In her *Observations upon Experimental Philosophy* (1666), Margaret Cavendish disparages the work of the Royal Society as puerile and unprofitable play, comparing its members to ‘Boys that play with watry Bubbles, or fling Dust into each other’s Eyes.’ Reading the work of Bacon, Boyle, and Hooke alongside poetry by Cavendish, Traherne, and Cowley, this paper shows how both advocates and detractors of the Society described the practices of experimental philosophy in terms of traits associated with childhood, framing youthful innocence, exuberance, and sensory clarity either as crucial components of, or as antithetical to, scientific experience. I probe in particular how these experimentalists, writers, and thinkers conceptualised the relationship between transient, intermittent, and often artificially-orchestrated moments of sensory experience as a source of experimental knowledge about the material world, and ‘experience’ in a looser sense, as the gradual, cumulative process of acquiring the forms of understanding and skill which constitute adulthood.

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