

Call Me Trimtab

"Something hit me very hard once, thinking about what one little man could do. Think of the Queen Mary—the whole ship goes by and then comes the rudder. And there's a tiny thing on the edge of the rudder called a trim-tab. It's a miniature rudder. Just moving that little trim-tab builds a low pressure that pulls the rudder around. Takes almost no effort at all. So I said that the little individual can be a trim-tab. Society thinks it's going right by you, that it's left you altogether. But if you're doing dynamic things mentally, the fact is that you can just put your foot out like that and the whole big ship of state is going to go. So I said, "Call me Trimtab."

-Excerpted from R. Buckminster Fuller tape transcript for Barry Farrell for Playboy interview, 2/1972.

"Within the grand strategy of anticipatory problem-solving to be accomplished exclusively through design transformation of human ecology's physical environment apparatus, the design stratagems range from powerful to subtle. For instance, instead of attempting to push the bow of an ocean liner from one side to the other in order to steer it (as we do the front ends of automobiles, as well as of social trend fronts), inasmuch as the great seas also try to push the bows to one side or the other, thus tending to throw the ship out of control, the naval architect must design in such a way that the ship's course will not tend to be diverted by heavy seas, yet will be steerable.

To do this he designs a ship's hull with the hinge or pivot point of the ship occurring forwardly under the step of the bow. This makes a long lever arm aft and a very short lever arm forward of the pivot and the long lever overpowers the short one as in a weathervane "ship." Thus the naval architect makes the stern of the ship (rather than the bow) swing to one side or the other of the course. The course tends to be held steadily by the bow. The stern tries to follow the bow in a straight course. The keel then makes the stern follow the bow when the ship is in motion.

In order to change course, the stern is deliberately swung to one side or the other. This is done by the rudder at the stern, which is so small as to be easily manipulated. The rudder, by making a small drag angle, creates a partial vacuum on the side of the rudder opposite to that of the direction in which the rudder is moved. This partial vacuum starts to pull the stern of the boat, which causes a much larger partial vacuum to build up on the stern quarter of the ship on the side toward which the stern swings as the ship moves through the water in this askew attitude. This vacuum is built up for the same reason that the horizontal askew attitude of a wing-foil in motion through which the air creates the lifting vacuum of its cambered or top surface. The reason is that it is a longer distance around the cambered askew side for the parted water to reach, as suddenly displaced by the ship's motion, which makes the longer-way-reach tense the air-interspersed water molecules, creating a partial vacuum. So powerful is this partial vacuum, or negative pressure, chain-reaction buildup that it can for instance suck-pull the 30-knot-speeding hull of the 85,000-ton, Empire State Building-sized Queen Mary into a new angle in respect to the directionally fixed momentum of her bow-pivot center, which thus hinges the Queen Mary into a new course attitude, which is fixed when the rudder is returned past "midship" to "meet her" or break the vacuum build-up and then returned to midship position.

This principle of creating vacuums with minimum effort that will self-regenerate to build up large vacuums to govern very large, pattern-transforming work is even more dramatically emphasized in the case of the giant jet airliners where, literally, postage stamp-sized trim-tabs in the trailing edges of the large vertical and horizontal ruddering surfaces are all that are used by the automatic-gyro-pilot servo-mechanisms to keep these hundred-ton sky-giants hurtling along at 600 miles per hour on accurate multi-dimensional course despite invisible atmospheric turbulences far greater in size and velocity magnitude than those of the water ocean.

My philosophy takes primary heed of the fact that all in Universe is in constant, transformative, complex motion and all transforms in patterns of least resistance. Therefore, philosophically it became evident that by subtly designed, "trim-tab" sized inventions we could, with least physical effort, control the least resistant directions of various fundamental transformings. This could be done by devices which would so control the angle and frequency occurrences of little vacuums or tensions that they would automatically induce large vacuums and tensions which could cause man's ecological patterning to evolve in preferred patterns. Designs could also detect and discretely vitiate specific subtle vacuums chain-reacting into larger vacuums and thereby holding certain transforming systems on socially deleterious courses.

How much more powerful is the miniscule ship's rudder when in good order than a squadron of ships trying to maneuver a rudderless ship in heaving sea by attempting to push the rudderless one with their plunging bows in preferred directions as do tugs maneuver a big ship in still water when the ship is moving too slowly

to have a steering-way! Also how futile are shouted words of warning and exhortation in such situations! Only the rudder and the brain that directs the rudder are effective. No wonder Norbert Wiener included the Greek name for rudder in coining his "Cybernetics" to identify the newly-emergent computer's feedback system science. No wonder the early Egyptian and Greek shipmasters stood in the stern of their ships, facing forwardly alongside the single oar-steering slave as the crew of backwards-facing slaves tensed as the banks of vacuum-fulcrumed oars. Here is the picture of society straining at its slavishly-accepted work, backing up, blindly, into its future as an often near-sighted excursion captain cons the course.

My philosophy also takes heed of the approximately unlimited ratio of length to girth of tensional controls which always tend to pull true versus the very limited length-girth ratio of pushing devices which when pushed tend to bend and break.

Philosophically it is clear that trim-tabs occur in trailing edges of trailing devices—in the tail-end of tail-end events—at the stern of the ship as the last event and not at the bow as the first event. The bow is important to keep the ship on a chosen course but the stern rudder puts and holds it on chosen courses. The real steering takes place when the non-scientifically-informed observer thinks everything is "all over." But that final steering has to be done from "on board." Just "having the last word" from away back in the wake of the ship is futile. Scientists have often said that the most important part of their greater discoveries occurred at the outset, in the proper formulation of the project's objectives, forgetting that those enlightened formulations were really the after-image inducements of tail-end events of earlier and seeming failures of experimentation.

My philosophy also concentrates upon synergy, the behavior of whole systems unpredicted by the behavior of the system's components, taken singly, or in addition, as for instance chrome-nickel-steel, whose tensile strength is 50 percent greater than the sum of the tensile strengths of all its component metals. Synergy is readily explained by mathematics.

It was in the synergetic combination of such trim-tab and tensional-type thinking regarding intellectual advantage over physical pattern dynamics that my philosophy emerged in 1927 as a set of generalized principles governing objective design formulations. I saw, as the tail-end event of one of my own private catastrophes, that the seemingly adverse events of history could always be, and sometimes have been turned to fundamental advantage—even by physically miniscule individual man, despite the formidability of the era of massive governments, corporations and promotional or protectional organizations representing all manner of debilitating biases. In 1927 I deliberately entered the "trim-tab lab."

-Excerpted from "New Forms vs. Reforms," from the World Design Science Decade documents, by Buckminster Fuller, Vol. 1: 53, 1963

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