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*Visual Representation in the Theory of Algebraic Functions and their Integrals in the late 19th Century*

Riemann's definition of the "Riemann surface" and his use of this tool in his theory of Abelian functions provoked a great deal of interest in understanding how to use these objects effectively, especially after the geometric interpretation by Clebsch. It has often been observed (Weyl alludes to it in his 1913 monograph, for example) that the vagueness of the definition was an obstacle to its successful use. However, the late nineteenth century saw a variety of techniques for attempting to understand what a Riemann surface was, and there are interesting attempts at creating understanding and insight via the use of graphical methods. Building on work by Bruno Belhoste, in this paper we shall look at several such representations, focussing on the methods of Paul Appell and Edouard Goursat for the study of algebraic functions.