The neurons that shaped civilization ~ Vilayanur Ramachandran

The author begins by expressing his awe for the human brain and stating its different abilities to contemplate complex phenomena in the universe. How do we study the brain? We can observe the change in behaviour patterns of patients with lesions or abnormalities in comparison with normal beings, e.g. Capgras syndrome, Phantom limb, Synesthesia, etc can be observed with how they deviate with their normal behaviours. Or we can put electrodes in the brain and eavesdrop on each neuron which is less practical. Now the author puts a discussion about mirror neurons. There are a group of neurons called motor command neurons in the frontal lobes of the brain and they fire when we perform an action, e.g. grab an apple. A subset of these neurons(maybe about 20%)called mirror neurons also fire when we watch somebody else perform an action or grab an apple. So, how our brain distinguishes between our actions or someone else's when both stimulations evoke the same brain region? It's because we have touch and pain receptors in the skin, for the actions performed by ourselves we have feedback signals from these receptors, but for others' actions, we don't hence we can distinguish. What's the significance of mirror neurons? They adapt to or perform connections through other person's actions or point of view, so when we perform actions like imitation or emulation, they play a significant role, since they store the patterns of behaviour learned from other person's perspective. The author states that 75000 years ago, there was a sudden emergence of human skills like fire, shelter, language, etc. The author claims that a sophisticated mirror neuron system suddenly evolved enhancing people's ability to emulate so whenever there was a sudden discovery, it rapidly spread horizontally across the population and vertically down the generations. This is how cultures(a group of people following common laws, actions, and routines) and civilizations(group of cultures) evolved adapting new skills quickly and improving over time. Not only for actions, we've mirror neurons for touch and other functions too, so when we're touched the neurons will fire, or when we watch another person being touched, then also a subset of them fires. E.g., a person with a phantom limb may watch another person performing an action with his limb, and starts feeling his pain relieved just by watching the other guy by having a sense of his own limb working through mirror neuron activation. So, there's no real distinction between our consciousness and others surrounding us if we cut down all the feedback signals that allowed us to distinguish. This is analogous to what Eastern philosophy states that there is no real individual self and we're all connected by our consciousness. In neuroscience, the same concept would sound like all the mirror neurons in a group of people constantly communicating with each other. So, the mirror neurons may play a key role to decipher our consciousness, understanding our evolution of cultures, and a vast number of other skills unique to human beings.