

# The History of Information

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Most of us think that information is a relatively new phenomenon, limited to human kind, computers, and perhaps to animals. But that view is wrong. Information reared its head in the first  $10^{-32}$  second of the big bang. It got its start when space first told matter how to move. That was a communicational exchange. An informational exchange. And information showed itself in that first  $10^{-32}$  second after the Big Bang when the first “things” precipitated from a sheet of space and time. Those first things were leptons and quarks. And quarks have a peculiar property. They cannot survive on their own. So they rushed to find each other and to gang up in groups of two or three. But not just any partners would do. Each quark was born with the equivalent of an etiquette book, an instruction manual telling it which fellow quarks to rush toward and which quarks to avoid. Each quark was born picky. It was born with a vocabulary called attraction and repulsion. Each quark read the signals from another quark and either sped away or glommed together in a permanent embrace. In my book *The God Problem, How a Godless Cosmos Creates*, I give a simple definition of information. Information, says the God Problem, is anything a receiver can interpret. How do we know when a receiver is getting the message? We watch the receiver’s response. In other words, stimulus and response—the two things that BF Skinner felt were the core of psychology—are vital to the observation of information. Quarks fleeing from each other or flying together were responding to the cues of other quarks. They were interpreting a stimulus and producing a response. They were communicative. They were social. And they were informational. Those 13.8-billion-year-old social quarks, by the way, are alive inside of you and me today. Quark threesomes are your protons and neutrons. But there’s more. Informational processes of the sort we see in quarks appear at every stage of the cosmos’ evolution. They appeared in the atoms that came together 380,000 years after the big bang. They appeared in the sweepings of cosmic dust that would someday be called galaxies. They appeared in the gravity balls that would form stars, planets and moons. They appeared in the first elements and molecules. And they are alive in every macromolecule that would become a part of life. Information is the backbone of the evolution of the universe. And information is the essence of the gatherings of matter that think of themselves as you and me.