

## Calculating the Moment of Creation

Forty years before our story begins, Dr. Ernestine Wagonar set out on the quixotic quest to determine precisely the time and date of the Big Bang, counting back from the present. The purpose of such an investigation would be to put the annual New Year's celebration on a scientific basis, so that each new year would begin on the date that time began. Also, each new year's number would be based on how many years had passed since the beginning of time rather than on some imprecise and highly ethnocentric criterion such as the supposed year of the birth of Christ or, for Jews, counting back through the Old Testament to arrive at a moment of Creation between five- and six-thousand years ago.

Since the Big Bang took only a hundredth of a billionth of a trillionth of a trillionth of a second, Dr. Wagonar argued, it was an occurrence that could be pinpointed in time. It was actually the beginning of time, of course, but placing it on an imaginary grid of years, days, hours, and minutes, it might have happened, for argument's sake, at 3:13 AM on May 8<sup>th</sup> of the year zero. Not that, in that case, May 7<sup>th</sup> of the year zero would have existed. Nor would the year zero have existed since the Earth wouldn't revolve around the sun for another eight billion years or so. But the calculation, however absurdly Earth-centric, would permit humanity to move its New Year's celebration to May 8<sup>th</sup> for a year whose number would be somewhere in the vicinity of 13 billion, 81 million, and perhaps 504, 983 (just a guess).

As you might imagine, Dr. Wagonar's obsession with this quest was a lonely one, there being very few people, scientists or otherwise, interested enough in the accuracy of the annual New Year's celebration to devote more than a moment's thought to it. January 1 of some Year of Our Lord or other did quite nicely, thank you. But Dr. Wagonar tried to persuade her colleagues and fellow cosmologists that a proper New Year's Day and year would reshape humanity's vision of itself in the universe, humble it, give it a more universal basis for celebration, and by repetition, year after year, begin to erase the tribal traditions that divided it into potentially hostile camps. A New Year's celebration based on reason rather than on superstition would be a step towards a life of reason, a society of reason, even a ritual of reason, supplanting religion and bringing peace to Earth and humankind.

Besides, she argued, once humans had colonized space, a more universal calendar would be required. And what could be more universal than the birth of the universe as the starting point for counting years?

The difficulty was in being precise enough about the age of the universe to come up with an exact date. The best estimate of the age of the universe was 13.81 billion years, but that was give or take 120 million, which left one very far from the kind of precision Dr. Wagonar was looking for. Over the forty years during which Dr. Wagonar pursued this quest, the estimates for the universe's age became increasingly precise, giving her ample hope that within her time of tenure at Margaret Fuller University she would be able to publish an article in a major scholarly journal on the subject most dear to her heart. But it was not to be, and Dr. Wagonar was eventually persuaded to retire without having achieved her lifelong goal.

One warm and humid March afternoon on her tiny balcony overlooking the garden of her condo complex, while sipping her third margarita in the hour since lunch, having on her retirement relocated from New England to Key West with all of the attendant changes in habits and morals, Dr. Wagoner was visited by a little man in what looked like a Star Trek costume, bald but with two thin antennae waving like undersea kelp from just above his forehead, who appeared in front of her as if having teleported from some spaceship circling invisibly overhead.

“Dr. Wagoner,” the little creature began in perfectly normal American English. “Please don’t be alarmed. I come only because for many of your Earth years I have been intrigued by your project of establishing the New Year on a rational basis. It’s something we did several of your millennia ago. I thought if I gave you the precise date and time of the Big Bang together with the equations necessary to arrive at them, it might help you in your admirable quest to create a more rational ritual framework for your race.”

“Can you do that?” Dr. Wagoner exclaimed, so excited by this possibility that all questions about the reality and origin of the little creature disappeared behind blazing light of the Holy Grail he seemed to be about to offer her.

“Of course,” he said. “Just one detail of your justification will need to be changed, however. How Earth-centric of you to assume that once you get into space the universal measurement of time could be in Earth years! The date and time I will give you assumes a grid of Earth time, but I assure you that we use a more universal grid based on a cycle of which you can have no comprehension. Even so, I say let the Earth creatures take the first step towards living a life of reason! The rest will follow in due time.”

“Oh, thank you, thank you, Dr. ...? Mr. ...?”

“You can call me Frank,” the little man said. “And thank you for your dedication to a more science-based, rational life! Well, goodbye now! You will find all the necessary documents next to your computer. Please don’t hesitate to take credit for the equations. My guess is that if you say you got them from me, well ...”

And with a little giggle, Frank disappeared.

A little woozy from her third, just-gulped-down margarita, Dr. Wagoner pulled herself up from her wicker chaise lounge and staggered through the open glass doors to her computer, next to which, as promised, was a neat manila envelope containing a few sheets of paper. And even in her inebriated state, just glancing at the equations so beautifully printed on creamy, thick paper, she could see that there was something extraordinary here, something so simple yet so utterly unimaginable up until that very moment, that once these equations had been disseminated and digested, human understanding of space and time would be forever changed.

And so she did the only thing that seemed to make sense to her at the moment, which was to tuck the equations carefully back into their envelope, lay the envelope back beside her computer, and

with her clothes still on, fling herself into bed for a nice, long nap. If the envelope was still there when she awakened, which she very much doubted, she would deal with it then.

Twelve hours later she awoke in the dark, confused. What was she doing in bed with her clothes on? What time was it? Her clock said 4:00. Must be AM. It would be light if it were PM. What had she been doing before she got into bed in her clothes? Oh, yes, the margaritas. She had been sitting on her balcony drinking her usual margaritas ... The envelope!

She jumped out of bed, went into the bathroom to relieve herself and splash some cold water onto her face, then rushed into her living room and over to her computer.

The envelope was still there.

Hands shaking, she reopened the envelope. The equations were still there. How could that be? She dreamed this, didn't she? It was an alcohol-induced dream! She looked at the first equation, which seemed a straightforward calculation of the Hubble constant using the latest Planck-derived observations, the only difference being that the constant itself, at the end of the process, had a different value from the one most cosmologists assigned to it. One little tweak to the equation, and the result was quite different.

The same was true of the other five equations: each used data presently available to derive slightly different values for such things as the amount of dark matter and energy in the universe, the apparent size of the universe, and so on, so that the last equation, which was based on those new values, came up with the date and time of the Big Bang (positioned on an imaginary grid of Earth years) as November 19 at 9:31 PM precisely 13,810,732,421 years ago.

Dr. Wagoner's first thought was: Oh, that's far too big a number! People couldn't go writing numbers like that into their checkbooks! Or diaries. Or calendars. Or whatever people under a certain age used nowadays. The way people referred to the years would have to be made more convenient, like 421, or 2,421! Why hadn't she thought of that before?

Her second thought was: How wonderfully considerate of Frank to have crafted these equations in such a way that she could reasonably claim to have come up with them herself! There wasn't a single piece of data that was not available to her in the current cosmological literature, nor was there a single tweak of a single equation that was beyond the mathematical ability of even a mediocre cosmologist like herself, whose last publication, a description of an obscure galaxy observed in her brief turn at the Mt. Lick Observatory in California, had appeared over twenty years earlier.

Her third thought was: What will this do to my life? How can I claim to have come up with these equations all by myself? How can I accept the accolades, the honors, the prizes, perhaps even a Nobel prize, while living a lie for the rest of my life?

This thought gave her serious pause. She was tempted simply to put the equations away for the moment to give herself time to think about that. But to sit on such an extraordinary scientific discovery seemed impossible. It felt like sitting on top of an erupting volcano. How could she

keep this for just one extra moment to herself? She couldn't, that's all. She couldn't. And off the equations went to the Journal of Cosmological Research, the most prestigious journal in the field.

The rest, as they like to say, is history.

Dr. Wagoner, as one might imagine, became one of the most famous and recognizable scientists of her generation, a Household Word, not quite on a par with Einstein, but not far behind. The curious thing is that she became such really, within herself as well as in the public eye – a truly brilliant, deep thinking, creative cosmologist, as though in her sudden emergence into the spotlight she was like a plant that had not had enough sunlight and now had a chance to bloom. Her Nobel acceptance speech became the classic statement of the significance of an esoteric science in everyday life. She guest lectured at all the major universities of the world, gave TED talks on the Internet to millions, mentored a generation of cosmologists, and on her own, with no help from Frank or any other alien fairy godfather, pushed human understanding of the universe even farther ahead, with ideas and equations of her own creation.

Yet all this accomplishment was bitter in her mouth, for it was poisoned at the source, and she never could forget from whence it came. Frank's visit to her little condo in Key West seemed like a visit from Mephistopheles, with she in the role of Dr. Faustus, and the rest of her life was her punishment in Hell. Her biographers (yes, there were three before she died, with more after) plied her with questions about her great discovery, and what was she to say? That although she was able to figure out when time began, she hadn't a clue as to how she had been able to do it? But her reticence on the subject was taken to be humility, and the more she equivocated, the more people admired her, until she began to shun public life altogether, which people attributed to her declining health.

On her deathbed she could stand it no longer. The idea that her life would continue to be a lie throughout human history tortured her even more than it had in the years of her fame. With her last strength she scribbled a note on a pad by her bed, recounting in detail her meeting with Frank and the source of the equations in the envelope he had left behind. In tears she begged humankind for forgiveness, pleading that she had seen no alternative to the deception, but that now she wanted the truth to be known. Which gave her just one moment of peace before she died.

Of course, her scribbled note was attributed to the dementia of a dying woman. The doctor who pronounced her dead decided that the best course was not to ruin her reputation by making her insane confession widely known, although he did show it to some of her closest associates, all of whom agreed with his assessment, one of whom preserved the note, which remained in his family as a curiosity for generations until it was sold at auction and appeared, again as a curiosity, on whatever media then existed for disseminating news.

Somewhere in a galaxy far, far away, an alien scientist, the one who had called himself Frank, smiled. Mission accomplished. It was a feather in his cap that he had suggested using the obsession of that stupid woman with the date of New Year's Eve to feed humanity false values for the Hubble and cosmological constants, the amount of dark matter and energy in the universe, and the universe's size. As a result, he was chosen for the mission above more

experienced alienists and promoted from Alienist 5 to Alienist 3, skipping a whole grade ahead of his arch rival and nemesis, Xhylerizchionim.

He settled his 42-ton body into his 86-hour pod, folding his array of thick, gray lower curtain-skins comfortably around him. The false values his equations had arrived at using the flawed data derived from primitive instruments would retard human emergence from their home galaxy for millennia. His own civilization would continue to have exclusive dominion over the universe without having either to enslave or exterminate competitors. Although no human would ever know it, least of all Dr. Wagoner, her personal sacrifice had saved billions of human lives.

And New Year's Day? Had it been moved to November 19? Was the year changed to 13,810,732,421, or 2,421, or 421? Of course not! New Year's continued to be celebrated on January 1, and the year remained whatever number the Year of Our Lord was. Some cosmologists campaigned for a Big Bang Day to be celebrated on November 19, but in the end that came to nothing. It turned out that rational ritual was an oxymoron. At least for humans.

As for the non-human rational creatures out there in the vast reaches of the universe, thanks to Dr. Wagoner, with an assist from Frank, it may, thank God, knock on wood, take a few extra millennia to find out.