

movable, usually unorganized custom. Examples²³⁵ are: better rail car coupling systems, much needed in Europe; different rail gages, wider templates, contra-standard tracks; and especially inventions in broadcast and other public communication systems which would interfere with standardized features at the receiving end, chiefly in radio and television receivers, phonographs; also the familiar alphabets, signals, musical notation, digits, arithmetic, calendar, weights and measures.

[216] In all these fields nondisruptive additive improvements are welcomed, like the new high frequency channels of radio and TV, and new words and scientific symbols, which supplement without contravening established custom. But even great standardizations have been occasionally broken and changed for the much better, chiefly when a government asserted its authority, as when the Janney automatic car coupler was forced in by American law in 1887-93, in place of the slow and deadly link-and-pin, while thousands of other solutions rested helplessly in the Patent Office. In the Middle Ages Arabic numerals and algorisms gradually replaced the Roman numbers and abacus by the choices of scholars. The change of the Turkish alphabet from Arabic to Roman by Kemal, and of the Russian alphabet, spelling, calendar, and measures by the Soviets, are examples of strong government action, where national consistency was requisite. The blind, whose writing falls under the control of a few schools and publishing houses, have had their raised letters transformed by invention several times in the last century, in progressive departures from the traditional Roman original, with vast benefits. So it may even happen that the blind shall lead us sighted folk, whose alphabet and system of spelling, custom-bound and lacking legal control, have not been much changed, nor improved on the whole, since 28 centuries ago, when the Greeks invented the vowels. To obtain any upsetting inventions, in a vast and potentially invaluable field, consisting largely of every kind of *communications*, it is usually necessary for government to assert its authority.

[217] To distill into a simple formula our observations on custom-barred invention, we should say that the power to invent, or in any way to change things abruptly, is inseparable from *ownership* or *control* over all those things that must be changed to use the invention, including even part of the education, thoughts and activities of those who must use the novelty. If invention be thus inseparable from ownership or authority, it follows that where there is no ownership nor authority enough concentrated to act sufficiently together, no invention can be brought into use, wherefore no one will spend much time nor any money to invent and perfect that obviously unadoptable invention. In still fewer words, without requisite ownership or preempted control, bold invention is impossible. Therefore, considerable areas of American civilization remain century after century without possibility of improvement by invention, namely those areas, chiefly of communication, in which a high degree of standardization is enforced by unorganized custom, no one asserting ownership nor authority. And these areas must always remain without progress by invention, unless and until the American Government asserts its authority for such purpose, as most other nations have done.