SYMMETRY, CAUSALITY, MIND

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Symmetry, Causality Mind

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Introduction

There is perhaps nothing more singular, in our relationship to time, than the fact that we live only in the present. At any moment in time, we cannot have contact with the past because the past no longer exists, and we cannot have contact with the future because the future has not yet come into being. We are, inescapably and completely, prisoners of the present.

When one stands in an empty subway station in the early morning, one sees all around one objects that hold for one the memory of events at which one has not been present. The dents in a bin are unavoidably seen as the result of kicking. The graffiti records the swift movements of a young artist. The scratched surface of the platform is seen as the result of active and impatient feet. A crumpled newspaper evokes the compacting actions of hands. The large splash of coffee, on the floor, points to an unintended spilling. The broken corner of a jutting wall testifies to the impact of a moving vehicle. A squashed beer-can recalls a compressing grip. A torn shirt, on the ground, signifies some hasty scuffle.

Like the subway station, the present is a silent chamber that has a history we cannot experience. It is only from the contents of this chamber, that we might be able to infer prior events. Indeed, in this chamber, we have no contact even with our own past. For, because we exist only in the present, any event that has happened to us is now out of reach. A wall stands between us and our own past. We can examine only what we possess within the present, the relics that surround us—and, only from these relics, can we infer what we have undergone.

But, you might argue, we have *memory*.

Memory, however, does not solve this problem; it defines the problem. To see this, observe first that memory, like anything experienced by the mind, exists only in the present. In fact we shall argue that memory is always some *physical* object, in the present—a physical object that some observer *interprets as holding information about the past*. The object can exist in the external environment of the observer, e.g., it can be a squashed beer-can; or it can exist within the observer, e.g., it can be a piece of neuronal material. In either case, the interpretation of the object as memory belongs to the observer.

But, how can an object be interpreted as holding information about the past? The only possible answer, we argue, is this: The past, about which the object is holding information, is the past *of the object itself*. In fact, an object becomes memory for an observer when the observer examines certain features of the object and *explains* how those features were *caused*.

We shall argue, in this book, that all cognitive activity proceeds via the recovery of the past from objects in the present. Cognitive activity *of any type* is, on close examination, the determination of the past.

Surprisingly, our argument will center on an analysis of the psychological relationship between *shape* and *time*. It will be argued that an important means by which the mind recovers the past is *shape*. As such, shape forms a basis for memory. The mind assigns to any shape a causal history explaining how the shape was formed. It is by doing this that the mind *converts shape into memory*. Furthermore, we will reduce the study of shape to the study of *symmetry*, and thus we will show that symmetry is crucial to everyday cognitive activity: *Symmetry is the means by which shape is converted into memory*.

Our argument will be elaborated as follows: The first three chapters will give an analysis of *perception*. Whereas perception is conventionally understood to be the study of how the mind recovers the *spatial* layout of the environment, we shall argue that perception concerns the recovery of *time* that is locked into the environment. In doing so, we shall show that Computational Vision can be reduced purely to symmetry principles. In Chapter 4, we will examine *cognition* in general, and it is here that we will argue that all cognition is the determination of the past. Chapter 5 will present preparatory material so that we are able to amplify our view further with respect to perception in the lengthy Chapter 6. In Chapter 7, we shall extend our basic rules to *linguistics*. We will argue that any sentence is understood psychologically as a piece of causal history. That is, a sentence is an "archaeological" relic—one that is dis-interred by the listener such that it reveals the past. Chapter 8 then presents a theory of *art*. We analyze a number of paintings in detail, and argue that an art-work is an object from which a person can extract the maximal amount of history. Finally, in Chapter 9, we examine *political subjugation*, because we argue that this reveals further the particular relationship we propose between history and mind.

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