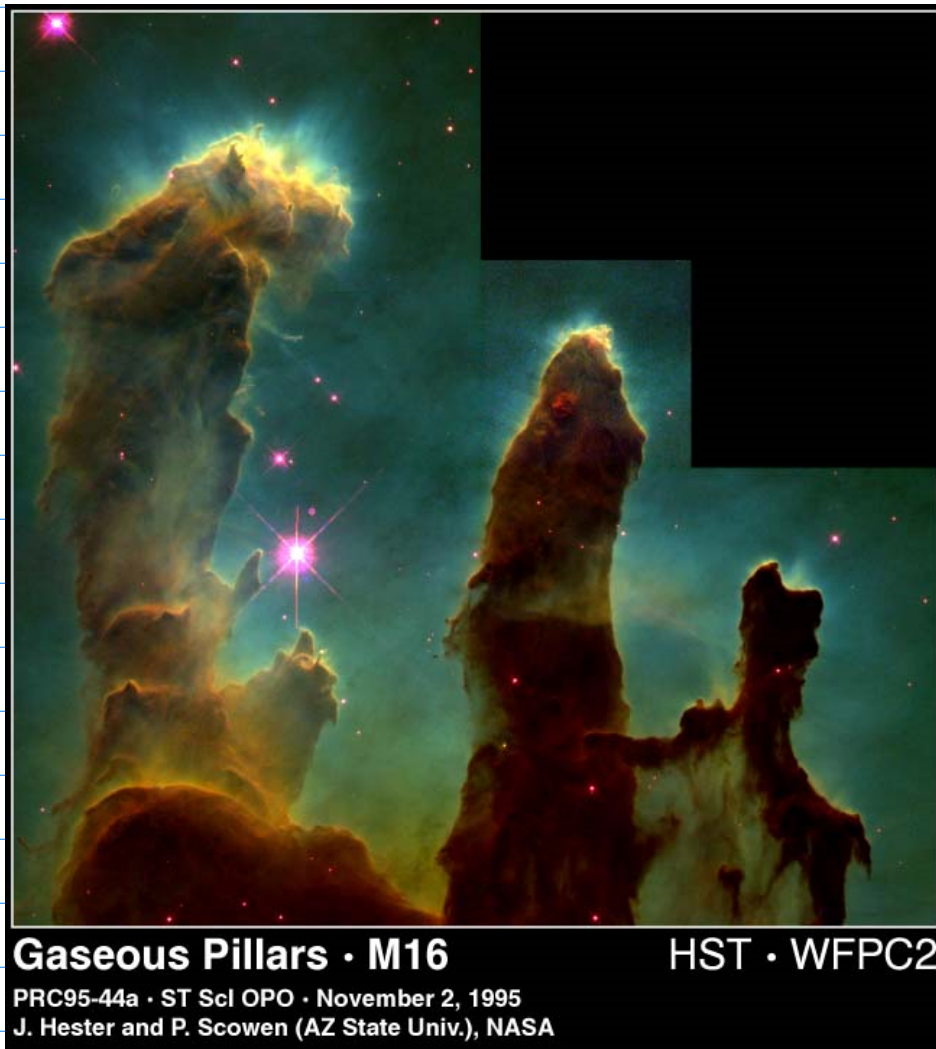


STARS ARE FORMED IN THE GIANT MOLECULAR CLOUDS (GMC)



Gaseous Pillars · M16

HST · WFPC2

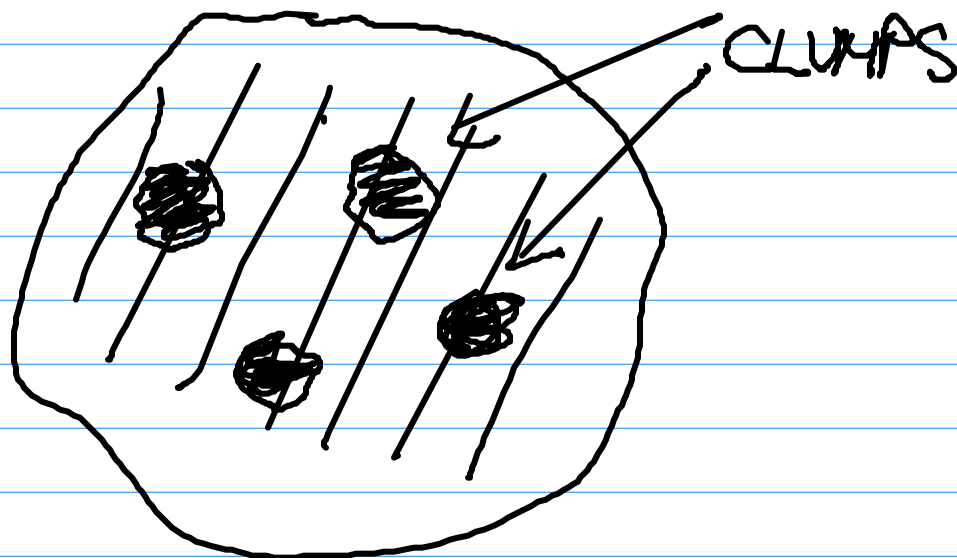
PRC95-44a · ST Sci OPO · November 2, 1995  
J. Hester and P. Scowen (AZ State Univ.), NASA

GIANT : DIAMETER RAUGES FROM  
15 ly TO 600 ly

MOLECULAR : THEY ARE DENSE ; THE  
DUST BLOCKS THE STARLIGHT OF THE  
SURROUNDING STARS KEEPING THE INTERIOR

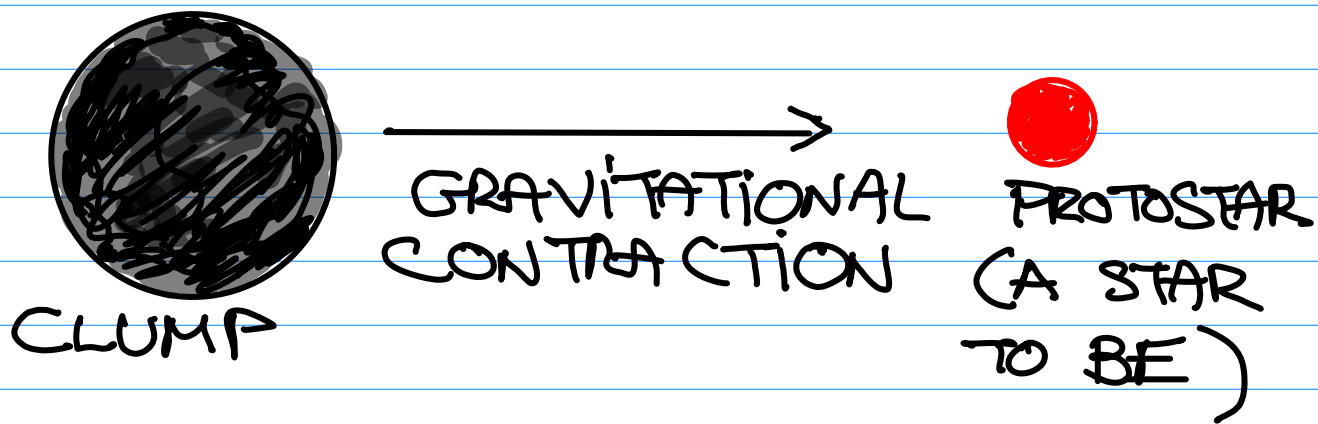
OF THE CLOUD COOL. THE LOW TEMPERATURE MAKES IT POSSIBLE FOR HYDROGEN ATOMS TO BIND INTO THE MOLECULES  $H_2$ .

THE MATERIAL IN GMC IS NOT DISTRIBUTED UNIFORMLY - THERE ARE CLUMPS OF HIGHER DENSITY.

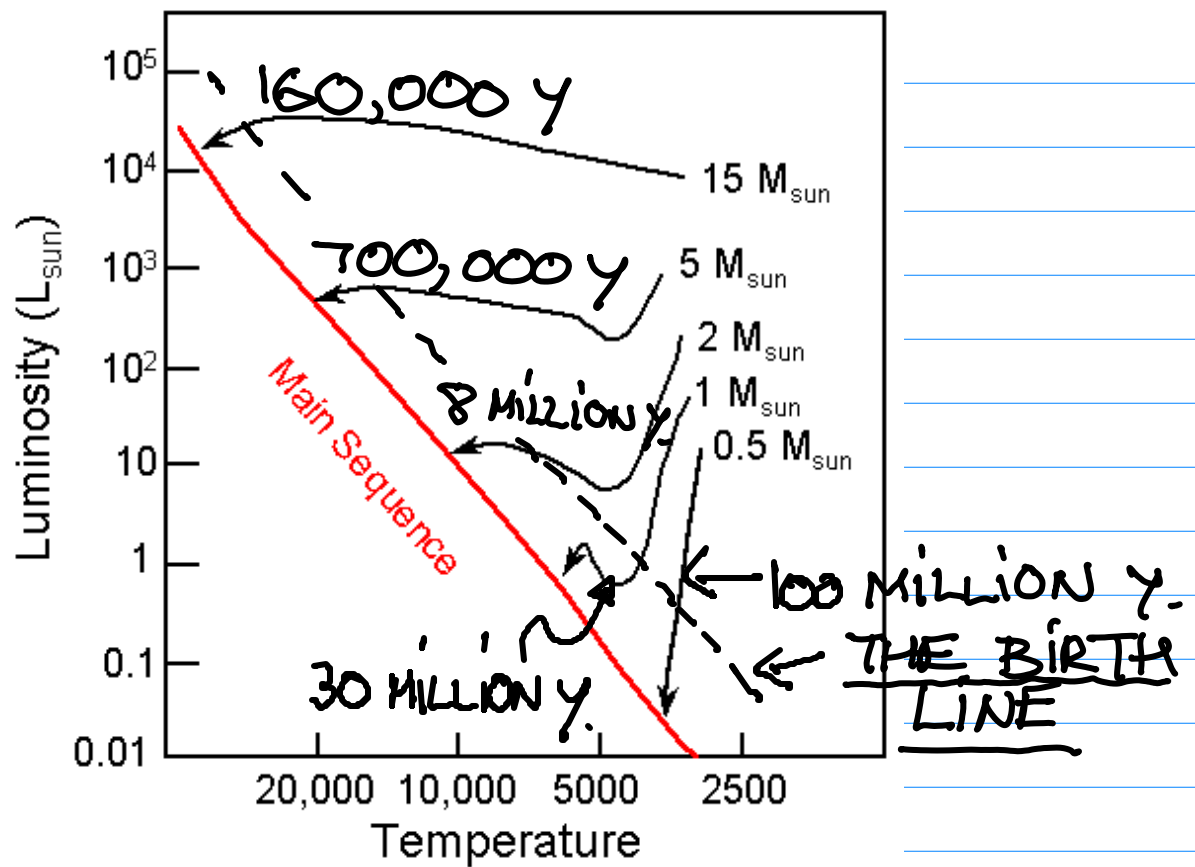


WHY DO THESE CLUMPS FORM? LIKELY AN EXPLOSION FROM A NEARBY SUPERNOVA PRODUCES THE SHOCK WAVE WHICH PRODUCES CLUMPS AS IT PASSES THROUGH THE GMC (SEE THE LINK "TRIGGERED STAR FORMATION" AT THE STUDY AIDS.)

SOME DENSE CLUMPS, START COLLAPSING UNDER THEIR OWN GRAVITY AND THEY HEAT UP IN THE PROCESS (GRAVITATIONAL ENERGY IS CONVERTED INTO THERMAL ENERGY)



If the clump has enough mass so that the temperature in the core of the protostar reaches 10 million degrees K, the fusion of hydrogen into helium will start and the protostar becomes a main sequence star. This protostar stage is shorter for higher mass stars and longer for the lower mass stars.



THE PROTOSTARS CAN BE OBSERVED AT INFRARED WAVELENGTHS WHEN THEIR TRACK ON HR DIAGRAM CROSSES THE BIRTH LINE.