

A BRIEF HISTORY OF NANOTECHNOLOGY Reference is often made to a lecture given by Richard Feynman in 1959 at Caltech [85]. One wonders whether Feynman and Minsky had previously read Robert A. Heinlein's short story "Waldo", which introduces this idea (it was published in the August 1942 issue of "Astounding" magazine under the pseudonym Anson MacDonald). Here, we find the germ of the idea of the assembler, a concept later elaborated by Eric Drexler. The assembler is a universal nanoscale assembly machine, capable not only of making nanostructured materials but also other machines (including copies of itself). The first assembler would have to be laboriously built atom-by-atom, but once it was working its numbers could evidently grow exponentially, and when a large number was extant, universal manufacturing capability, hence the nano-era, would have truly arrived (See also Chapter 8). However, the idea of a minute device intervening at the level of elementary particles was conceived almost a hundred years earlier by James Clerk Maxwell when he invented his "demon" for selectively allowing molecules to pass through a door, thereby entangling physics with information. The demon was described in Maxwell's Theory of Heat first published in 1871, but had already been mentioned in earlier correspondence of his. Perhaps Maxwell should be considered as the real father of nanotechnology.