

# Likenesses

JACOB BRONOWSKI

---

---

Man has only one means to discovery, and that is to find *likenesses* between things. To him, two trees are like two shouts and like two parents, and on this likeness he has built all mathematics. A lizard is like a bat and like a man, and on such likenesses he has built the theory of evolution and all biology. A gas behaves like a jostle of billiard balls, and on this and kindred likenesses rests much of our atomic picture of matter.

In looking for intelligibility in the world, we look for unity; and we find this (in the arts as well as in science) in its unexpected likenesses. This indeed is man's creative gift, to find or make a likeness where none was seen before—a likeness between mass and energy, a link between time and space, an echo of all our fears in the passion of Othello.

So, when we say that we can explain a process, we mean that we have mapped it in the likeness of another process which we know to work. We say that a metal crystal stretches because its layers slide over one another like cards in a pack, and then that some polyester yarns stretch and harden like a metal crystal. That is, we take from the world round us a few models of structure and process (the particle, the wave, and so on), and when we research into nature, we try to fit her with these models.

Yet one powerful procedure in research, we know, is to break down complex events into simpler parts. Are we not looking for the understanding of nature in these? When we probe below the surface of things, are we not trying, step by step, to reach her ultimate and fundamental constituents?

We do indeed find it helpful to work piecemeal. We take a sequence of events or an assembly to pieces: we look for the steps in a chemical reaction, we carve up the study of an animal into organs and cells and smaller units within a cell. This is our atomic approach, which tries always to see in the variety of nature different assemblies from a few basic units. Our search is for simplicity, in that the distinct units shall be few, and all units of one kind identical.

And what distinguishes one assembly of these units from another? the elephant from the giraffe, or the right-handed molecule of sugar from the left-handed? The difference is in the organization of the units into the whole; the difference is in the structure. And the likenesses for which we look are also likenesses of structure.

This is the true purpose of the analytic method in science: to shift our gaze from the thing or event to its structure. We understand a process, we explain it, when we lay bare in it a structure which is like one we have met elsewhere.