

***Hallucinations and Microscopes:  
Comments on Bas van Fraassen's Recent Work on Observability***

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This paper revisits and defends Bas van Fraassen's view that we do not (literally) see through microscopes.

The first part of the paper briefly evaluates the position of van Fraassen (1980), Ian Hacking's criticism (1981 [1983, 1985], 1982), and van Fraassen's reply (1985). I distinguish between three arguments in Hacking's criticism: the *argument from practice*, the *argument of the preposterous coincidence*, and the *argument of the grid*. I agree with van Fraassen that none of these arguments refute his position. But I go on to suggest that this is true only "strictly speaking": while Hacking's arguments do not show that van Fraassen's position is logically flawed, they show that it would seem very odd to any practicing scientist (using microscopes).

The second part of the paper introduces van Fraassen's recent work on observability and microscopes (2001, 2008). This work was provoked by Paul Teller's (2001) criticism. Teller draws attention to the phenomenology of seeing through microscopes: we do not experience ourselves as looking at images; we experience ourselves as looking at the object on the microscopic slide. van Fraassen responds with an elaborate theory of a new type of observables: "public hallucinations". These are optical phenomena that are less invariant than objects, but more invariant than private hallucinations or dreams. Rainbows, reflections, shadows, and microscopic or telescopic images are cases in point. van Fraassen claims that it is these phenomena we observe when looking through a microscope. And he goes on to defend his constructive-empiricist stance regarding them: that we should be agnostic regarding the unobservable entities we postulate their basis.

The third part of my paper turns to the so-far most detailed critical study of van Fraassen's recent (2001, 2008) views: Mark Alspector-Kelly's (2004) paper. (Since there are few differences between van Fraassen (2001) and (2008)--as far as microscopes and observability is concerned--Alspector-Kelly's critique can also be read as directed against van Fraassen's 2008 discussion.) Alspector-Kelly attacks in numerous intriguing ways; all are meant to establish the point that there is no

reason to favor naked-eye observation over instrumentally-aided observation. For instance, he argues that van Fraassen's new theory forces van Fraassen to admit that the entities he calls "observables" are postulated entities *just like* the entities he calls "unobservable"; that ordinary language rightly speaks of microscope-use as a form of seeing; and that our best scientific theories regard microscopic detection as no less reliable than naked-eye observation.

The fourth and last part of my paper is a defense of van Fraassen's position against Alspector-Kelly's criticism. I seek to show that public hallucination cannot play the role of sense data; that our ordinary language does not "track" reliability of detection in its use of "to see"; and that it is wrong to suggest that scientific work on the reliability of detection supports the scientific realist's position.

I conclude with some general comments on why the debate over the limits of observability continues to be important.

### Literature

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