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## DUE TO BAD TRANSLATION

Ken Tapping, 30<sup>th</sup> September, 2014

Despite what one might see in science textbooks, science rarely advances smoothly, or in a logical series of developments. It goes up blind alleys, may be driven by fortuitous discoveries or observations. However this erratic process will not happen without hard work and careful observation. One lovely example is the string of events driven by a combination of poor observations and bad translation from Italian to English.

Around the end of the 19<sup>th</sup> Century Percival Lowell, a wealthy American gentleman scientist, heard about interesting observations of the planet Mars made by Italian astronomer Giovanni Schiaparelli, at the Milan Observatory. Schiaparelli had seen linear features on Mars, which he referred to as channels. Of course he used the Italian word, "canali". He only meant they are linearish grooves in the ground; there are features like that on the Moon too, and are entirely naturally occurring. However, Lowell and others misunderstood, and interpreted "canali" as "canals". This is a different issue altogether. Canals are made by engineers. So the idea arose that these structures indicated the presence of intelligent Martians, carefully managing a scarce resource on an arid, dying world. This generated a wealth of science fiction stories, among which the writings of Edgar Rice Burroughs and H.G. Wells are probably the best known. If there were intelligent Martians capable of huge engineering projects, they would have telescopes. These would enable them to see our green, wet, warm world, become envious, and then consider the idea of coming here and taking over. There are probably more science fiction and fantasy books and movies about Mars than about all the other planets in the Solar System combined.

In such an atmosphere, it was easy for Lowell to develop a deep and lifelong interest in Mars – The Red Planet. So he selected a really high, clear, dark site, near Flagstaff, Arizona and had an observatory built on the top, intended exclusively for observing Mars. He spent many years

meticulously mapping the planet's surface, carefully charting all the canals criss-crossing it. His vision was of agricultural areas connected by canals transporting water from the Polar Regions. This idea was supported by seeing the icecaps around the Martian poles growing and shrinking with the passage of the seasons.

Some astronomers, including many amateurs, were skeptical about those canals. They had noticed that when the atmosphere was fairly stable they saw canals flashing in and out of visibility. On the other hand, when the observing conditions were excellent, there were no canals. This led to some experiments with cardboard discs with random lines and blobs on them. Through a perfectly focussed telescope, test observers saw random lines and blobs. On the other hand, if the telescopes were thrown slightly out of focus, the observers saw canals linking the blobs, just like canals taking water between agricultural areas.

However, the romantic picture of Martians carefully husbanding the resources of a dying world was so attractive that it survived until the 1960's, when an American spacecraft flew by the planet. It sent back pictures of huge deserts, mountains, craters and great canyons, no canals, no agricultural areas, and no signs of any Martians.

The big question is how much our romantic visions of Mars led to the intense study to which the planet has been submitted, with orbiting spacecraft, landers, rovers and continuing discussion of manned missions to the world – probably quite a lot. However, Lowell's telescope went on to contribute more directly to astronomical progress. Clyde Tombaugh used it to discover Pluto.

Jupiter rises in the early hours. Saturn and Mars lie close together low in the sunset twilight. Saturn is now the one on the right. The Moon reaches First Quarter on the 1<sup>st</sup>.

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