Newton's Understanding of Space and Time

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Terms

- Time – duration
- Space – open areas between stuff
- Place – a part of space which a body takes up
- Motion – movement of a body from one place to another

Different kinds of Stuff

- Relative – the way we measure things
- Absolute – the way things actually are

Sailor on the Boat

- “As if that part of the earth, where the ship is, was truly moved towards the east with a velocity of 10,010 units, while the ship itself, with a fresh gale and full sails, is carried towards the west with a velocity expressed by ten of those units, while a sailor walks in the ship towards the east, with one unit of the said velocity, then the sailor will be moved truly in immovable space towards the east with a velocity of 10,001 units, and relatively in earth towards the west with a velocity of nine of those units.”

  (AW 285)

More Examples!

Why this is a Problem

- It's about truth

- "…if the meaning of words is to be determined by their use, then by the names time, space, place, and motion, their sensible measures are properly to be understood; and the expression will be unusual, and purely mathematical, if the measured quantities themselves are meant. On this account, those who interpret these words for the measured quantities violate the accuracy of language, which ought to be kept precise. Nor do those who confound real quantities with their relations and sensible measure defile the purity of mathematical and philosophical truths any less."

  (AW 287b)

Bucket Experiment

- Suspend a bucket full of water from a string
- Twist the string up and then let go, allowing the bucket to spin
- The water in the bucket will not move at first, but it will soon begin to rotate with the bucket and form a small whirlpool