

Science is concerned with structure as distinct from value and quality. One reason for this is that structure alone is precisely or mathematically expressible (even if only with certain qualifications). Another reason is that structure is intersubjectively observable in a sense or in a degree in which quality and value are not. But, as Russell rightly held, structures and relations logically could not exist without qualities, because structures presuppose entities distinguished in some other way than merely by their relations, and relations of relations, i.e., by their structures.

Science is abstract, not in that it ignores details as distinct from general properties, but in that it ignores quality and value—properties that are and must be at least as general as structure. Science uses (sensory) qualities (and values) as mere indices of abstract structures.

But it is not only science that abstracts; our sense perceptions themselves are enormous simplifications of the perceived world. Although there are billions upon billions of individuals (cells, molecules, atoms, particles), direct perception gives us only gross outlines of quasi-individual groups of these individuals. This, too, is an extreme form of abstraction, even though one performed not by but for us as conscious beings—partly by our bodies, and partly by mental functions that elude conscious in(tro)spection.

Thus science and perception are both abstract, even if in different ways. It is one thing to leave details out of account as simply special cases of some general property (as ordinary perception does); it is something else again, to omit one or more general properties themselves (as science does). Although science does not simply abstract from, or omit, certain of the positive features of the perceived world, but, on the contrary, enormously adds to them—e.g., by adding the subworld of microorganisms to the macroorganisms perceived as part of the rich world of daily experience (*Lebenswelt*), or by adding galaxies and island universes to the stars visible in the night sky—it nevertheless does abstract in the other way, by setting aside the entire class of what have often been called secondary and tertiary qualities, focusing entirely upon the so-called primary qualities, which are really structures (of qualities) rather than qualities in the distinctive sense. Ordinary perception, on the other hand,

yields both quality (and value) and structure, but neither distinctly and with sharpness of detail.

Thus conscious sense experience omits and abstracts as genuinely as science does, though in a different way. Only a combination of the two as in their different ways revelatory of the natures of things can give us such awareness of concrete reality as falls within our capacity.

Even so, most of the universe is and must ever remain qualitatively mysterious to us. Structures can be traced from experience to bodily process, and thence to extra-bodily or environmental process, far out into the universe. But qualities can reach us only across bridges of feeling that at each stage lose most of the individual distinctnesses of the previous stage. Consequently, science has to focus on group structures rather than individual qualities. We can know the spatiotemporal patterns of what goes on in real individuals. But their feeling qualities—how can we ever know them—or (as I would add) whether they even have such qualities?

What we cannot know, however, we do not need to know in order to plan our own lives and to find our role in the creative advance that is reality. Moreover, we know what, in principle, it is that we are missing, and why, no matter how our knowledge may increase, we are always bound to miss it.

In sum: Perception is essentially concrete in that it exhibits all the general categories of reality, but it is in detail abstract by failing to exhibit distinctly most of the individual instances of these categories. Science, on the other hand, is essentially abstract in that it systematically sets aside some categories because they are not interindividually measurable, but in detail it is concrete by its power to detect otherwise hidden individual cases of the categories it employs. Science may be used to remedy the defects of perception by expanding the inventory of individuals far beyond the deliverances of direct perception. Perception (or what perception and memory have in common) may be used to remedy the defects of science by expanding the list of cosmically applicable categories to include those systematically set aside by science. The only question is how this is to be done—whether (as Hartshorne holds) by including "generalized [*sic!*] versions of the basic dimensions of

experience as such, e.g., qualities of feeling and personal and impersonal memory (i.e., perception)," or whether (as I hold) solely and simply by including the analyzed logical/ontological structure of experience as such, in its nonsensuous aspect, as distinct from its aspect as sense experience or perception.