those phenomena are controlled by weather, they could be manipulated inside buildings. Such facts have long been known; [366] to investigate them exhaustively and put them to work would seem well worth the Government's while. Who knows—the resultant inventions might not only invigorate and prolong our life, but some might even be useful for killing people, and hence rate military funds.

6. Other Inventions

[361] One of the commonest materials on earth is *quartz*, silica, SiO_2. In its pure form it is also one of the most excellent materials, strong, elastic, very hard, expanding so little with heat that it is almost immune to heat breakage, insulating, insoluble, almost impervious to chemical attack, transmits light much better than optical glass, can pipe it around corners, so that a quartz fiber can carry light as a flexible wire carries electricity. In a flexible rope of many fibers of quartz, or less well glass, supplying as well as returning light, this art of *fiber optics* can have a large future, in reading machines (¶ 336) and cybernetics generally, and for inspecting hidden recesses of living bodies or artifacts, and for following a person's head movement, projecting a second picture, e.g., of instrument readings onto his spectacles during fast operations. Quartz is good, too, for lenses, and for precise molds, and it transmits infrared and ultraviolet light, so much needed for health, vitamin D, and germ killing, which all our glass windows, light bulbs, and fluorescent tubes hold back. Yet this so common and capable substance is so scarce and costly in its clear fused form that we rarely see or use it, although it was produced as early as 1901.[367] No law of nature seems to bar the way to making this wonderful substance as common as glass, which is mostly quartz anyway. But the private inventors have failed to make it cheap; so probably the Federal ones should have a long go at it.

[362] *Artificial diamonds* are another such substance, that has been known since 1897, and could be very useful if cheaper, especially for sharpening our ever harder alloys, and for drilling rock.

[363] A *rock tunneling machine*, which would perform every part of this work by power, with a minimum of human participation, has been attempted for a century. Now that we may be digging underground like moles, but in deep rock, to protect ourselves and necessities from atomic blasts, such inventions become more needed than ever.

[364] *Soil solidification*, for quick and cheap building of roads, runways, foundations, and fortifications, is a field of invention of major civil use, which has also caught the eye of the military.

[365] The *prediction* and even the *control of weather*, is another opportunity for science and invention, that War has become aware of, and Peace might still more benefit from.

[366] The prediction of *earthquakes* and *volcanic eruptions* is another much needed field that governments and universities have long essayed, but without definitive success as yet.

[367] Good and cheap *prefabricated houses*, and semimovable types, might be classed as a social rather than mechanical invention, so easy would be their mechanical inventing, if once the social problem were solved, of who were to pay for the inventing, and manufacture the houses, with a large enough market assured to justify the immense