

Possible Principles Underlying the Transformations of Sensory Messages

A wing would be a most mystifying structure if one did not know that birds flew. One might observe that it could be extended a considerable distance, that it had a smooth covering of feathers with conspicuous markings, that it was operated by powerful muscles, and that strength and lightness were prominent features of its construction. These are important facts, but by themselves they do not tell us that birds fly. Yet without knowing this, and without understanding something of the principles of flight, a more detailed examination of the wing itself would probably be unrewarding. I think that we may be at an analogous point in our understanding of the sensory side of the central nervous system. We have got our first batch of facts from the anatomical, neurophysiological, and psychophysical study of sensation and perception, and now we need ideas about what operations are performed by the various structures we have examined. For the bird's wing we can say that it accelerates downwards the air flowing past it and so derives an upward force which supports the weight of the bird; what would be a similar summary of the most important operation performed at a sensory relay?

It seems to me vitally important to have in mind possible answers to this question when investigating these structures, for if one does not one will get lost in a mass of irrelevant detail and fail to make the crucial observations. In this paper I shall discuss three hypotheses according to which the answers would be as follows:

1. Sensory relays are for detecting, in the incoming messages, certain "passwords" that have a particular key significance for the animal.
2. They are filters, or recoding centers, whose "pass characteristics"

