

higher or better synthesis of ideas than before achieved, like Ericsson's *Monitor*. These crucial solutions may also come while at his regular *ad hoc* work, even under pressure, especially when the inventor has great interest, no expectation of distractions, a sense of well-being, and of having the confidence of others.⁵⁴³

OTHER NONLOGICAL METHODS OF INVENTION

[589] Perhaps a drug can someday be found, that will induce free association in a well-stocked mind, like the hypnagogic state on awakening. The drug's action might need to be long lasting because the work of the subconscious mind, or its endless turning of the kaleidoscope until a competent pattern flashes, seems usually to take long hours, days, or months. Alcohol and tobacco in moderation are sometimes resorted to by inventors, but probably have only their familiar relaxing effects.⁵⁴⁰

[590] Another way of attacking a baffling problem is Edison's famous custom of trying everything, logically indicated or not. A modern scientist, say a physicist, having a mind well furnished with principles telling him at once that most imaginable proposals are utterly hopeless, will usually sniff at this try-everything method, as a waste of time. And indeed Edison probably used it in chemistry because he had no schooling in that nor any science; in electric matters he did not use it. By the same token the try-everything method is good and used today where science is lacking. In our ignorance of how and why certain chemicals poison certain species of germs or pests, it is approved practice to test new chemicals wholesale against harmful species wholesale. Once in a thousand tries a useful discovery will be made; and each experiment costs little, especially with wholesale techniques.

[591] Kettering stressed empiricism, trying things out under working conditions, however expensive and time consuming this process. "Let the problem be the boss," he said, adding that the facts of Nature are the only authority in the world that an inventor should respect.⁵⁵⁵

[592] Another method of forcing the mind to try paths which habit would never think of is the *check list*, such as Osborn⁵⁴⁷ and Von Fange⁵⁵⁶ recommend, a ready prepared list of charges that one might make in any device, such as to put it to other uses, make it larger or smaller, substitute something else, reverse its action, combine it, etc. Or with more of logic, one could apply a *matrix*, i.e., a logical ringing of the changes, using a 3-dimensional, intellectual model probably, which expresses all the possible different combinations of the properties or ideas into which the given subject matter has been analyzed.⁵⁵⁷

[593] Professor Gordon, when with the A. D. Little consulting firm, conducted a regular team, reported successful but since dropped, which seemed based on the one idea of the ambivalence of knowledge, or the need of an untrammelled mind. His team almost shunned appropriate competence, comprised an anthropologist, an engineer-sculptor, a business manager, and some other engineers, and its problems were posed in the most general manner, considering not "How to make a better can-opener," but "Opening"; or not a knife, but "Separat-