

spain-2007-04.txt, Ralph Abraham, March 18, 2007

CORDOBA

*** Sunday, February 25, 2007. At tea time we arrived at a brand new hotel that put form above function: the decor was inspired, but there was very little furniture. Courtney and I devised a mathematical program for the coming two weeks in Andalucia, with emphasis on the dynamics of cultural diffusion.

*** Monday, February 26, 2007. In an early morning memo I described our new vision for the coming two weeks with these guiding questions:

- ** What is the big (complex dynamical) picture in which 1492 is a bifurcation moment?

- ** What are the mechanics of cultural diffusion and evolution, eg, in the case of the Ancient Greek heritage?

- ** Is it possible to make a mathematical model of cultural diffusion?

I walked to the Roman Temple, due south from the hotel. Partly restored, I saw its eleven columns, dating from the 3rd century BC, rising from the midst of the modern downtown. Along the way I happened upon a marvelous Archeological Museum. The fathomless depth of history in this city began to assert itself.

The hotel is in a rat warren of little cobble stoned streets, so the bus bringing the Ross High School group from the airport went in circles trying vainly to approach the hotel. Finally the 14 students and four teachers arrived on foot around noon. We all wore the school uniform, which turned out to have great practical value on the trip.

*** Tuesday, February 27, 2007. The real tour now began. We walked with professional guides through the Juderia, the Jewish part of the old city. We had arrived in the Middle Ages, when Cordoba was the largest city in Western Europe, and was overrun by Islam in 711 AD. We saw the Sinagoga, built later, in 1315.

Then we came to the Mezquita, the principal surviving monument of

Cordoba. Originally a Christian church, it reopened as a mosque in 795. And of course, after the Reconquest of 1236, it again became a Christian church. As we entered within the structure, our first impression was its size. It seems to stretch to infinity. In fact, it covers 240,656 square feet, or 5.63 acres, just a shade less than Saint Peter's.

And here was my first encounter with Islamic patterns, which had become my central focus and main obsession during my weeks of preparation for this trip. The creation of these patterns demonstrates expert knowledge of the constructions of Euclid's "Elements of Geometry", which was translated from Greek or Syriac into Arabic in the late 8th century, just as this mosque was under construction.

In fact, Cordoba, during its Islamic heyday, was a center for the translation and study of the Greek corpus, when (it is reported) there were some 60 libraries in the city, the largest of which -- holding perhaps 600,000 books -- rivaled the Alexandrian Library, destroyed just a century before the golden age of Islamic Cordoba began.

Finally we came to the Alcazar, or Castle of the Christian Kings. This structure was built in the 13th century, on top of Islamic remains which cover a base of Roman remains.

By now the complex dynamical systems metaphor came again to mind. In my MS # 96, "The Origins and Bifurcations of Algebra", I developed a model for cultural diffusion involving hydrodynamical diffusion or perfusion of cultural layers through an environment, and chemical reactions between the layers. This seems a good fit with the history of Andalusia. Through the geographical and living ecology washed, firstly, paleolithic humans, leaving ancient cave paintings and archeological remains, among the oldest known. Then neolithic culture washed ashore from Egypt and Mesopotamia, ca 6000 BC. Then megalithic and copper culture from 3000 BC, and bronze ca 2000 BC. By 1000 BC Phoenician trade had developed around the Mediterranean, followed by the Greeks around 800 BC, and the Romans from 300 BC. Of all this we had seen presentations in museums. But from the Romans on, we had seen actual remains:

Roman, Jewish, Christian Visigothic, Islamic, and Roman Catholic layers.

We departed for Sevilla in the middle afternoon, with a stop at the Medina Azahara, just outside Cordoba. It had been an entire city for a few years: begun in 936, built in 40 years, abandoned in 981, and wrecked between 1010 and 1013. We were able to see only an extensive archeological dig in progress, and a small part of the complex, recently restored. The royal reception hall, covered with carved patterns, indicates the level of ornamentation of the original. My pattern obsession stepped up a notch.

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