

Neandertal canal backpedal

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Last issue, we reported on research findings that the hypoglossal canal (this carries the nerves controlling the tongue musculature, which in humans carries out the complex functions required for speech) in Neandertals was the same size (both in absolute terms, and relative to mouth cavity volume) as that of modern humans.¹

The (evolutionist) researchers from Duke University had also tested some 'hominid' skulls and found that these were in the ape category. They reasoned like this: more nerve fibres are needed to control speech, so would require a larger canal. Thus they hypothesized that a human-sized canal meant that a creature had the capacity for language. Their conclusion, based on this, was that Neandertals had fully human speech.

However, further research by three graduate students at the University of California at Berkeley seems to have cast serious doubt, if not falsified, the hypothesis that the size of the canal necessarily indicates speech capacity.²

Their findings (also using both absolute values, and those relative to oral cavity size):

1. Cadaver studies in humans (104 samples) showed no correlation between the size of the hypoglossal nerve, or the number of fibres it

contains, and the size of the canal through which it passes. The variation in the canal size in modern humans was wide — from 4.4 to 36.55 mm².

2. Some living nonhuman primates (40 out of 75 samples) have hypoglossal canal sizes in the modern human range.
3. Out of four samples of the skulls of the extinct australopithecines (which virtually no one, including these researchers, thinks had speech capabilities) one had an area of 17 mm², well above the modern human average.

The authors found that the average gibbon, for example, has a hypoglossal canal twice the size of that in modern humans. In modern humans, the size of the hypoglossal canal can also vary on each side of the same skull. In one specimen, one side was twice as large as the other. In one human cadaver, one of the smallest nerves ran through the largest canal.

Their conclusion: one cannot deduce speech capability from the size of the hypoglossal canal in the skull, and based on the hypoglossal canal sizes, the speech capabilities of Neandertals are still an 'open question'.

The original researchers from Duke University object to this, pointing out that the Berkeley conclusion amounts to saying that so long as there is any overlap between species, mean differences are not significant.

It is good science to attempt to exhaustively test a hypothesis, as the Berkeley researchers appear to have done. The episode is a useful reminder of the tentativity of all scientific conclusions.

References

1. Muresan, D. and Wieland, C., 1998. Language skills in early humans. *CEN Tech. J.*, 12(3):257.
2. DeGusta, D., Gilbert, W.H. and Turner, S.P., 1999. Hypoglossal canal size and hominid speech, *PNAS* 96(4): 1800-1804. See also *Science* 283(5405):1111.

No dark matter found in the Milky Way galaxy

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Probably the major cosmological debate among 'big bang' cosmologists is whether the universe will expand forever ('open') or will eventually collapse ('closed'). This depends on the mass density of the universe, represented by the symbol Ω . If $\Omega < 1$, then the universe is open; if $\Omega > 1$, the universe is closed. The fate of the universe is directly related to whether the universe's geometry is hyperbolic (open) or elliptical (closed), i.e. the multi-dimensional equivalent of a hyperboloid ('saddle'), or ellipsoid or sphere. The currently fashionable 'inflationary' models predict that the universe's density is just below the threshold of collapse, i.e. $\Omega_c = 1$ — a geometrically 'flat' universe.¹

Biblical creationists should oppose the 'big bang' theory, because this implies a universe 10 to 15 Ga old, which contradicts biblical chronology and implies death before the Fall. However, some atheists, especially Marxists, also oppose the 'big bang'! This is because it teaches that the universe has a beginning, and they dislike the corollary that everything that has a beginning has a cause.^{2,3} Other atheists try to salvage both the 'big bang' and their atheistic faith by postulating an eternally oscillating universe. One problem is that 'several measurements currently seem to suggest a density of only a fraction ($\Omega = 0.3$) of the critical density,'⁴ and there are many insuperable difficulties even if we grant $\Omega > 1$.^{2,3}

Many astronomers, because of their presuppositions, believe that 90 % of the mass of the universe is invisible matter, called dark matter. The dark matter is believed to exist in several forms: hot dark matter, 20 % of the total, and cold dark matter, 70 % of total.⁴ The dark matter could include neutrinos,⁵ burnt-out stars, smaller

