Is there anybody out there?

By Wendy McCorry, Science Communicator

Do aliens exist? This is perhaps the most common question asked by visitors to the planetarium. Admittedly it is usually asked by our younger visitors who have no idea that such a question could be at all laughable - they simply want to feed their curiosity.

The reply given is a steadfast, "Well, we can't rule out the possibility of life on other planets but as yet we have found no evidence…"
This inevitably leads to a look of disappointment, as all the child really wants to hear is that yes, some night he might look outside to see a one eyed little green man climbing out of a flying saucer in his back garden.

Adults seldom ask the question, but if they do they pretend to be joking, in case you should repeat their query too loudly in front of another grown up. Let's face it, we'd all like to know the answer, but most of us are too embarrassed to ask.

One man who was not too embarrassed to ask, however, was Frank Drake. In 1960, whilst working as a radio astronomer at Cornell University, Drake performed Project Ozma, the first modern SETI (Search for Extra-Terrestrial Intelligence) experiment, using the 25m diameter Green Bank

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radio telescope in West Virginia to search for signs of extra-terrestrial transmissions from the stars Tau Ceti and Epsilon Eridani These stars were chosen because they were located near the Solar System, and fairly similar to the Sun.

Image courtesy of National Radio Astronomy Observatory/ AUI/NSF

Frank Drake by the Green Bank antenna. Born in 1930, Dr Drake is a major figure in the field of radio astronomy, but is probably best-known for his SETI work.

Although the experiment yielded no positive results, it was the start of a hugely popular SETI movement which continues to this day.

At the heart of SETI is the belief that if there are hundreds of billions of galaxies, each containing hundreds of billions of stars and billions of planets, surely there is a distinct possibility of intelligent life out there.

In 1961, Drake attempted to put this question into scientific terms by assigning values to all its relevant influencing factors. This is known as the Drake Equation and reads as follows:

$N = R^* fp\ ne\ fl\ fi\ fc\ L$
N is the number of communicating civilizations in the galaxy
R^* represents the average rate of star formation in the Milky Way Galaxy
fp is the fraction of those stars that have planets around them
ne is the number of planets per star that are capable of sustaining life
fl is the fraction of planets in ne where life

evolves
f_i is the fraction of f_l where intelligent life evolves
f_c is the fraction of f_i that develop the technology to release electromagnetic communications
L is the lifetime of the communicating civilizations

Frank Drake's own solution to the equation estimates that there are ten communicating civilizations in the Milky Way:
Drake's values give N = 10 × 0.5 × 2 × 1 × 0.01 × 0.01 × 10,000 = 10

Drake believes that the value of the equation is not in the answer itself, but in the questions which arise when attempting to calculate each of the variables. He hopes that with increased knowledge from the fields of astronomy, biology and other sciences, the amount of guesswork required in reaching each of the values will be reduced and replaced by a more realistic estimate. Progress is already being made towards this goal, with the discovery of other solar systems within our galaxy, and the existence of possible Earth-like planets such as the much publicized Gliese 581c.

Why not try to calculate your own answer for the Drake Equation? Bear in mind that your answer should not be less than one, otherwise you will have proved what many of us have long suspected - that intelligent human life does not exist!