

[1]: The End Of All Things:

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A distance as vast as humanity's first flight into the wider inter-stellar cosmos can only really be comprehended by restricting ourselves to the mathematics of the situation, for if we choose to view it from any human angle we will surely prevent ourselves from such an undertaking. This presents a fundamental problem, in that while computers can be used to great effect to pilot us, navigate us, they cannot on their own alleviate the human worries, the human psychological issues, or simply the boredom that may be faced.

Our question is how best to ensure our frail human bodies, our complex mental states, and even our neuroses, are protected during a journey such as this? Is it wise to force sleep or suspension of biological function, or is that protecting us from one thing - the aging of our bodies and the mental issues of constant long term flight - but opening us up to a different risk - that humanity may simply no longer exist as we exit our sleep? Would it be wise to construct a craft able to make the journey without incurring the problems of traditional long-haul flight, i.e. some form of 'faster than light' travel? Or would it be better to construct a craft able to conduct humanity as a species - with a suitable genetic pool - rather than humanity as a small set of individuals?

In 2087, humanity or rather the Dutch chose the latter, and it was successful to a degree. It was successful in obtaining human colonisation of another world, but it was not successful in ensuring the trouble free continuance of the Human race, for the genetic pool size was too low at the arrival destination for anything other than sustained population inbreeding and the issues inherent in that course towards the future.

If one allows for the degrees of freedom inherent in a journey such as Humanity's first manned excursion beyond the confines of the solar system, the population size that is sent on the mission must be of sufficient size that no biological, technological, psychological, genetic or astrophysical issue can cause the mission to fail. The required modelling can plan for the worst case given reasonable, if not measured, probabilities for certain events. Unknown unknowns can be accounted for by wide design margins and suitable pre-flight contingency plans. Genetic diversity and long term human evolution can be safeguarded by distributed caches of human genetic material from a highly diverse sample of the Earth's population. All of these factors can be judged, along with the current technological abilities of the time, to arrive at an optimum population density for the mission. Further, risk can be managed via redundancy, in this case by sending humanity out to three separate destinations of roughly the same distance. With this in mind a second flight was launched in 2089 and a third in 2091.

The issue of the mission success rate was not one of computation, modelling or probability analysis, it was simply human error. On all three flights, the human population density - as defined as the optimum live population for the craft being built that would ensure a suitable genetic pool on arrival - were underestimated by between ten and twenty-five percent. This presented the technical planners for future missions with somewhat of an ethical dilemma for it had been re-calculated, that a craft that would be of sufficient population density would not reach the accelerations necessary for arrival before their human cargo incurred significant resource-based losses in population. As I'm sure you'd agree this became an cyclical problem whereby to survive the incurred genetic loss, both human population and resources would need to increase, but would incur further reductions in acceleration that would again defeat any increase in population.

To add to these worries, the number of samples held within the human genetic material caches had been overestimated by approximately five percent. Despite that being generally held as a good thing by the members of the world congress, it was evident that this was useless as the population of women on all missions would not be able to utilise the material, and inbreeding would again result, albeit with an improved thirty-three generation time delay.

With these issues in mind, the world congressional on interplanetary colonisation (WCIC), i.e. the Dutch administrators, ordered a series of follow-on missions. Rather than sending multiple ships to colonise habitable planets in a wide galactic distribution, it was decided to send these missions to the original three destinations. The idea behind this being that with the likely live human population at each destination, along with the frozen human genetic material caches, the follow-on missions would reach their destinations just at the point at which modelling indicated likely inbreeding had resulted. While this was reasonable, critics of the WCIC - in particular, the American society of ethics (ASE) - highlighted that these WCIC plans made two fatal assumptions. Firstly, that the original missions had indeed arrived at their destinations and secondly that the inbreeding time scale from the models allowed too tight a margin. This was particularly stark when one took into account any variations in solar winds, inter-stellar matter concentrations and that the models all assumed the Humans at the destination had the will and determination to use frozen human genetic material in lieu of more traditional monogamy or the new societal trend towards polyamorous relationships.

Despite objections, the WCIC initiated three further missions in 2107, 2109 and 2111. Each of these missions had an improved human colonisation payload, operating under the assumption that the original mission arrived at the destination but that human lives lost en-route were minimal, i.e. the assumption that all was well in terms of genetic diversity. These missions utilised a full re-modelling of the original population density equations, increased design overheads for unknown factors and utilised humanity's modest improvement in propulsion to increase the populations per ship to greater than ten percent above the populations of the original three missions. To help alleviate genetic issues three special measures or rather three orders were given to the crews of these missions, first that the genetic material caches were to be utilised en-route and secondly that all relationships were to be fully polyamorous. It was further ordered that once the new mission arrived at the destination, that all prior relationships must be suspended in order to promote interbreeding between the original mission and secondary mission personnel and that twenty percent of all pregnancies must utilise the wider pool of the human genetic material caches.

By the year 2135, a further set of three missions, (in 2127, 2129 and 2131), had been sent to the original three destinations. These missions were helped significantly by increased scientific involvement as the Dutch-lead WCIC merged with NASA, ESA and JAXA. A number of multinational companies also joined this consortium, showing that once budgets and resources were combined on a world scale the equations of population density per ship would again be modified and improved probabilities of human colonisation would result. Thus by 2135, a total of nine inter-stellar ships had left earth with a total live population of zero point nine billion, along with the genetic material of a further six hundred million. This yielded best case live populations per destination of three-hundred million (one hundred million per ship), and genetic caches of a further two hundred million (sixty-six point six million per ship). While these last three missions launched without technical issues, the general political and societal feelings towards the missions and to the WCIC consortium were less than amicable. Indeed, the three launches were marred by political uprisings, civil war and government-sanctioned massacres. The most severe of these massacres was in Paris on the eve of the 12th August 2131 launch.

While the biological sciences had contributed significantly to the modelling of population density for the missions, and the disciplines of physics and engineering had continued to evolve inter-stellar propulsion technologies, the social sciences had struggled with the genetic issues occurring closer to home. Each political uprising or issue with civil unrest was directly correlated to human genetic issues and the public's anger at the situation. In 2050, the WCIC consortium had implemented long standing programs to attract the best minds, the most physically able and the most genetically suitable specimens of humanity the world had to offer. Ultimately this had reduced the breeding stock of intelligent individuals on earth and had led to a subconscious societal trend towards negative eugenics. Quite simply, by the mid 2120s the birth rate of intelligent, physically able and genetically wide individuals had been skewed by generations of selected segregation for the WCIC space program, whilst the wider population had continued to increase exponentially. The uprisings and subsequent massacres, were a demonstration of societal disquiet with the decreasing proportion of people able to affect any real beneficial outcome for society. Both the dwindling elite and the more populous normal classes became ever more concerned that society was reaching a global precipice whereby the civilisation ran the real risk of collapse.

To quell the flames and cries of social injustice, by 2140 the American government had instigated a world-wide genetic remapping using all remaining samples within the WCIC consortium stockpiles. This was effectively an injection of two point three billion unique human genetic codes collected over the course of one hundred years from all corners of the globe into the beating heart of the global population. This was initially met with general positivity, however the required stipulation that fifty-five percent of all pregnancies were to use this genetic code became a significant societal issue, and one that ultimately proved problematic to implement. Over the course of the proceeding four generations, the stipulation succeeded in correcting the majority of the social imbalance between the elite that had ultimately left the planet and the more normal populace, but created a rift within the traditional models of monogamous and polyamorous relations.

With these new societal issues, the decision was made in 2250 to reduce the stipulated fifty-five percent to a more reasonable and socially accepted twenty percent. Further, these pregnancies were increasingly voluntary and were offered to women as an option alongside other fertility treatments. With the WCIC now in tatters after a dual attack from social unrest in the early 2130s and the subsequent political unviability during the latter decades of the 2100s, humanity looked for answers from the heavens, namely from the three planets that were the focus of humanitys inter-stellar adventures.

From an analysis of the distances, travel times, likely resources and of course relativistic effects, the scientists of the middle 2200s were in the unfortunate position in that no communication was probable or indeed expected from any of humanitys chosen inter-stellar destinations. This lead to a realistic outlook from the educated but a general disappointment and sense of generational anger from those less well educated. A new social rift formed during the 2260s whereby the decades of social rejection of science deepened. At the same time, those less well-off both intellectually and financially began to vocalise discontent with the manner in which society had suffered for the now perceived doomed to fail missions to colonise other worlds. While incorrect regarding communication back from those destinations, they were right in their disillusionment with the worlds authorities and the defunct WCIC as the goal of promoting humanitys growth had paradoxically come at the stupefying cost of at-home human growth and prosperity.

Quite rightly, the peoples of the world did not think the sacrifices of the previous generations were worth the un-evidenced assumption that humans had achieved independent colonies throughout the heavens.

The rift between the dwindling intellectual classes of the world and the wider population was not as fervent as the rifts of previous generations, however it was much lengthier in generational terms. Over time the numbers of children becoming interested in the sciences fell to the point at which society was being sustained by the discoveries and inventions of prior generations and the raw determination of the working classes. Technology was maintained by the few intellectuals produced by an ever more agricultural and manufacturing education system, while the bare mechanical and electrical systems of the world were forever being patched up into ever more inefficient versions of their originally preeminent selves.

As this class rift, shunning intellectualism, lasted for some two hundred generations, approximately five thousand years, the administrations of the planets states, continents and oceanic colonies became ever entrenched in a form of nationalism. This took the form within the general public as a consideration that neighbouring states were bigots and troglodytes; however, the irony here was that all independent nations had descended into a disparate set of prejudiced nationalistic thought. Therefore, between any two states, there was mutual hate and distaste for intellectualism. Any perceived ethical or intellectual intelligence or even shreds of cultural heritage were despised as being the other nations inability to emotionalise the past events of down-trodden working classes. Thus all nations of the planet became ever closer to a de-evolved, entirely atavistic, societal state similar to humanitys pre-renaissance of the 13th century.

During the period of 7,000 to 9,500 AD, the technological prowess of the human society that had sent life into the cosmos, became ever more basic. Even if radio signals from other worlds were being broadcast towards earth, humanity was no longer in a position to receive, let alone understand, any messages. Further, while no particular societal event had occurred, such as the wars or mass extinctions of old, the technological decline of humanity manifested itself as the planet no longer being able to support a large population. For example, without technological help, crop or raw material yields were too low to support populations, and a new equilibrium of human

population vs global resource utilisation was evident in each of the centuries after the mid-50th century. Thus from the peak human population of eleven point two billion in the year 2080, the world-wide human population had shrunk to a pitiful five hundred million as of 6,500 AD. This was followed by unprecedented lows of one hundred and fifty million as of 7,500 AD and eighty-two million as of 8,500 AD. A particular feature of this, was that sporadic skirmishes between the now significantly insular colonies, lead to a globally separated population with trade becoming increasingly limited over the centuries.

At some point between approximately 3,500 AD and 9,000 AD, Earth time, a message was broadcast towards Earth. However, a combination of factors, some noted and some assumed, lead to a deep lack of historical record for this momentous event. This message constituted the pinnacle of humanitys dominion over the cosmos and simply if not rather disappointingly stated that humanity had arrived. It did not detail which destination, which mission to that destination, or what the state of humanity was at that destination. In fact, the message was so vague, that no historical importance, other than its transmission could be inferred from it. Historically, it is both not clear when this message finally arrived in the Terran system our home planet system nor if humanity was in a position to receive the message. It is widely held that the lack of historical record on earth is a product of either not getting the message or the steady technological and societal decline of humanity on earth. Further, while the time and location of the transmission are both a matter of history as recorded by the WCIC missions, the error bars on the modelling of mission travel time, actual speed, actual distance travelled and the assumptions of the inter-stellar medium, resulted in a significant range of probable Earth reference frame arrival times. Suffice to say that this message if it had been received would have helped to prevent the serious societal issues during the period 2,100 AD to 2,900 AD. While vague, one would have hoped it would quell the social disillusionment with intellectualism and the sciences. Social scientists have therefore proposed that the message was likely to have been received, however at a date too late in the technological decline of society to either be interpreted correctly by the governing bodies of the time, or to be widely accepted the crowning achievement it most certainly is by the wider public.

As the history of humanity on earth is both broken by societal decline and inaccurate due to the disillusionment with intellectual endeavour, the history of educated, enlightened humanity is naturally better recorded by the notes and laborious documentation of the WCIC missions. Suffice to say humanity within the Terran system in the years post 9,000 AD was still the dominant species on the planet, however by simple virtue of their small population size, humanity was no longer in a position to self-proclaim ownership of the Earth. The history of man then, after this time, can be assumed to both be stable and uneventful. The social scientists within the WCIC mission populations, and their offspring in later generations, have theorised that a likely course of humanity would be a resurgence of progress at some point in Earths history. This is based on the observation that multiple civilisations and wide geographic empires have periodically formed and collapsed in the earlier recorded history of humanity.

Through a combination of records kept at two of the three destinations, and the recording buoys left en route, it is possible to construct an accurate history of humanity after the WCIC launches. It is this history that represents, to the reader, a topic of far greater interest than the simple, agricultural or nomadic tribes of post 90th century AD Earth.

The End....