**1/25/09 THESKEPTICARENA.COM**

**GAMBLER'S FALLACY**

**THE GAMBLER'S FALLACY IS THE MISTAKEN NOTION THAT THE ODDS FOR SOMETHING WITH A FIXED PROBABILITY INCREASE OR DECREASE DEPENDING UPON RECENT OCCURRENCES.**

**FOR EXAMPLE, IN CALIFORNIA WE HAVE A STATE RUN GAMBLING OPERATION CALLED SUPERLOTTO. THE IDEA IS TO PICK 6 NUMBERS AND MATCH THEM TO SIX SELECTED FROM 51 NUMBERS. SOUNDS EASY. THE ODDS OF DOING SO? HERE IS WHAT HAPPENS IN A TYPICAL WEEK. ON JULY 25, 1998 THE NUMBERS WERE: 5, 7, 21, 32, 44, 46. THE JACKPOT WAS $16,000,000. THERE WERE NO TICKETS WITH ALL SIX NUMBERS. 170 TICKETS MATCHED 5 NUMBERS AND WON $1,588 EACH; 9,715 MATCHED 4 OF 6 NUMBERS FOR $72 EACH AND 176,657 MATCHED 3 OF 6 NUMBERS FOR $5 EACH.**

**IF YOU PROGRAMMED A COMPUTER TO RANDOMLY GENERATE SIX DIFFERENT NUMBERS EVERY SECOND TAKEN FROM THE NUMBERS 1 THROUGH 51, YOU WOULD HAVE TO WAIT NEARLY SEVEN MONTHS BEFORE EVERY COMBINATION CAME UP AT LEAST ONCE.**

**THE ODDS OF MATCHING 6 OF 6 NUMBERS ARE 1 IN 18,009,460; 5 OF 6 ARE 1 IN 66,702; 4 OF 6 ARE 1 IN 1,213; 3 OF SIX ARE 1 IN 63.**

**THE ODDS OF WINNING ANYTHING ARE 1 IN 60.**

**IF YOU BUY 100 TICKETS A WEEK, YOU CAN EXPECT TO WIN THE JACKPOT ON AVERAGE EVERY 3,463 YEARS. IF YOU BUY $25,000 WORTH OF TICKETS A WEEK, YOU CAN EXPECT ON AVERAGE TO WIN ABOUT EVERY 14 YEARS. IF YOU EXPECT TO LIVE 50 MORE YEARS, YOU SHOULD BUY $6,927 WORTH OF TICKETS A WEEK IF YOU WANT TO HAVE A GOOD CHANCE OF WINNING THE JACKPOT IN THIS LIFETIME. OF COURSE, IF YOU DO, YOU MAY NOT EVEN BREAK EVEN. YOU COULD WELL BE ABOUT $2,000,000 IN THE HOLE, DEPENDING ON WHEN YOU WIN.**

**HOWEVER, IF YOU WOULD BE SATISFIED WITH GETTING 5 OUT OF 6, YOU WILL HAVE A MUCH EASIER GO OF IT. YOU ARE LIKELY TO GET 5 OUT 6 EVERY 12.8 YEARS ON AVERAGE IF YOU BUY 100 TICKETS A WEEK. HOWEVER, YOU WILL HAVE SPENT NEARLY $67,000 TO WIN ABOUT $1,500.**

**IF YOU WANT TO "GUARANTEE" YOURSELF TO BE A "WINNER," BUY ABOUT $120 WORTH OF TICKETS A WEEK. ON AVERAGE, YOU ARE LIKELY TO TAKE HOME, BEFORE TAXES, ABOUT $10 A WEEK. THUS, TO BE A "GUARANTEED WINNER" YOU NEED ONLY LOSE ABOUT $110 A WEEK. WHAT COULD BE EASIER? (THIS "GUARANTEE" COMES WITH A LIMITED WARRANTY OF NO VALUE AND IS BASED UPON PAYOUTS FOR THE WEEK OF JULY 25, 1998.) OF COURSE, YOUR WINNING AT ALL IS PURELY THEORETICAL. YOU MAY NEVER WIN REGARDLESS OF HOW OFTEN YOU PLAY AND HOW MUCH YOU SPEND. MATHEMATICAL ODDS ARE BASED ON THEORETICAL CHANCE, WHICH IS NOT THE SAME AS REAL ODDS IN THE REAL WORLD. THEORETICALLY, THERE IS A ONE IN TWO CHANCE OF A COIN FLIP COMING UP HEADS, BUT IN REALITY HEADS MIGHT COME UP MORE OR LESS THAN FIVE TIMES IN TEN FLIPS.**

**YOU MIGHT THINK THAT YOU CAN BEAT THE ODDS BY EITHER SELECTING NUMBERS THAT HAVE NOT BEEN CHOSEN IN RECENT DRAWINGS, OR BY SELECTING NUMBERS THAT HAVE COME UP MORE FREQUENTLY THAN EXPECTED IN RECENT DRAWINGS. IN EITHER CASE, YOU ARE COMMITTING THE GAMBLER'S FALLACY. THE ODDS ARE ALWAYS THE SAME, NO MATTER WHAT NUMBERS HAVE BEEN SELECTED IN THE PAST. THIS FALLACY IS COMMONLY COMMITTED BY GAMBLERS WHO, FOR INSTANCE, BET ON RED AT ROULETTE WHEN BLACK HAS COME UP THREE TIMES IN A ROW. THE ODDS OF BLACK COMING UP NEXT ARE THE SAME REGARDLESS OF WHAT COLORS HAVE COME UP IN PREVIOUS TURNS. DICE PLAYERS FREQUENTLY COMMIT THIS FALLACY. WHEN THEY SEE A PLAYER MAKE HIS POINT SEVERAL TIMES IN A ROW, THEY THINK THE ODDS OF HIM MAKING HIS POINT AGAIN DIMINISH. THEY DON'T. THOSE ODDS ARE FIXED AND THEY NEVER CHANGE. THE ODDS OF MAKING ANY GIVEN POINT DIFFER, OF COURSE, DEPENDING ON WHAT THE POINT IS. FOR EXAMPLE, THERE IS A SIX IN THIRTY-SIX CHANCE THAT A 7 WILL BE ROLLED, BUT ONLY A ONE IN THIRTY-SIX CHANCE THAT A 2 OR A 12 WILL BE ROLLED.) I WON'T COMMENT ON THE FUTILITY OF SUPERSTITIOUS ACTS LIKE BLOWING ON THE DICE OR TALKING TO THEM IN AN ATTEMPT TO INFLUENCE THE OUTCOME EXCEPT TO SAY THAT SUCH RITUALS ARE BASED ON MAGICAL THINKING AND ARE COMMONPLACE IN OUR SPECIES.**

**LOTTERIES SEEM TO SHARE SOMETHING IN COMMON WITH ILLEGAL PYRAMID SCAMS: IN ORDER FOR ANYONE TO WIN BIG, MANY PEOPLE MUST LOSE JUST ABOUT EVERYTHING THEY BET.**

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**THE SCIENCE SEGMENT**

**DINOSAUR EXTINCTION**

**12/16/08**

**THE AGE OF THE DINOSAURS ENDED ABRUPTLY ABOUT 65 MILLION YEARS AGO WHEN SOME CATASTROPHIC EVENT DROVE THEM TO EXTINCTION, AND NOW A VEHEMENT CONTROVERSY OVER THEIR DISAPPEARANCE IS EMERGING ANEW.**

**LIKE MANY SCIENTIFIC DEBATES, THIS ONE IS HOT AND HAS BEEN GOING ON FOR YEARS, BUT ONLY ONE SIDE IS HAVING ITS SAY IN SAN FRANCISCO THIS WEEK, AND THE DINOSAURS HAVE NO ONE TO SPEAK FOR THEM.**

**AN INTERNATIONAL GROUP OF SCIENTISTS IS ARGUING THAT POISONOUS FUMES FROM VIOLENT WAVES OF VOLCANIC ERUPTIONS IN INDIA MILLIONS OF YEARS AGO KILLED OFF THE BEASTS, NOT - AS UC BERKELEY SCIENTISTS FIRST PROPOSED NEARLY 30 YEARS AGO - THE IMPACT OF A GIANT METEORITE THAT BLASTED A HUGE UNDERSEA CRATER IN MEXICO AND TOUCHED OFF A KIND OF "NUCLEAR WINTER" THAT DARKENED THE SKIES WITH A PALL OF DUST AND DEBRIS THAT THE CREATURES COULD NOT POSSIBLY HAVE SURVIVED.**

**THE ORIGINS OF THE BIG DEBATE BEGAN NEARLY 30 YEARS AGO WHEN THE GEOLOGIST WALTER ALVAREZ AT UC BERKELEY AND HIS FATHER, LUIS, A NOBEL PHYSICS LAUREATE, PROPOSED THAT A COSMIC COLLISION BY AN OBJECT FROM SPACE AT LEAST SIX MILES WIDE CRASHED JUST OFF MEXICO'S YUCATAN PENINSULA ABOUT 65 MILLION YEARS AGO AND CREATED WHAT IS KNOWN AS THE CHICXULUB CRATER.**

**LEADERS OF THE INDIAN VOLCANO THEORY HELD THE STAGE MONDAY AT MOSCONE CENTER WEST IN SAN FRANCISCO, WHERE SOME 14,000 SCIENTISTS OF MANY DISCIPLINES ARE GATHERING THIS WEEK FOR THE ANNUAL MEETING OF THE AMERICAN GEOPHYSICAL UNION.**

**AGREEMENT ON TIMING**

**THEY AGREE WITH THE ALVAREZ ARGUMENT ABOUT THE GENERAL TIME FRAME OF THE MASS EXTINCTION, SAYING IT OCCURRED ABOUT 65.7 MILLION YEARS AGO AT A CRUCIAL PERIOD IN EARTH'S HISTORY CALLED THE CRETACEOUS/TERTIARY BOUNDARY.**

**THEY ALSO AGREE IT WASN'T ONLY THE DINOSAURS THAT WENT EXTINCT BUT THAT THE VAST MAJORITY OF PLANTS AND OTHER LIFE FORMS ON EARTH DIED ALONG WITH THEM. AND WHEN THE MASS EXTINCTION WAS OVER, THE MAMMALS OF THE WORLD FINALLY HAD THEIR OPPORTUNITY TO THRIVE AND EVOLVE AND DOMINATE THE EARTH.**

**BUT GERTA KELLER OF PRINCETON UNIVERSITY AND HER COLLEAGUES PART WAYS WITH THE BERKELEY SCIENTISTS ON THE CAUSE. KELLER, JOINED BY VINCENT COURTILLOT OF THE UNIVERSITY OF PARIS AND SUNIL BAJPAI, OF THE INDIAN INSTITUTE OF TECHNOLOGY, DELIVERED THEIR FINDINGS AT A PRESS CONFERENCE MONDAY AND WILL PRESENT DETAILED SCIENTIFIC REPORTS ALL THIS WEEK.**

**AT THE PRESS CONFERENCE, KELLER INSISTED THAT THE IMPACT CRATER WAS FORMED AT LEAST 300,000 YEARS BEFORE THE GREAT EXTINCTION AND "CAUSED NO SPECIES EXTINCTIONS" - CERTAINLY NOT TO THE DINOSAURS. SHE CAME TO HER CONCLUSION, IN PART, BY AGE-DATING CLUSTERS OF MINERAL SPHERULES THAT PRESUMABLY SPEWED OUT OF THE CHICXULUB CRATER AND LANDED IN TEXAS, WHERE KELLER SAID SHE GATHERED AND TESTED THEM.**

**INSTEAD, SHE ARGUED, THE EXTINCTION COINCIDED WITH THREE OR FOUR WAVES OF VOLCANISM IN A REGION OF NORTHWEST INDIA KNOWN AS THE DECCAN TRAPS. SHE SAID BOTH FOSSILIZED PLANKTON AND EVEN DINOSAUR EGGS COVERED WITH LAVA FOUND IN THE DECCAN AREA BORE STILL MORE TESTIMONY TO BACK HER THEORY. THE MASS EXTINCTION, SHE SAID, "WAS COMPLETE BY THE FOURTH ERUPTION."**

**KELLER'S THEORY OF DECCAN VOLCANISM AS THE CAUSE OF THE DINOSAURS' EXTINCTION "HAS BEEN VASTLY UNDERESTIMATED," SHE SAID, WHILE "THE CRATER'S IMPORTANCE AS EVIDENCE HAS BEEN VASTLY OVERESTIMATED.**

**"THIS IMPACT CAUSED NO EXTINCTIONS."**

**ALVAREZ'S RESPONSE**

**WALTER ALVAREZ, WHO WAS NOT AT THIS WEEK'S MEETING OF SCIENTISTS AND WHOSE FATHER DIED 10 YEARS AGO, REJECTED THE IDEA THAT VOLCANISM IN INDIA WAS THE SOLE CAUSE OF THE MASS EXTINCTION.**

**IN A TELEPHONE INTERVIEW AND AN E-MAIL EXCHANGE, HE INSISTED MONDAY THAT THE ARGUMENTS BY KELLER AND HER COLLEAGUES "HAVE BEEN EXAMINED IN DETAIL BY OTHER SCIENTISTS AND GENERALLY REJECTED."**

**"FEW EXPERTS ON THE MASS EXTINCTION WOULD AGREE WITH KELLER THAT THE CHICXULUB IMPACT IS OLDER THAN THE MASS EXTINCTION," HE SAID.**

**ALVAREZ RECALLED THAT MORE THAN 30 YEARS AGO HE DISCOVERED THIN LAYERS OF THE ELEMENT IRIDIUM - EXTREMELY RARE ON EARTH BUT MUCH MORE ABUNDANT IN METEORITES - SCATTERED ACROSS MANY CONTINENTS, AND THAT THIS WHAT TRIGGERED HIS OWN THEORY.**

**"THE DEBRIS FROM A GIANT IMPACT ... IS INDEED FOUND AROUND THE WORLD IN SEDIMENTS DEPOSITED AT EXACTLY THE TIME OF THE MASS EXTINCTION," ALVAREZ SAID. "THE VOLCANISM IN INDIA MAY HAVE PLAYED AN INTERESTING CONTRIBUTORY ROLE, BUT FEW WOULD AGREE THAT VOLCANISM WAS THE ONLY CAUSE AND THAT THE CRATER WAS IRRELEVANT. THE VAST MAJORITY OF RESEARCHERS STUDYING THE CRETACEOUS-TERTIARY MASS EXTINCTION AGREE THAT THE CHICXULUB IMPACT WAS THE PRIMARY TRIGGER OF THE EXTINCTION."**

**AN EARTHLY CONVULSION**

**THE ANCIENT EPOCH OF VOLCANIC ERUPTIONS IS WELL KNOWN AND MARKED ONE OF THE GIANT CONVULSIONS IN EARTH'S HISTORY. AT LEAST FOUR WAVES OF MASSIVE ERUPTIONS SPREAD SUCCESSIVE SHEETS OF THICK BASALT ACROSS THE LAND FOR MORE THAN 500 MILES, AND THEY PILED INTO A PLATEAU MORE THAN 11,000 FEET HIGH OVER THOUSANDS OF YEARS.**

**KNOWN AS "FLOOD BASALTS," THEIR AGES CORRELATE MORE OR LESS WITH THE TIME WHEN THE DINOSAURS WENT EXTINCT, COURTILLOT SAID. THE EVIDENCE, HE SAID, INCLUDES A REMARKABLE OBSERVATION THAT MAGNETISM EMBEDDED IN THE ROCKS IS ORIENTED IDENTICALLY DURING EACH OF THREE MAJOR EPISODES OF VOLCANIC ERUPTIONS, INDICATING THAT THEY ALL OCCURRED IN A VERY SHORT TIME AT ALMOST EXACTLY THE SAME TIME AS THE MASS EXTINCTION.**

**THE FIRST MAJOR PULSE OF ERUPTIONS, COURTILLOT SAID, IS DATED AT ABOUT 67.5 MILLION YEARS AGO; THE SECOND AT JUST ABOUT 65 MILLION YEARS, AND THE THIRD 100,000 YEARS "OR A BIT MORE" LATER, JUST AFTER THE MASS EXTINCTION.**

**BUT HOW DID THOSE ERUPTIONS KILL THE DINOSAURS? EACH PULSE OF ERUPTING LAVA, COURTILLOT ARGUES, COULD HAVE RELEASED FROM 10 BILLION TO 150 BILLION TONS OF SULFUR DIOXIDE, WHICH WAS CHEMICALLY CONVERTED TO "SULFATE AEROSOLS" IN THE STRATOSPHERE. THOSE MICROSCOPIC PARTICLES ARE A FACTOR IN TODAY'S GLOBAL WARMING, BUT IN MASSIVE CLOUDS THEY'RE POISONOUS TO LIFE.**

**"SULFATE AEROSOLS ARE LIKELY THE MAIN AGENT OF THE (EXTINCTION) CRISIS," COURTILLOT SAID.**

**BAJPAI NOTED THERE IS ALSO GEOLOGIC EVIDENCE THAT A MAJOR SEAWAY MUST HAVE SPLIT THE NORTHERN REGION OF THE DECCAN PLATEAU DURING THE ERUPTION WAVES, HE SAID, AND THAT DINOSAUR REMAINS ARE COMMON THERE TODAY - MORE SUPPORT FOR THE DECCAN SIDE OF THE DEBATE, HE MAINTAINED.**

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**THE ARENA GOES ABROAD**

**CHRISTIANS SECRETLY TARGET CONVERTS IN NORTH AFRICA**

**12/15/08**

**ISLAMIC LEADERS IN NORTHERN AFRICA SAY THEY ARE INCENSED BY THE TACTICS OF CHRISTIANS BENT ON SECRETLY CONVERTING THEIR FOLLOWERS, REUTERS REPORTS. RELIGIOUS AUTHORITIES GRIPE THAT MISSIONARIES IN MOROCCO AND ALGERIA ARE USING “UNETHICAL” METHODS, SUCH AS SPREADING FALSE INFORMATION AND PREYING ON THE WEAK. “PEOPLE RESPOND POSITIVELY WHEN THEY DON’T HAVE THEIR FULL FREEDOM,” ONE OBSERVER SAID.**

**CHRISTIANS DENY THIS, ARGUING THAT THEY STAY LOW-KEY IN ORDER TO SET UP SCHOOLS OR JOBS FOR LOCAL FOLLOWERS, WHO FACE PERSECUTION BY THE GOVERNMENT OR THEIR OWN FAMILIES. NONETHELESS, THEIR METHODS AREN’T ALWAYS CULTURALLY SENSITIVE. “THE NEW BREED OF MISSIONARY DOESN’T HAVE THE SAME HISTORICAL TRAINING AS THE OLDER ESTABLISHED DENOMINATIONS,” ONE EXPERT SAYS, “SO THERE’S A BULL-IN-A-CHINA-SHOP EFFECT.”**

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**FAMOUS QUOTES**

**GEORGE WASHINGTON (1732 – 1799) 67 YEARS.**

**HE WAS THE SUCCESSFUL COMMANDER-IN-CHIEF OF THE CONTINENTAL ARMY IN THE AMERICAN REVOLUTIONARY WAR FROM 1775 TO 1783, AND LATER BECAME THE FIRST PRESIDENT OF THE UNITED STATES, AN OFFICE TO WHICH HE WAS ELECTED, UNANIMOUSLY, TWICE AND REMAINED IN FROM 1789 TO 1797.**

**"THERE IS NOTHING WHICH CAN BETTER DESERVE OUR PATRONAGE THAN THE PROMOTION OF SCIENCE AND LITERATURE. KNOWLEDGE IS IN EVERY COUNTRY THE SUREST BASIS OF PUBLIC HAPPINESS."**