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The linear redshift-distance relationship: Lemaître beats Hubble by two years

Edwin Hubble is often credited with discovering the expanding Universe based on spectra taken by him. There are several errors in this statement and we feel that it is the responsibility of those who are aware of the historical facts to set the record straight.

The detection of the expansion of the Universe is one of the most important scientific discoveries of the 20th century. It is still widely held that in 1929 Edwin Hubble discovered the expanding Universe (Hubble 1929) and that this discovery was based on his extended observations of redshifts in spiral nebulae. Both statements are incorrect. There is little excuse for this, since there exists sufficient well-supported evidence about the circumstances of the discovery. The circumstances have been well documented even recently with the publication of two books: Bartusiak (2010), Nussbaumer & Bieri (2009). Both were positively reviewed in the December 2009 issue of Physics Today.

The facts are simple: Friedman (1922) was the first to publish non-static solutions to Einstein's field equations. However, he did not extend that into a cosmological model built on astronomical observations. In 1927 Lemaître rediscovered these dynamical solutions. In the same publication he extracted (on theoretical grounds) the linear velocity–distance relationship v=Hr. Combining redshifts published by Strömberg (1925) (who relied mostly on redshifts from Slipher (e.g. Slipher 1917)) and Hubble's distances via magnitudes (Hubble 1926), he calculated for the "Hubble constant" two values, 575 and 670 km/sec/Mpc depending on how the data is grouped. For Lemaître these results showed that the Universe was expanding. Two years later Hubble found the same velocity–distance relationship v=Hr on observational grounds from practically the same observations that Lemaître used in 1927. However, Hubble does not credit anyone for the redshifts, most of which again came from Slipher.

A number of today's professional astronomers and popular authors (e.g. Singh 2005) believe that the entirety of Lemaître's 1927 paper (published in French in an otherwise obscure journal) was re-published in English in the Monthly Notices of the Royal Astronomical Society (MNRAS) in 1931 (Lemaître 1931) with the help of Eddington. This is also incorrect as the two pages from the 1927 paper that contain Lemaître's estimates of the Hubble Constant are not in the 1931 MNRAS paper for reasons that have never been

properly explained.

Unfortunately there have been several recent examples of prominent people writing in the popular press who continue to promote Hubble's discovery of the expansion of the Universe (for example, see The New York Times, 15 January 2011 Op-Ed by Brian Greene). Not only have the two books mentioned previously discussed the history of the discovery, but others have stated the facts as well (e.g. Peebles 1984).

There is a great irony in these falsehoods still being promoted today. Hubble himself never came out in favor of an expanding Universe, on the contrary, he doubted it to the end of his days. On the other hand it was Lemaître who was the first to combine theoretical and observational arguments to show that we live in an expanding Universe. This vital fact is far too often brushed aside, whereas it should be accepted as an essential ingredient in the history of science.

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