The Exploration of the Unknown

Kenneth I. Kellermann\textsuperscript{1}, James M. Cordes\textsuperscript{2}, Ronald D. Ekers\textsuperscript{3}, T. J. Lazio\textsuperscript{4}, Peter N. Wilkinson\textsuperscript{5}

1 - National Radio Astronomy Observatory, USA
2 - Cornell University
3 - CSIRO
4 - Naval Research Laboratory
5 - University of Manchester

The discovery of cosmic radio emission by Karl Jansky in the course of searching for the source of interference to telephone communications and the instrumental advances which followed, have led to a series of new astronomical discoveries, including the non-thermal emission from stars and galaxies, electrical storms on the Sun and Jupiter, radio galaxies, AGN, quasars and black holes, pulsars and neutron stars, the CMB, interstellar molecules and giant molecular clouds; the anomalous rotation of Venus and Mercury, cosmic masers, extrasolar planets, precise tests of gravitational bending, gravitational lensing, and gravitational radiation. These discoveries, which to a large extent define much of modern astrophysical research have resulted in eight Nobel Prize winners. They were the result of the right people being in the right place using powerful new instruments, which in many cases they had designed and built. They were not the result of trying to test any particular theoretical model or trying to answer a previously posed question, but they opened whole new areas of exploration and discovery.

It is important that those who are in a position to filter research ideas, either as grant or observing time referees, as managers of facilities, or as mentors to young scientists, not dismiss as “butterfly collecting,” investigations which explore new areas of phase space without having predefined the result they are looking for. Progress must also allow for new discoveries, as well as for the explanation of old discoveries. New telescopes need to be designed with the flexibility to make new discoveries which will invariably raise new questions and new problems.