

# The Greatest Achievement of Modern Thought

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There's an old saying that science is no more a collection of facts than a house is a collection of bricks. Indeed, the meta-content of science, the set of deep, logical connections between concepts, contributes more to our understanding of the world than conclusions, alone. One might argue that conclusions without the connections from which they are formed are useless or that conclusions are each only a nexus of views or observations, and in this case, the striking conclusions of science cannot exist without an appreciation of the logical connections between structures. Of course, organizing knowledge and inquiry around the logical connections between structures is not the only way to organize a body of knowledge. The learning of the sixteenth century was organized around an entirely different concept.

I have to make an appeal again to my favorite philosopher and historian, Michel Foucault, to justify my position. Foucault says in *The Order of Things*, "Up to the end of the sixteenth century, resemblance played a constructive role in the knowledge of Western culture. It was resemblance that largely guided exegesis and the interpretation of texts; it was resemblance that organized the play of symbols, made possible knowledge of things visible and invisible, and controlled the art of representing them." Foucault continues to observe the tragic consequences of resemblance as the basis for knowledge and inquiry when he says, "By positing resemblance as the link between signs and what they indicate (thus making resemblance both a third force and a sole power, since it resides both in the mark and the content in identical fashion), sixteenth-century knowledge condemned itself to never knowing anything but the same thing, and to knowing that thing only at the unattainable end of an endless journey." Since resemblances exist everywhere, sixteenth-century knowledge engaged in endless, uncritical commentary on observable phenomena. Of sixteenth-century learning, Foucault writes, "The function proper to knowledge is not seeing or demonstrating; it is interpreting. Scriptural commentary, commentaries on ancient authors, commentaries on the accounts of travellers, commentaries on legends and fables: none of these forms of discourse is required to justify its claim to be expressing a truth before it is interpreted; all that is required of it is the possibility of talking about it."

The most important quality of modern thought is its rejection of insubstantial resemblance and its accompanying endless commentary as the basis for

knowledge and its recognition of logical relationships as the connective tissue of facts and observations and critical to understanding and discovery. We can see good examples of the importance of structural connections in the process of investigation and discovery in the genesis of calculus. The Fundamental Theorem of Calculus exploits the deep connection of the rate of growth of the area under a curve to the steepness of the curve to develop a formula for the area under a curve in terms of the slope of the tangent to the curve at a given point, the value of the derivative of the curve at the point. Similarly, the method of solving recurrences by generating functions exploits the existence of closed form expressions for series by the connection of series to sequences to develop closed forms for recurrence relations, which are essentially sequences. By systematically exploring conceptual connections between structures, modern thought became markedly more inventive than its predecessors.