

## Dr. Matrix Talks to Owen O'Shea

I received a post card on February 28, 2014 that a certain mysterious stranger with the initial *IM*, would be at a private residence in Atlanta on Wednesday, March 19, 2014. The postcard went on to say that if I wished to meet with this person then I should be at the relevant address at noon on March 19. The card was signed with a solitary letter *I*.

I had no idea whom the card was from. It seemed like a lady's handwriting but I was not sure. I sent back a short note to the return address on the card that I would indeed be there at the appointed time and date.

On Wednesday, March 19, 2014, I drove through the busy streets of Atlanta to the designated address. I pulled the car up outside the very modern two storey house, situated in a leafy suburb of the city. I went to the hall door and rang the door bell. It was answered by a woman in her early to mid seventies, with short dark hair and an oriental complexion. My first impression was that this lady, whoever she may be, must have been a complete stunner in her day!

The lady greeted me with a kiss to my cheek. She then led me by the hand through a hallway, and then into a nice, bright, and spacious dining room. There was a large table in the middle of the room. At the head of the table sat an elderly, feeble-looking man, with short gray hair and a gray goatee.

"Welcome, Mr. O'Shea," the old man said, as he shook my hand firmly. "I am Dr. Irving Joshua Matrix, an old, old friend of the late Martin Gardner."

I was shocked, but delighted to meet the famous numerologist. "I am very pleased to meet you, Dr. Matrix," I said.

"Likewise," Dr. Matrix said. He extended a large, bony hand over towards the lady standing by the door. "You have met my daughter, Iva. She is my right-hand lady now. Iva has a brilliant mind, just like her Dad, and is quite adept at handling the integers. Martin had his eye on Iva, you know, for many years."

"I cannot blame Martin for that," I said honestly. "I can plainly tell that Iva must have been very beautiful in her day. You have lost none of your good looks, Iva. But I am sure you have inner beauty also. I am also delighted to know that you have an interest in numbers."

Iva blushed at my compliment. "Flattery will get you everywhere," she said. "Yes, I love numbers. They are so beautiful, so elegant."

"Sit down," the old man said, "and make yourself comfortable. I believe you have a great interest in numbers and in mathematical magic. You know, when I knew you were coming to see me I said to myself it must be very overwhelming to be in the presence of a great mathmagician. But I tell you now, Mr. O'Shea, there is no need for you to feel overwhelmed in my presence!"

"I'll try hard not to be," I said.

"I understand," Dr. Matrix said, "that you are looking for a few number curiosities to mark the eleventh gathering for Martin here in Atlanta. The number 11 is the fifth prime and the square of 11 is factorial five, plus 1. I am afraid I will not be able to attend this gathering. I am 106 years old this year. I am no longer a young man, even though I look only fifty five! I was born on Friday, February 21, 1908. That was the sixth day of the week; a perfect number and a perfect date to bring a perfect being into the world! That is probably why I am always interested in numbers that contain the digit 6. My original surname was Bush. Substituting numbers for letters in that name we find the first letter, *B*, is represented by 2, the second, *U*, is represented by 21, the third, *S*, is 19 and the fourth, *H* is represented by 08. That gives 2/21/1908, which is my date of birth."

"That's a nice coincidence," I said.

“It was more than coincidence,” Dr. Matrix said. “The mysterious power of the occult was active on that day in 1908. It seems like only yesterday. Ah, yes, yesterday, when I was young ....” For just a few tender moments the good doctor slowly and lowly sang the first few words of the song Charles Aznavour made famous.

“I will not be able to attend this gathering for Martin,” I said. “But I will ensure that a document with the information you are about to give me will get to the conference.”

“That is fine by me,” Dr. Matrix said. “I am 106 years young this year. If one eliminates the zero in that number, one is left with 16. 106 is twice the 16th prime. If one transfers the 6 at the back of that number and places it to the front, one obtains 610. That is the smallest Fibonacci number that begins with 6.”

“Nice one!” I said.

“I can give you a few more curiosities,” Dr. Matrix said, “for you to share with your colleagues at the conference.

“That would be great,” I said, as I sat down. I took out my pen and note pad.

“The first thing I have noticed,” Dr. Matrix said, “is that the conference on MG begins on the 78th day of the year, or precisely 41 weeks before the end of the year '14. The integers 41 and 14 are, of course, mirror images of each other. I see that the conference is taking place at the Ritz-Carlton Downtown Hotel at 181 Peachtree Street, N.E. Atlanta, Georgia, 30303. That is an interesting address. You see, the 41st odd prime is 181 and the two words ATLANTA, GEORGIA, contain a total of 14 letters. Furthermore, using the usual alphabet code where  $a$  equals 1,  $b$  equals 2,  $c$  equals 3, and so on, the three words ATLANTA, GEORGIA, AMERICA sum to 181.”

“Amazing!” I said, as I noted the curiosity in my note pad.

“The difference between 41 and 14,” Dr. Matrix said, “is 27. The zip code of the hotel that will host the conference is 30303. The product of the non-zero digits of that number is 27.”

“That’s interesting,” I said.

“The number 27,” Dr. Matrix said, “is significant in my life to date. It is, you know, the smallest two-digit number in which the sum of its digits is equal to the sum of its prime factors. I have experienced precisely 27 leap years in my time. The digits of my date of birth, 2211908, first appear in the decimal expansion of  $Pi$  at decimal position 543864. Curiously that string of digits, 2211908, appears 27 times in the first 200 million decimal digits of  $Pi$ .”

“Wonderful! I said, as I scribbled the info into my note pad.

“I was born,” Dr. Matrix said, “in Kagoshima, on the Japanese island of Kyushu, on the 52nd day of the year. There are, of course, 52 cards in a deck. Perhaps my birthday made it inevitable that I would like playing with the pasteboards! Saying the same thing another way I was born 314 days before the end of the year. (1908 was a leap year.) You will surely be aware that the digits 3, 1 and 4 are the first three digits of  $Pi$ . It is this close affinity with the first three digits of the famous transcendental number that has strengthened my interest in  $Pi$  over the years.”

“I see,” I said.

“The number 314,” Dr. Matrix said, “is an interesting number. It is the sum of two squares:  $5^2 + 17^2$ . It is also the smallest number that can be expressed as the sum of three squares in six different ways:  $3^2 + 4^2 + 17^2$ ;  $3^2 + 7^2 + 16^2$ ;  $5^2 + 8^2 + 15^2$ ;  $8^2 + 9^2 + 13^2$ ;  $1^2 + 12^2 + 13^2$  and  $7^2 + 11^2 + 12^2$ .”

“Marvellous!” I said, as I scribbled down the numbers. “Anything else on 314?”

“Yes, I have,” Dr. Matrix said. “The sixth power of 314 equals 958468597212736. You may notice that the numbers 314 and 958468597212736 contain between them every digit from 1 to 9 twice. This property of the number 314 and its sixth power is not shared by any other integer.”

“That’s beautiful!” I said.

“Here’s a little curiosity concerning the three digits of 314,” Dr. Matrix said. “Consider the six different permutations of 314. These are: 134; 143; 314; 341; 413 and 431. Sum those six three digit numbers and you will get a date that is famous in the history of the USA.”

I did the calculation there and then. I was surprised to see that the sum of the six numbers is 1776.

“Have you any little curiosity concerning the digits of  $Pi$ ,” I asked.

“Yes, of course I do,” Dr. Matrix answered, as he rubbed his little beard with his thumb and forefinger. “Consider the first nine digits of  $Pi$ . Taken in triplets these digits are 314; 159 and 265. Now sum those three numbers and you will find that their total, 738, equals  $6 + 66 + 666$ .”

“How wonderful!” I said.

“There’s more!” Dr. Matrix said. “Consider the *reversal* of those three numbers I mentioned. These are 413, 951 and 562. These numbers sum to 1926. *That* number equals  $666 + 666 + 666 - 66 - 6$ .”

“Wow! I said. “That’s interesting.” I scribbled down the results the good doctor had given me.

“My late father,” Dr. Matrix said, “was born in Figure Five, a small town in Arkansas. Perhaps it is because of that that I have always been fascinated by the number 5. The Pythagoreans believed that the number 5 is significant. So do I. I could give you many examples, but I will limit it to five. There are five Platonic Solids. The only prime ending in 5 is the number 5. The fifth digit of  $Pi$  is 5. The fifth Fibonacci number is 5. The only polygon in which the number of sides and the number of diagonals are equal is the five sided figure we call the pentagon.”

“Brilliant!” I said. “Have you anything unusual concerning the letters of the alphabet?”

“I do,” Dr. Matrix said. “Consider my initials. They are *IJM*. Some believe that these initials represent *Intelligent Japanese Mathmagician*, rather than *Irving Joshua Matrix*. But that is a story for another day, so I will not say any more about it today. In any event using the earlier code the sum of my initials equals 32. I am very close to my daughter, Iva. The sum of the letters of her name is also 32. Of course 32 is a power. In fact it is the largest known power in which all of its digits are prime. The fact that Iva’s name and my initials sum to 32 reflects the close and *powerful* relationship that we enjoy.”

“Very nice,” I said.

“Martin Gardner,” Dr. Matrix said, “was born on October 21, 1914, nearly 100 years ago. That day was a Wednesday. As you know, in the western world the first day of the week is assumed to be Sunday. That places Wednesday as the middle day of the week. The name WEDNESDAY signifies this, as its first three letters are WED. Wednesday *weds* the first part of the week to the second part. In any event using the earlier alphabet code, the sum of the letters in the word WEDNESDAY is 100. Using the same code the sum of the letters in the expression MID-WEEK DAY is also 100.”

“That’s fantastic!” I said.

Just then Iva brought in a large tray containing coffee and doughnuts.

“Dig in,” she said, as she poured the steaming hot coffee into three large mugs.

“Thanks Iva,” I said. “I can easily see why Martin was so enamoured with you.”

“I was very fond of Martin too,” she said, as she sat down beside me. “He really enjoyed Dad’s company. Martin and I often went out to dinner together. But it was a platonic friendship. By the end of the night Martin usually ended up taking notes on some number puzzle or oddity that Dad had mentioned to me. Martin was always a perfect

gentleman. But that was so long ago. It seems like a previous life now as I recall those distant, hazy days! I later met the only man for me. We were married in Japan. He passed on two years ago, but we had a happy twenty years together. We had two boys, Irving and Joshua. Irv and Josh both work in New York. They both like numbers, and strange curiosities.”

“It must be nice to know,” I said, “that there are two budding numerologists in the family.” I drank the mug of steaming hot coffee and ate two lovely doughnuts. They were delicious. I then turned my attention to the elderly doctor once more.

“I know you liked playing with dice,” I said. “Have you any nice dice problems, Dr. Matrix, that I can pass on to my colleagues at the conference?”

“Yes, I do,” Dr. Matrix said. “I will give you just one. If I roll one die the probability of rolling a six is  $1/6$ , or 16.67 per cent. If I roll two dice does the probability of rolling a six increase or decrease?”

“Well, er, it must increase, I think,” I said. “Let me see.” It took me a few minutes to work it out. Yes, the odds do increase, but a lot more than one would initially suspect! The probability of rolling a six with two dice is 11 chances in 36, or 30.56 per cent.

“What about cards?” I asked. Any good tricks or puzzles?”

“Here’s a simple one that your colleagues might like,” Dr. Matrix said. The elderly doctor took a small heap of eight cards that were sitting face down near him on the top of the table. He held the heap face down. He then transferred the top card to the bottom of the heap and dealt the next top card, which was an Ace, face-up on the table. Then he transferred the top card of the heap to the bottom of the heap and dealt the new top card, which was a Deuce, face-up on the table. Then he transferred the top card of the heap to the bottom and dealt the new top card, which was an Ace, face-up on the table. He continued doing this, putting one card on the bottom of the heap and dealing one card on to the table. The procedure resulted in the following cards being dealt in the following order on the table: Ace, Deuce, Ace, Deuce, Ace, Deuce, Ace and Deuce. Dr. Matrix asked me how to figure out the how the eight cards were ordered. It took me a while to do it, but eventually I cracked it. The cards from the top of the heap - held face down - are ordered as follows: Deuce, Ace, Ace, Deuce, Ace, Ace, Deuce and Deuce.

It was time for me to say my goodbyes. I was delighted with the info that Dr. Matrix had given me.

“I will have to say goodbye now, Dr. Matrix,” I said. “I am due to return to my little country across the ocean tomorrow.”

“Yes,” Dr Matrix said. “I realize you come from Ireland. Geographically, Ireland may not appear significant. But as Victor Hugo once said: ‘there is no such thing as a little country. The greatness of a people is no more determined by their numbers than the greatness of a man is by his height.’”

“It is very kind of you to say that, Dr. Matrix,” I said.

Dr. Matrix stood up and gripped my hand. “Goodbye, Mr. O’Shea, he said, “It was nice meeting you. I hope your colleagues will like the information I have given you.”

“I’m sure they will,” I said. “Thanks again, Dr. Matrix. You are a man one does not meet every day! It is a great pleasure to have met you.”

I walked to the front door with Iva. “My Dad is delighted to have met you,” Iva said. “Any friend of Martin’s is a friend of my Dad. We are leaving Atlanta later today, so we will probably not meet again. Take good care of yourself, Owen.” Iva held my hand and lightly kissed me on my cheek.

I then walked to my car. As I was driving away I could see Iva’s reflection in my car’s mirror, as she continued to wave me goodbye until I went out of sight.