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### **The critical temperature and the atmosphere**

ABSTRACT. Andrews' work on CO<sub>2</sub> concluded that there is a critical temperature above which a gas cannot be condensed to a liquid by pressure alone. Many scientists did experiments which showed that the liquid phase did exist above the critical temperature. In his Bakerian Lecture to the Royal Society, J.D. Bernal showed that the critical temperature was just a point on a continuous line. Simple experiments showed that above the critical temperature there were not just three phases of matter—solid, liquid and gas—but four phases: gas, liquid, solid and multimer phases (and possibly many more). The multimer phase is the basis of clouds. It has quite different properties from the gas phase (air) and the liquid phase (rain). The different properties can be seen not only in clouds but also in a study of high pressure boilers. Latent heat was thought to be zero at and above the critical temperature but the Drakelow supercritical boiler showed this to be incorrect. Many weather publications use the three phase concept of matter; this paper opens up the use of a fourth phase in cloud studies.

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