hertwig, 'The Cell' (transl. by Campbell, 1895), p. 58, &c. The micellar theory does not seem to have found much favour in France or in this country, where a general opinion prevails which is probably best represented in the words of Claude Bernard: "Les phénomènes physico-chimiques des êtres vivants, quoique soumis aux lois de la physique et de la chimie générales, ont leurs conditions particulières qui ne sont réalisées que là, et dont la chimie pure ne peut offrir qu'une image plus ou moins inexacte" ('Phén. de la Vie,' &c., vol. ii. p. 487).