The following excerpts are from *Zero: The Biography of a Dangerous Idea* by Charles Seife.

The point about zero is that we do not need to use it in the operations of daily life. No one goes out to buy zero fish. It is in a way the most civilized of all the cardinals, and its use is only forced on us by the needs of cultivated modes of thought.
Alfred North Whitehead

In the history of culture the discovery of zero will always stand out as one of the greatest single achievements of the human race.
Tobias Danzig, Number: The Language of Science

. . . Egyptians were of a practical bent. They never progressed beyond measuring volumes and counting days and hours. Mathematics wasn't used for anything impractical, except their system of astrology. . . . The Greeks were different; they embraced the abstract and the philosophical, and brought mathematics to its highest point in ancient times. Yet it was not the Greeks who discovered zero. Zero came from the East, not the West.

Though the Greek number system was more sophisticated than the Egyptian system, it was not the most advanced way of writing numbers in the ancient world. That title was held by another Eastern invention: the Babylonian style of counting. Zero was borne out of the need to give any given sequence of Babylonian digits a unique, permanent meaning.

Though zero was useful, it was only a placeholder. It did little more than make sure digits fell in the right places; it didn't really have a numerical value of its own. A zero in a string of digits takes its meaning from some other digit to its left. On its own, it meant . . . nothing. Zero was a digit, not a number. It had no value.

A number's value comes from its place on the number line -- from its position compared with other numbers. . . . [N]owadays everybody knows that zero can't really sit just anywhere on the number line, because it has a definite numerical value of its own. It is the number that separates the positive numbers from the negative numbers. Zero must sit in its rightful place on the number line, before one and after negative one. Nowhere else makes any sense. Yet zero sits at the end of the computer and at the bottom of the telephone because we always start counting with one.

. . . [T]he Greeks so despised zero that they refused to admit it into their writings, even though they saw how useful it was. The reason: zero was dangerous. It is hard to imagine being afraid of a number. Yet zero was inexorably linked with the void -- with nothing.

But the fear of zero went deeper than unease about the void. To the ancients, zero's mathematical properties were inexplicable, as shrouded in mystery as the

birth of the universe. This is because zero is different from the other numbers. Unlike the other digits in the Babylonian system, zero never was allowed to stand alone -- for good reason. A lone zero always misbehaves. At the very least it does not behave the way other numbers do.

Zero has no substance. Yet this substanceless number threatens to undermine the simplest operations in mathematics, like multiplication and division.

In the realm of numbers, multiplication is a stretch -- literally. Imagine that the number line is a rubber band with tick marks on it. Multiplying by two can be thought of as stretching out the rubber band by a factor of two: the tick mark that was at one is now at two; the tick mark that was at three is now at six. Likewise, multiplying by one-half is like relaxing the rubber band a bit: the tick mark at two is now at one, and the tick mark at three winds up at one and a half. But what happens when you multiply by zero?

Anything times zero is zero, so all the tick marks are at zero. The rubber band has broken. The whole number line has collapsed. Multiplying by zero collapses the number line. But dividing by zero destroys the entire framework of mathematics.

Seife, Charles (2000). *Zero: The Biography of a Dangerous Idea* (pp. 6, 12-21).