and sciences begin to arise, they will at first be those of pure speculation. The mind delights to escape from the trammels which had bound it to earth, and luxuriates in its newly found powers. Hence the abstractions of geometry—the properties of numbers—the movements of the celestial spheres—whatever is abstruse, remote, and extramundane—become the first objects of infant science. Applications come late: the arts continue slowly progressive, but their realm remains separated from that of science by a wide gulf which can only be passed by a powerful spring. They form their own language and their own conventions, which none but artists can understand. The whole tendency of empirical art is to bury itself in technicalities, and to place its pride in particular short cuts and mysteries known only to adepts; to surprise and astonish by results, but conceal processes. The character of science is the direct contrary. It delights to lay itself open to inquiry, and is not satisfied with its conclusions till it can make the road to them broad and beaten: and in its applications it preserves the same character; its whole aim being to strip away all technical mystery, to illuminate every dark recess, and to gain free access to all processes, with a view to improve them on rational principles. It would seem that a union of two qualities almost opposite to each other—a going forth of the thoughts in two directions, and a sudden transfer of ideas from a remote station in one to an equally distant one in the other—is required to start the first idea of *applying science*. Among the Greeks, this point was attained by Archimedes, but attained too late, on the eve of that great eclipse of science which was destined to continue for nearly eighteen centuries, till Galileo in Italy, and Bacon in England, at once dispelled the darkness; the one by his inventions and discoveries; the other by the irresistible force of his arguments and eloquence.

(65.) Finally, the improvement effected in the condition of mankind by advances in physical science, as applied to the useful purposes of life, is very far from being limited to their direct consequences in the more abundant