

underlies modern science; underlies modern military science too; underlies the forces of change in jurisprudence, international relations and comparative theology; and any field you can think of.

This is a tradition which we can identify in terms of certain common symbols; things which the people who use these symbols understand in common; certain common processes of the mind such as synthesis and deduction; and certain common standards of accuracy--understanding of the meaning of such terms as consistency and relation; and common views of what constitutes logic, logical consistency, and the applicability of available evidence. It is this tradition which is changing our lives, and at such a rate that we are unable to keep up with it ourselves. I can illustrate the way it is doing it.

Take an object in one dimension. You say the dimension is X . I understand that what you are talking about is length, and I am happy with length. I have the sense that I have dealt with pieces of string and I know what it is. Take an object in two dimensions each of which is X , and you say X^2 . You are talking about the area of something, and I am comfortable with you. I have bought and sold land and handled pieces of paper. You take an object in three dimensions each of which is X , and you say X^3 . And I say yes, you are describing the volume of a cube; I am happy with that; I make martinis too. Then you say, all right, let us take an additional dimension, to make four, each of which is X . And you say X^4 . Now you are describing the volume, or whatever you want to call it, of something in four dimensions.

But now you are no longer talking about an object. This is not something that anybody ever saw, or felt, or heard; this is a rational construct; something in and of the mind. Now, there was a concept very similar to X^4 which Einstein derived from the mathematics of Minkowsky when he made the shift from the special theory to the general theory of relativity. He used specifically--of course, he was using Cartesian coordinates--a fourth coordinate which he handled precisely as if he had gone up to X to the fourth power. And it was this insight which led to the additional insight that there would be gravitational effects on light passing through sufficiently strong gravitational fields, and that led to the hypothesis that if you could somehow blot out the sun you would see apparent displacements of the stars at its margin, because their light would be bent as it went past the sun.