



COSMOLOGY COMPARED TO WEATHER PREDICTION AND KEEPING TRACK OF OUR MARBLES WITHOUT LOSING THEM

HOW WILL WE KNOW WHEN THE SCIENCE WE CALL PHYSICS IS MATURE ENOUGH TO DESCRIBE THE ORIGIN OF WHAT WE CALL THE UNIVERSE, OR THE GREATER COSMOS?

LET'S CONSIDER THE ACCURACY OF WEATHER PREDICTIONS. LET'S SAY THE CHANCE OF RAIN NEXT TUESDAY IS PREDICTED TO BE 80%. WILL IT RAIN 80% OF THE TIME ON THAT DAY? OR AT 80% STRENGTH COMPARED TO THE HEAVIEST RAIN EVER SEEN, BUT ALL DAY? WELL, IN ALL LIKELIHOOD, AS WE ALL KNOW, THE CHANCE OF IT BEING COMPLETELY SUNNY ALL DAY IS PRETTY GOOD, MAYBE 50/50 OR SO, SO WHY NOT JUST FLIP A COIN?

THE SAME APPLIES TO COSMOLOGY TODAY. FLIP A COIN. EITHER GOD DID IT OR DARWIN. NOT VERY SATISFYING. THROW IN HEISENBERG AND SCHRODINGER AS POSSIBLE CREATORS AND THE COIN TOSS MAY COME UP BOTH, NEITHER AND EITHER ALL AT THE SAME TIME.

BACK TO THE WEATHER METAPHOR. THE SITUATION IS DIFFERENT ON SHORTER TIME SPANS OF COURSE, AND SITUATIONS WHERE WE CAN OBSERVE RELEVANT INFORMATION. SAY ONE HOUR. IF I VIEW THE CURRENT RADAR MAP, AND KNOW THAT IT IS RAINING VERY HARD IN A LARGE REGION OF PENNSYLVANIA TO MY SOUTH, JUST 60 MILES AWAY, AND THE WINDS ALOFT ARE AVERAGING 30 MPH TOWARDS ME, I CAN GUESS RATHER ACCURATELY THAT IT WILL LIKELY RAIN HERE IN TWO HOURS. AND IT PROBABLY WILL. YET IT STILL MIGHT BE JUST DRIZZLE, OR IT MIGHT BE TORNADOES, THOUGH THEY ARE RARE HERE. AND OF COURSE WE ALREADY KNOW THE RAIN WILL BE A LITTLE EARLY OR A LITTLE LATE. PREDICTING WEATHER IS BASICALLY A THOUGHT EXPERIMENT, STARTING FROM OBSERVATIONS AT POINTS IN TIME AND SPACE WHILE IGNORING MOST POINTS AND MOST OF THE INFORMATION AT EACH POINT WE CHOOSE, TO SIMPLIFY CALCULATIONS, AND THEN RUNNING TIME FORWARD TO SEE WHAT IT MIGHT LOOK LIKE.

PRETEND YOU'RE TEN YEARS OLD. I AM. I ALWAYS WILL BE. TAKE A BAG OF MARBLES, HOLD IT UP IN THE AIR IN THE LIVING ROOM, AND TELL YOU'RE MOM THAT YOU KNOW EXACTLY WHERE EACH MARBLE WILL END UP IF YOU EMPTY THE BAG. YOU END UP SPENDING THE DAY GROUNDED IN YOUR ROOM. BUT THE NEXT DAY, WHILE SHE IS AT WORK, YOU DO YOUR MARBLE BAG EXPERIMENT A HUNDRED TIMES, MAKING AN ACCURATE DRAWING OF THE MARBLES ON THE FLOOR EACH TIME. AND YOU NOTICE SOME ROUGH PATTERNS OF SIMILARITY ON MOST OF THE HUNDRED DRAWINGS. SHE COMES HOME, NOTICES A BROKEN LAMP AND SENDS YOU TO YOUR ROOM. WHILE THERE, YOU WRITE A STORY ABOUT YOUR MARBLES AND DRAWINGS AND DECIDE TO SUBMIT IT TO YOUR SCIENCE TEACHER AND ASK HER TO ACCEPT IT AS SATISFACTION OF A HOMEWORK ASSIGNMENT THAT YOU DREAD DOING. YOUR TEACHER GIVES YOU AN A+. YOU SHOW IT TO YOUR MOM AND SHE PREDICTS THAT IN ELEVEN YEARS AND TWO MONTHS FROM NOW YOU WILL GRADUATE FROM UNIVERSITY WITH A PHYSICS DEGREE AND GIVE THE COMMENCEMENT ADDRESS TO YOUR WHOLE CLASS. THE TIME PASSES AND SHE IS SPOT ON WITHIN PLUS OR MINUS ONE WEEK. HOW DID SHE MAKE SUCH AN ACCURATE PREDICTION? SHE HAD KNOWLEDGE OF HOW A CALENDAR WORKS.

WE HAVE NO DIVINE QUANTUM RELATIVISTIC CALENDAR FOR TIME AND SPACE. WE DON'T KNOW WHETHER THE SPEED OF LIGHT HAS ALWAYS BEEN WHAT IT IS NOW. WE DON'T KNOW IF OUR EQUATIONS, EVEN THE ONES MOST VERIFIED, ARE EXACT OR JUST APPROXIMATIONS. TIME ITSELF IS VARIABLE, SO IS SPACE ITSELF APPARENTLY, WITH BOTH LOCKED INTO A RELATIONSHIP WITH LIGHT. BUT ARE THEY LOCKED TOGETHER ABSOLUTELY RIDGEDLY OR MORE LIKE CONNECTED BY RUBBER BANDS? HOW STIFF ARE THE RUBBER BANDS? CAN ANY OF THEM EVER BREAK? WHAT WOULD THAT MEAN? IS THE UNIVERSE A HOLOGRAM BUT WE ARE NOT, OR IS IT THE OTHER WAY AROUND OR NEITHER OR BOTH? THEY SAY JUST SHUT UP CALCULATE, BUT I HATE MATH.

BUT I'M GOOD AT IT, VERY GOOD. AM I? I AM.

TO THINK THAT THE ENTIRE COSMOS IS AS SIMPLE IN ITS DYNAMICS AS A BAG OF MARBLES OR THE WEATHER IN PENNSYLVANIA ON TUESDAY IS ABSURD, SO IT SEEMS OUR MINDS WILL NEED TO STAY OPEN ON THESE BIG QUESTIONS FOR THE TIME BEING. SO PLAY WITH YOUR MARBLES FOR SURE, BUT TRY NOT TO PISS OFF YOUR MOTHER!

WHICH CAME FIRST, CONSCIOUSNESS OR MATTER, THE EGG OR THE CHICKEN? WAY TOO SOON TO TELL. FLIP A COIN OR JUST PICK ONE. DUST OR CONSCIOUSNESS, WHICH CAME FIRST? IF DUST, WHERE DID THAT COME FROM? IF CONSCIOUSNESS, WHERE THAT? AT LEAST WE CAN PROBABLY SAY CONSCIOUSNESS IS ASKING THESE QUESTIONS, SO I CHOOSE TO START THERE. I HAVE TO. AND SO DO YOU.

IF WE CRAMMED ALL THE ENERGETIC PARTICLES OF OUR REALITY WE CALL THE COSMOS INTO THE ELECTROMAGNETIC SPECTRUM, WOULDN'T THAT ENERGY BUMP UP THE SPEED OF LIGHT TO HYPOTHETICAL INFINITY, COLLAPSING THE COSMOLOGICAL CONSTANT? IF WE DID IT VERY, VERY, VERY CAREFULLY WITHOUT BREAKING ANYTHING, WOULDN'T WE STILL BE THERE?

WOULD LIFE THERE BE POSSIBLE? I DON'T KNOW. AND NEITHER DO YOU. IF THE COSMOS REALLY IS A UNITY CONNECTED BY RULES (RUBBER BANDS) WHICH CAN NEVER BREAK, THEN AREN'T WE THERE ALL ALONG? WE ARE THE ONES ASKING THE QUESTIONS. DO WE FRAGMENT INTO MANY EGOS WHEN THE SPEED OF LIGHT SLOWS DOWN TO A FINITE VALUE, LIKE NOW IN OUR AREA OF THE COSMOS. IN OUR PERCEPTION OF EXISTENCE IN A COSMOS? IS OUR UNIVERSE JUST A LITTLE FENCED OFF PATCH IN THE GREATER COSMOS, MAYBE A NURSERY WITH A SPEED RESTRICTION TO KEEP US SAFE AND STABLE WHILE WE DEVELOP. GOD FORBID, COULD WE BE CHILDREN OF GOD? WHAT IF WE GROW UP? WILL WE BE SENT TO OUR ROOMS AGAIN ANYWAY? I HOPE NOT.

THE MORAL OF THE STORY IS THAT WHEN WE CAN PREDICT SUCCESSFULLY THAT NEXT TUESDAY, IT WILL RAIN HARD FROM 2:12 IN THE AFTERNOON TO 2:17, THEN STOP FOR SIXTEEN MINUTES EXACTLY, THEN START AGAIN AND RAIN FOR 18 MORE MINUTES, THEN STOP FOR THE DAY, AND THAT THE SUN WILL BREAK THROUGH THE CLOUDS AT EXACTLY 7:31 PM IF YOU ARE STANDING ON A CERTAIN SPOT, AND ALSO KNOW WHEN AND WHERE AND HOW STRONG ALL THE EARTHQUAKES ON EARTH WILL BE FOR THE COMING MONTH, THEN WE WILL BE ABLE TO RUN TIME BACKWARDS IN OUR HEADS TO THE BIG BANG AND FIND OUT THAT IT DIDN'T HAPPEN, BUT THAT SOMETHING REALLY INTERESTING DID, AND WE MIGHT ALL PRETTY MUCH AGREE ABOUT IT. BUT OUR MOMS WILL STILL SOMETIMES SEND US TO OUR ROOMS, OR MAYBE WE WILL JUST STAY THERE BECAUSE WE LIKE IT. IF WE EVER GET THERE, WILL WE FIND A GOD WITH ANSWERS TO ALL OUR QUESTIONS, OR JUST A LITTLE GIRL ASKING HER FIRST QUESTION, CAN I GO OUT AND PLAY? WHAT WOULD YOU SAY TO HER? CAN I TALK TO YOUR PARENTS? WHAT IF SHE ANSWERED, YOU'RE SILLY DADDY. AND WHY ARE YOU DRESSED UP LIKE THE EASTER BUNNY?

