George Leedham A5; 28 05 17

Question 5 – What illuminating parallels can be drawn between a philosophical account of the nature of space and a philosophical account of the nature of time?

Space - 'to boldly go where no one has gone before', there is that space, the stuff of science fiction and Star Trek in particular (and the famous split infinitive) and the mission to explore space, 'the new frontier'. There is also the space bar on my keyboard that I am typing with right now. Also the kind of space that most people like to have at least some of the time as in 'give me some space'. There is the space here in my study where I sitting, a space that I am occupying. And does this space mould itself around me, or do I displace space and if I do where does it go? Even things that appear solid, like the desk I am leaning on while I type in fact has space between the atoms and nuclei of the material of the desk. There is then several forms of space. Even if I were to leave this room and remove everything from it the space would be there, an empty void but it will still have the air in it and this comprises of molecules of nitrogen and oxygen, and both molecules have the space between the comprising atoms so there is space in space. If I were now to make the room air-tight and somehow suck out all the air so the room space is now totally devoid of air the space would be 'pure' but what would the temperature be, as in outer space there is no air and the temperature is absolute zero (-273 Kelvin). In this box of space, a box of nothing, would time, as we perceive it, exist as there is nothing to move, or be moving in the normal moments of time. Is it possible to have absolutely nothing? And is outer space totally devoid of all gases? Articles inserted late into this document assert that there is a gas in the vast intergalactic space.

Immanuel Kant posited that space is three dimensional and is of infinite quantity. But the space between these letters is only two-dimensional.

Space – a lot more to it than at first realised, and infinite quantity of some types of space. Space can them be bounded or unbounded. Bounded like the white space on this paper, the space as something that has matter and can be touched and manipulated. Bounded also as the volume of space around me in this room, perhaps we could call that 'fluid space', it contracts and expands as I and other things are taken into and moved out of this space. And unbounded space, that which is in outer space; it is of infinite quantity but not completely empty as there are minute quantities of gas in space. So then this space also has matter and apparently not enough of it as the universe does not contain all the matter that it should. Going back to the earlier text and the possibility of removing all the air and so creating 'pure space', this in theory would be completely empty, void of all gases and particles but this would require a perfect vacuum, and this is not possible.

Space then can take several meanings. Space then cannot be a complete void, a volume that contains no matter as it is now proven that this is not possible. Whether space is as I have called it bounded, unbounded, white space, fluid space, and the theoretical pure space it is of infinite quantity where it is as Kant describes it, three dimensional. Two dimensional space is the flat two dimensional space that we can see and perceive, like the spaces between these letters and is of no philosophical interest.

The following text – the result of a google search on perfect vacuum – explains why a perfect vacuum is not possible.

Perfect vacuum will be a highly orderly form of 'nothingness' inside which entropy is zero - by the laws of thermodynamics zero entropy is impossible. Hence perfect vacuum cannot exist (corollary: 99.9999% vacuum can be made to exist with the application of a lot of energy). (Uncited.)

Intergalactic space contains a few hydrogen atoms per cubic metre. By comparison, the air we breathe contains about10^25 molecules per cubic metre. (Wikipedia.)

Now that it has been rationally discussed that it is not possible for space to be completely devoid of matter, and that even outer space (intergalactic space) contains atoms and energy, and that this energy must flow due to entropy, then time must exist everywhere and could be described possibly as the space time continuum that is such a hackneyed expression (along with power conduits) so often mentioned in sci-fi.

This though then counters the ideas of Immanuel Kant who postulated that time is not an empirical conception, and that time is merely a subjective condition of our human intuition, and time itself, independent of the mind or subject, is nothing. Could this statement be likened to the philosophical question of a tree falling and making a noise if there is no one to hear it. Is time like this, not existing if there is no one to perceive it? And, if time did stand still if there was no one to perceive of the notion of time, how would we know? Some omniscient being may have stopped time and we would not know it, because if we perceive time as it is happening, if by some miracle someone, or thing, stopped time we would have no awareness of it. But physically this is not possible as if there can be no life if there is not energy flow from one state to another (entropy). But then that is the theory behind cryonics? People being frozen – suspended animation – so that time for them stands still and that their physical self does not deteriorate as there is no entropy. One is frozen in time. The body can then be brought back to life at some future date. So time still marches on outside this body, otherwise there would be no point to any of it as the whole idea of cryonics is to preserve body tissue so that one could in the future be cured of disease for which at present there is no cure. On another level suspended animation will be vital for any space travel, again this another common story background for science fiction films.

The illuminating parallel then is that for the universe to exist there cannot be any space void of molecules, and all three dimensional space must have energy. Entropy must also exist and this would take time to occur. Space then to exist must have time, and this time can only go forward. Even the few gas molecules in outer space must be constantly moving in time to exist - like entropy the process is irreversible so the phrase 'travelling through the space time continuum' so often heard in science fiction films has some reality.