How the Observer Creates Reality

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Unless they are "thought through the understanding", measurements remain as "intuitions" with no meaning to the observer. Informed by Kantian philosophy, this observer shows that a "concept", developed in the understanding, gives meaning to an intuition and creates a reality in accord with the concept.

Suppose an observer thinks of a number, *N*, and a function, $f: N \to n$, capriciously. The function *f* will map *N* onto another number, *n*, which will lie within any infinitely divisible discrete numerical framework of the observer's design.[1] Of course, because the framework is infinitely divisible all numbers *n* will lie within the framework. However, *n* will probably be either an integer or a fraction of low-denomination [1]. The number *N* was produced by thought; the (rational) number *n* must also have been produced by thought. It seems as if the observer chooses a value of *N* that will *subsequently* be mapped by *f* onto a rational number, *n*, within the observer's framework.

If *N* is instead the numerical value of any constant or parameter that has been measured *in any units*, any function $f: N \to n$ will again map *N* onto a rational number, *n*, within the observer's framework [2]. The numbers *N* that characterise things that draw the attention of the observer often map onto integer *n* or fractional *n* of low denomination. The numbers *N* that, as far as the observer is concerned, characterise closely related things often take up symmetrical locations within the framework [3, 4]. Numbers *N* that draw the special attention of the observer often map onto particular integers *n* that are implicit within the framework, e.g. multiples of 5 or multiples of powers of 5.

An example of a one-dimensional framework is shown in Figure 1. Here, a model supposes that the mass *N* in Planck units[2] of a particle *derives* from Planck scale through multiplication by an exponential factor $(\pi/2)^{-n}$, i.e. $n = -ln(N)/ln(\pi/2)$. Note the symmetrical arrangement of Λ and Σ^0 about *n* = 97 and the occupation by Λ_c^+ and Λ_b^0 of 'sublevels'.

[1] The function f can be an identity function (*n* = *N*). Since the results of a mapping by an identity function have not previously been shown, some examples are presented in the Appendix.
[2] Planck units take values relative to SI units within a framework designed by this observer [2], i.e. they are observer-dependent.

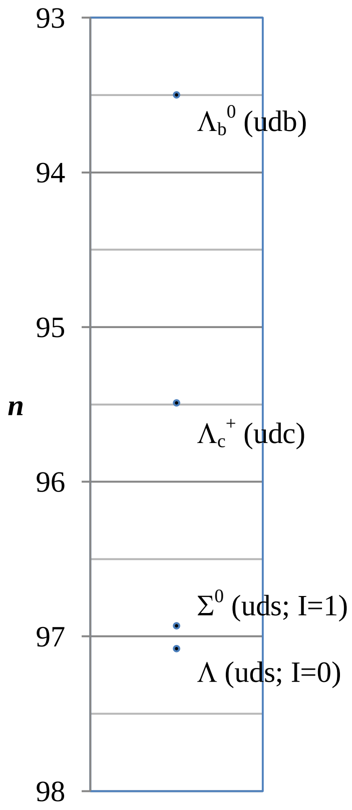

Figure 1: Values of *n* calculated from the masses *N* in Planck units of the lightest uds, udc and udb baryons using the equation $n = -\ln(N)/ln(\pi/2)$, i.e. $N = (\pi/2)^{-n}$. The particle masses used are Particle Data Group evaluations [5]. Also see [6].

Most frameworks this observer has used are two-dimensional. Closely coincident levels in a two-dimensional framework add extra tiers of significance to the one-dimensional frameworks. Examples of two-dimensional frameworks are shown in Figures 2, 3 and 4. In Figure 2, note that the electron and the up quark occupy levels whose level-numbers are multiples of 5. In Figure 3, the up and down quarks are arranged symmetrically about $n_1 = 110$ at (110, 50). In Figure 4, Alpha Centauri A and B – a binary pair – occupy sublevels and are arranged symmetrically about $n_1 = 35$ at (35, 40).

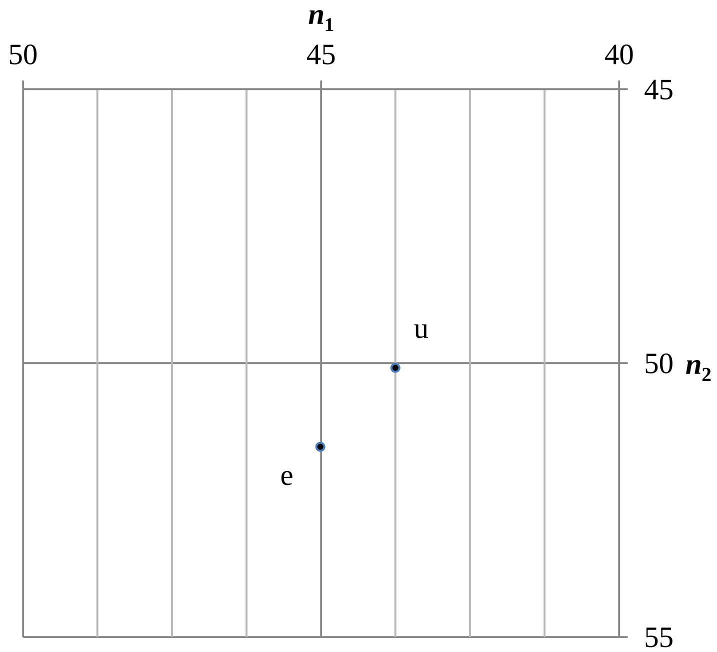

Figure 2: Values of n_1 and n_2 calculated from the masses *N* in Planck units of the electron (0.511 MeV) and up quark (2.16 MeV) using the equations $n_1 = -\ln(N)\,/ln(\pi)$ and $n_2 = -\ln(N)$, i.e. $N = \pi^{-n_1}$ and $N = \mathrm{e}^{-n_2}$. The up quark mass used is the central value of the Particle Data Group evaluation [5]. Also see [7].

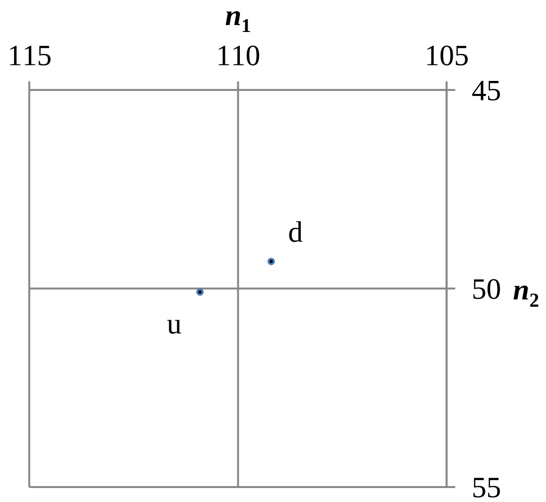

Figure 3: Values of n_1 and n_2 calculated from the masses *N* in Planck units of the up quark (2.16 MeV) and the down quark (4.67 MeV) using the equations $n_1 = -\ln(N)\,/ln(\pi/2)$ and $n_2 = -\ln(N)$, i.e. $N = (\pi/2)^{-n_1}$ and $N = \mathrm{e}^{-n_2}$. The particle masses used are the central values of the Particle Data Group evaluations [5]. Also see [7].

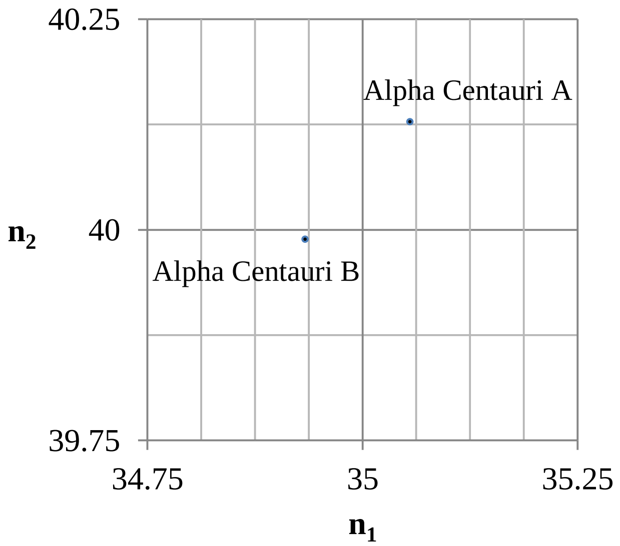

Figure 4: Values of n_1 and n_2 calculated from the radii N in Planck units of Alpha Centauri A and B using the equations $n_1 = [2ln(N) - ln(2)]/5ln(\pi)$ and $n_2 = [2ln(N) - ln(2)]/5$, i.e. $N^2 = 2\pi^{5n_1}$ and $N^2 = 2e^{5n_2}$. The stellar radii used are 1.2175(55) × 10^6 km (A) and 0.8591(36) × 10^6 km (B) [8]. Also see [9].

So how does *f* map any number *N* onto a rational number *n* within the observer's framework, sometimes years after *N* has been measured? Kant's words in the *Critique of Pure Reason* [10] are apposite; he declared, "In whatever way and through whatever means cognition may relate to objects, that through which it relates immediately to them, and at which all thought as a means is directed as an end, is **intuition**. …The capacity (receptivity) to acquire representations through the way in which we are affected by objects is called **sensibility**. Objects are therefore **given** to us by means of sensibility, and it alone affords us **intuitions**; but they are **thought** through the understanding, and from it arise **concepts**." Further, "Thoughts without content are empty, intuitions without concepts are blind. …The understanding is not capable of intuiting anything, and the senses are not capable of thinking anything. Only from their unification can cognition arise."

The number *N*, say the numerical value of a measurement, is an intuition of the observer; the equation $N = (\pi/2)^{-n}$, for example, where n is a rational number, is a concept, thought through the understanding to explain the value of *N*. The units of the measurement are implicit in the concept. Cooperation between the sensibility and understanding of the observer must occur since *N* is mapped by f onto rational *n*. The understanding uses the function $f: N \rightarrow n$ in conjunction with a framework to produce numbers n that reflect the significance to the observer of the corresponding numbers *N*, or the things characterised by *N*, and any perceived relationships among the numbers *N*. Integer *n* carry weight with the observer and since numbers *N* that are significant to the observer may map onto integer *n* whatever the model [11] and even numbers *N* of low significance sometimes map onto integer *n* it seems the observer strives to create a reality that accords with any model the observer should contemplate. In the main, though, numbers *N* that map onto integer *n* will characterise objects, such as the electron, that draw the particular attention of the observer and enable the observer to create a *cogent* reality. The understanding orders the acts of intuition and conception in accordance with an *a priori* intuition of time to create a consistent and logical reality. According to Kant, "…space and time are only forms of sensible intuition, and so only conditions of the existence of things as appearances…".

The use of the function $f: N \to n$ in conjunction with a framework in which to locate the values of n is just one way, though a powerful way, in which the understanding realises concepts. When it was found, using this method, that in Planck units the Bohr radius is given by $a_0 = (\pi/2)^{125}$ [12], it was immediately clear that, in Planck units, the electron mass is given by $m_\mathrm{e} = \alpha^{-1}(\pi/2)^{-125}$. After some reasoning, other parameters were found to take values, in Planck units, along similar lines to the electron mass, including the GUT scale [12], $m_\mathrm{GUT} = \alpha^{-1}(\pi/2)^{-25}$; the up quark mass, $m_\mathrm{u} = \alpha(\pi/2)^{-100}$ [12]; the Higgs boson mass, $m_\mathrm{H} = 2^{25}(\pi/2)^{-125}$ [13]; and the dark energy density, $\rho_\Lambda = ½(\pi/2)^{-625}$ [14]. It appears that the understanding had employed a new strategy – the combining of meaningful numbers – to arise at concepts of the most significant of parameters.

Although a concept may originate with one observer it will speak to the understanding of another observer and establish common ground between the observers.

References

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APPENDIX: *f* AS AN IDENTITY FUNCTION

If the function $f: N \rightarrow n$ is an identity function, i.e. $n = N$, the values of n will lie on the levels and sublevels of the observer's framework. To show this, a two-dimensional framework was first designed. On the abscissa the levels are multiples of 250 and the sublevels are multiples of 25, and on the ordinate the levels are multiples of 300 and the sublevels are multiples of 30. Each number n_i is plotted on the framework as a point (n_1, n_2) where $n_1 = n_i$ and $n_2 = n_i$.

In the first two examples a dictionary of 1296 pages [A1] was opened 10 times; each time one of the two page numbers showing was noted. In the first example (Figure A1) the dictionary was opened anywhere on a whim. In the second example (Figure A2) the dictionary was opened at places progressively further from the front of the book. It can be seen that levels and sublevels are preferred destinations for the numbers n_1 and n_2.

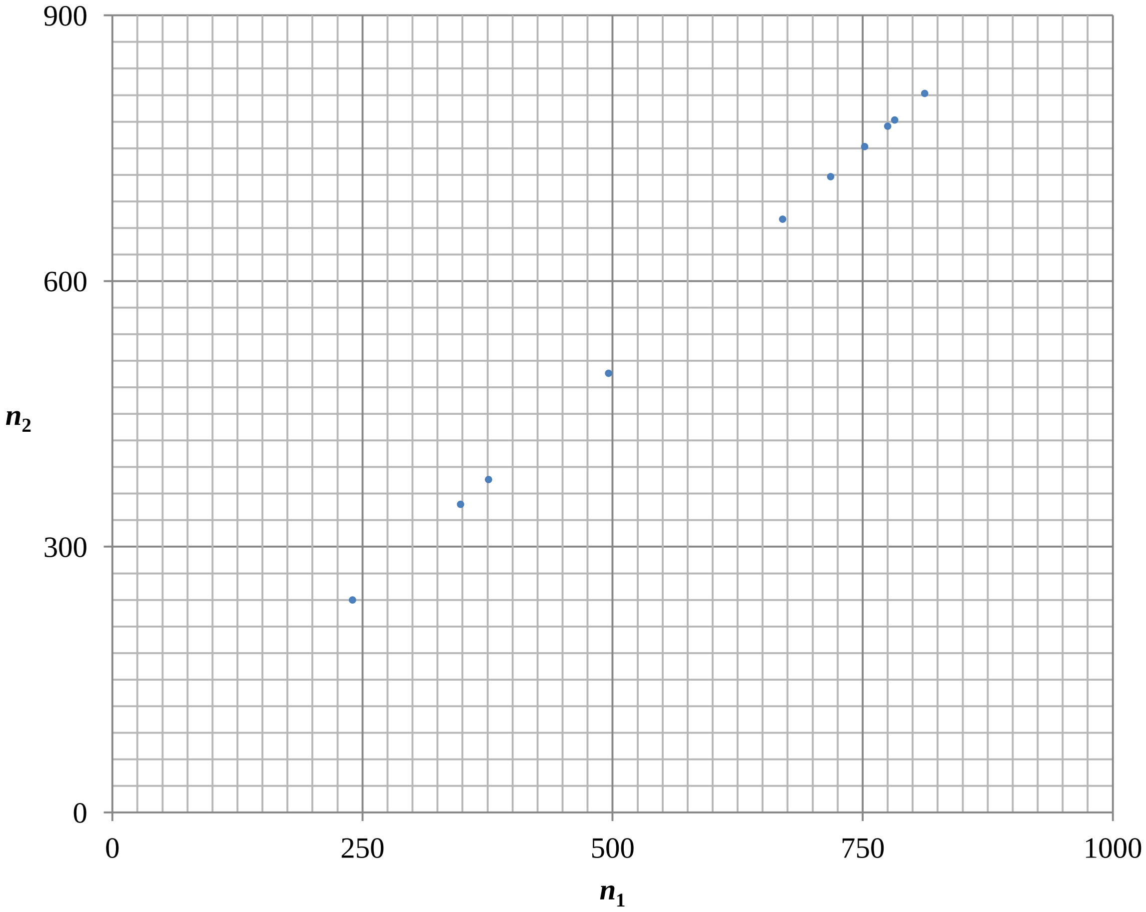

Figure A1: Page numbers noted when a dictionary was opened on a whim, 10 times. The page numbers were noted in this order: 752; 775; 348; 782; 376; 718; 812; 496; 240; 670.

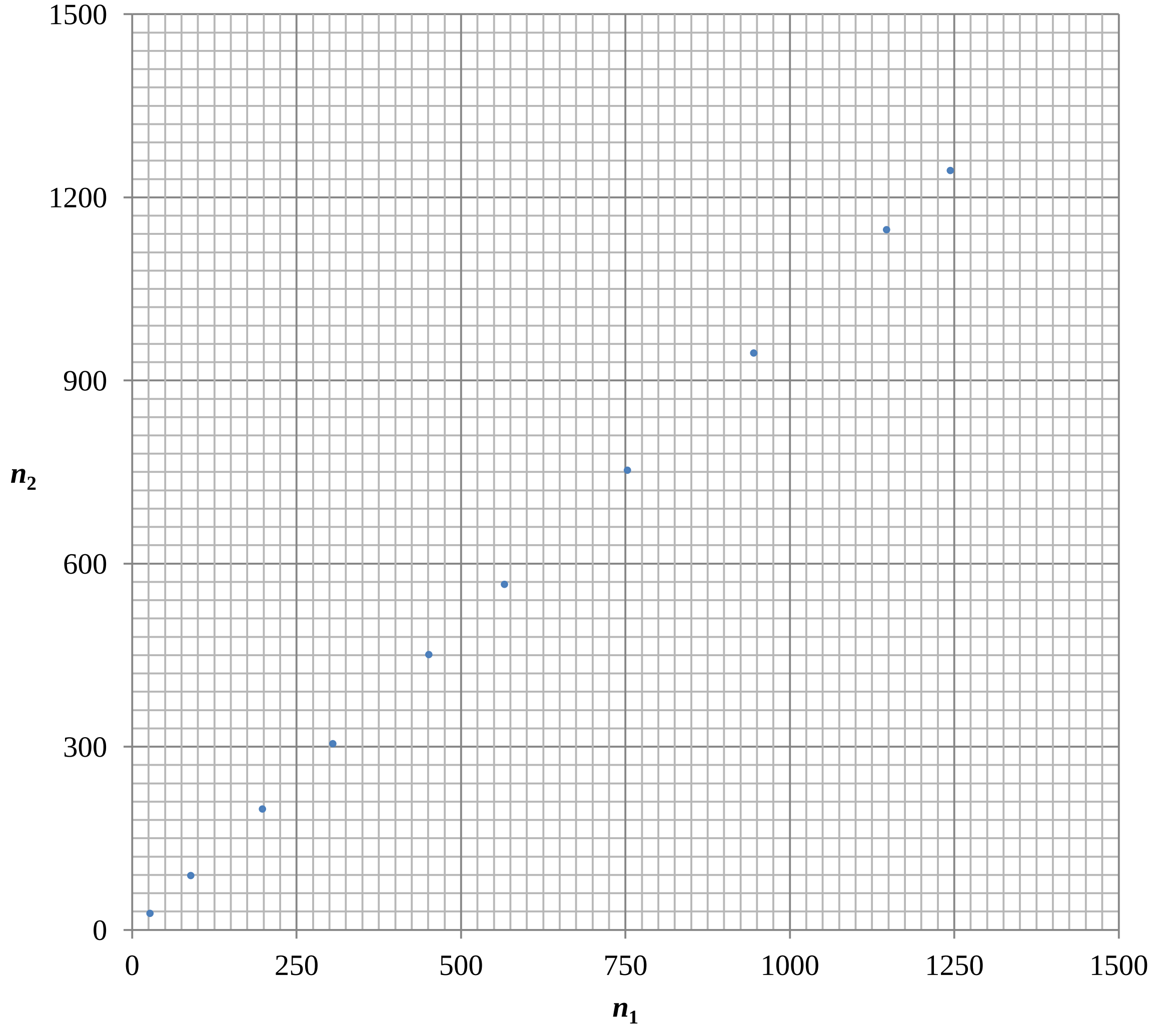

Figure A2: Page numbers noted when a dictionary was opened at places progressively further from the front of the book. The page numbers noted were: 27; 89; 198; 305; 451; 566; 753; 945; 1147; 1244.

Next, the distances in miles by air from London (LHR) to 15 worldwide destinations [A2] were plotted onto another framework, before any distances had been observed. No distances other than those shown were observed. As above, the mapping function is an identity function, and each number n_i is plotted on the framework as a point (n_1, n_2) where $n_1 = n_i$ and $n_2 = n_i$. The results are shown in Figure A3. There is a clear tendency for the values of n_1 and n_2 to occupy levels and sublevels in the framework.

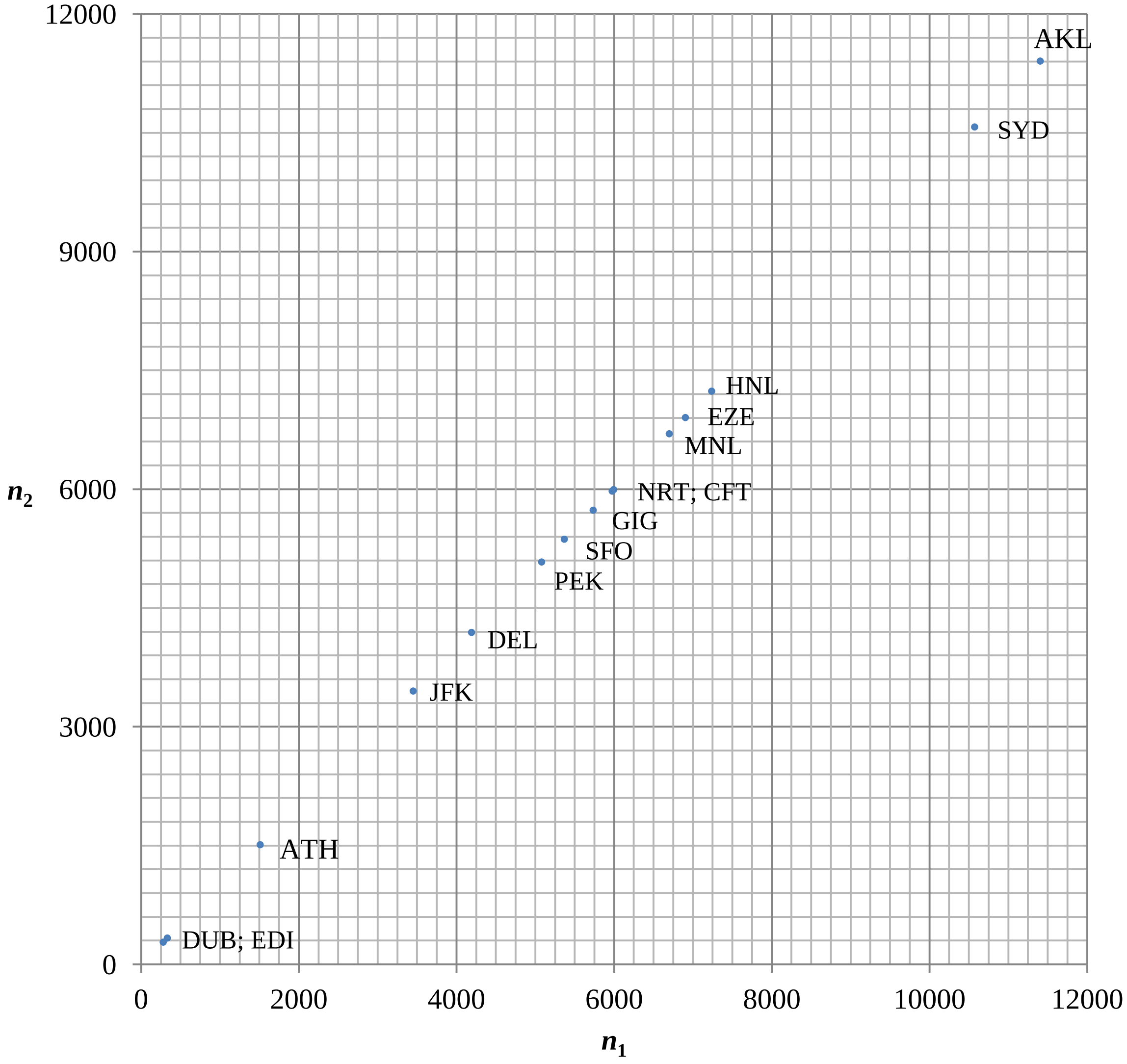

Figure A3: Air distances in miles from London (LHR) to (in this order of observation): Sydney (SYD, 10573 miles); San Francisco (SFO, 5368 miles); Tokyo (NRT, 5975 miles); New York (JFK, 3451 miles); Cape Town (CFT, 5994 miles); New Delhi (DEL, 4191 miles); Rio de Janeiro (GIG, 5734 miles); Dublin (DUB, 280 miles); Edinburgh (EDI, 332 miles); Beijing (PEK, 5080 miles); Manila (MNL, 6699 miles); Auckland (AKL, 11405 miles); Buenos Aires (EZE, 6904 miles); Athens (ATH, 1510 miles); Honolulu (HNL, 7237 miles).

References

A1. Chambers Concise Dictionary, W & R Chambers Ltd 1991

A2. www.airmilescalculator.com