

FOREWORD

NGC 346

Hubble's exquisite sharpness has plucked out an underlying population of infant stars embedded in the nebula NGC 346 that are still forming from gravitationally collapsing gas clouds.

The Hubble Space Telescope has undoubtedly had a greater public impact than any other space astronomy mission ever. The images included in this beautiful volume are quite staggering in what they reveal about the Universe we live in and have already become part of our common scientific and cultural heritage.

But what about the science impact? It is no exaggeration to say that the scientific output of the mission has far exceeded the most optimistic expectations of all those involved in the planning and execution of the project. When I joined the project in 1977, I had to describe the astronomy programme I would carry out with the Hubble once it was in operation in orbit. Seventeen years later when I received my first data, I was quite staggered by the quality of the images and also by the totally new science which they revealed about the ways in which relativistic jets can illuminate the environments of active galaxies. This is a repeated theme in essentially all areas explored by the Telescope. The images are not only beautiful, but are full of spectacular new science, much of it undreamed of by the astronomers involved. A good example is the discovery of protostellar discs seen in silhouette against the bright background of the Orion Nebula. Another is the ability to discover distant star forming galaxies by imaging in a number of wavebands. The observation of distant supernovae has enabled the present acceleration of the Universe as a whole to be measured – an undoubted triumph. And then there are the spectacular images of the Hubble Deep and Ultra-Deep Fields which have revealed what are almost certainly young galaxies in the process of forming the galaxies and larger scale structures we observe about us today. But these are only a few random samples of the wealth of scientific knowledge which has accrued from the mission. Every picture tells a wonderful story which has already been built into our picture of the evolving Universe.

What are the lessons to be learned from this spectacular success? The route to new understanding is through the ability to observe the Universe in new ways with techniques, that extend observational capability by a factor of 10 or more. In the case of the Hubble Space Telescope, the gains in angular resolution, or sharpness, and corresponding sensitivity, as well as the remarkable stability of the instruments in the remote environment of space, have given it unprecedented power to uncover new astrophysics. The results are a wonderful tribute to the dedicated efforts of many scientists, astronomers, engineers, managers and administrators, as well as to the vision of NASA and ESA in enabling the Hubble Space Telescope to come about. Long may this vision and the ability to inspire the public imagination continue as an essential means of deepening our understanding of the Universe.

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Hubble

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