

Why the oldest science is so modern

In the mid-19th century, the British Astronomer Royal, made the public statement at a dinner that he thought astronomy was basically a completed science, with only increased accuracy in brightness and positional determinations remaining. How wrong subsequent history has shown him to be. Astronomers have learned more about the universe in the latter half of the 20th century than in all previous history *in toto*. The following briefly outlines the major reasons why the oldest science is so modern.

- I. Technological Developments
 - A. the spectroscope
 - B. the photographic camera
 - C. improved optics, telescope design
 1. led to dominance of large reflecting telescopes
 - D. electronic detectors
 1. impacted spectroscopy, imaging, and photometry
- II. Space Developments
 - A. modern rocketry developed to provide means of sending telescopes into space
 1. we can observe the entire spectrum of radiation, as well as particle radiation, unfiltered by the earth's atmosphere, offering us views of objects and phenomena heretofore unseen and sometimes unimagined
 - B. exploration of the solar system
 1. has given us our first *in situ* observations of the planets and their satellites, comets and asteroids
- III. Computers
 - A. have effected telescope design in uncountable ways
 1. a major impact has been to allow larger telescopes to be built by enabling the utilization of the simpler altazimuth mount
 - a. tracking is accomplished by recalculating a star's altitude and azimuth many times a second and driving the telescope accordingly
 - B. data reduction and analysis enormously speeded up
 - C. modeling
 1. complex mathematics are required for modelling stars and many astrophysical phenomena) practically impossible to do w/o electronic computers and, with some problems, impossible to do w/o supercomputers
- IV. Theoretical Advances in Modern 20th Century Physics
 - A. relativity
 - B. quantum mechanics
 - C. nuclear physics
 - D. plasma physics