The phase-conjugate brain

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"As a means of carrying signals from one place to another nothing beats light. Fast and frictionless, photons trounce electrons as the ideal carriers of information." ~ Richard Lipkin, *Science News*

Abstract The concept of phase-conjugate mirrors as a central processing mechanism for perception, action and consciousness in the ventricles of the brain is discussed.

Key Words Phase-conjugate mirror, laser, light, brain, ventricles

How do brains gather the scattered fragments of sensations into whole, meaningful perceptions? Shape, size, color, distance, motion; concepts of use and name; and memories and affect are widely separated, yet awareness seems instantaneous. Scientists don't know how.

Phase-conjugate mirrors[1,2] might be how the brain works its magic. P-C mirrors are made from three lasers. Two are aimed to meet head-on. This creates a holograph-like structure of hot and cool spots made by the interaction of the light. A third laser beamed into this configuration reflects off the hot spots much like rain drops reflect sunlight to make a rainbow. Ordinary mirrors reflect light according to the angle at which the light strikes the mirror but P-C mirrors "self-target" — the reflection retraces a path back to its source regardless of the angle of incidence. Self-targeting happens automatically without lenses or precise focusing. Even in cloudy media, the reflection returns home perfectly formed because the retracing is so precise that the light undistorts as it passes backwards.

Many P-C mirrors can function in one place because mirrors using different colors do not interact. Even very weak lights self-target and mirrors instantly form and vanish as the lasers turn on and off. In addition, the reflection melds information from all three inputs permitting data from several sources to be combined and fed back to scattered locations. In optics laboratories, P-C mirrors are used to compare, categorize and recognize incoming and stored data instantly. They can even resolve partial or "fuzzy" images into known concepts and associated memories.

This is just what the brain must do. Imagine millions of coherent packages of light traveling right through the white and gray matter, meeting in strategic places, and creating millions of P-C mirrors that synthesize and reflect information to just where it is needed. Where could this take place? Perhaps in the brain's four ventricles. The ventricles are fluid-filled balloons located in the middle of each major division of the brain. Assumed by scientists to act as shock absorbers or waste depositories for the brain, the ventricles may, in fact, be where thought and awareness take place. This is an old idea. For most of western history, scientists and religious doctrine held the ventricles as the centers for reason, memory and consciousness. Modern researchers have failed to find the locus for consciousness *within* the brain. Maybe it is *outside*, in the ventricles.

This is not as far-fetched as it may seem. Many important brain centers border on the ventricles, and brains actually grow out of their ventricles. Neurons germinate in the neural tube and then migrate to precise locations to form the embryonic brain. The neural tube grows and distorts into the ventricles. It make sense that data would be routed to and from this root. Scientists believe that DNA radiates coherent light[3,4] and that photic energy can travel through brain matter outside the nerve pathways without dispersing or losing coherence.[4]

Phase-conjugate mirrors — with instantaneous communication back to the tiniest source, undistorted by the inhomogenous brain medium, able to combine temporal and spatial information from several sources, make partial images whole, correct for phase errors, adjust timing, filter noise, amplify weak signals without degradation, instantly recognize, categorize and associate images and memories — are perfect for describing brain function. The three dimensional dynamic hologram made of light energy at the mirror's core — not quite "spirit", not quite matter — seems perfect as the central processing mechanism for perception, action and consciousness.

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