I summarize arguments that suggest that the phase diagram of QCD, the theory of quarks and gluons, has a critical endpoint which is analogous to the endpoint of the water-vapor transition. I will argue that this point can be searched for in collisions of relativistic heavy ions. The main observables are fluctuation measurements, and the expected signatures are related to critical opalescence. I summarize the ongoing theoretical and experimental efforts devoted to observing signatures of critical fluctuations. I argue that along the way, we have gained new insights into an old theory, fluid dynamics.