03 — The forgotten order

In my younger years I worked as a steel construction engineer. A steel structure is calculated in successive orders. The first order gives the gross load-bearing capacity under loading. The second order corrects for bending effects and non-linearities. The third order accounts for still smaller deviations. And so it continues, in theory to infinity.

In practice, nobody does that. An experienced structural engineer knows: once the second order contributes something five to twenty times smaller than the first, you calculate to second order and stop. The third order you ignore — not out of laziness, but out of discipline. Because the measurement error introduced by the additional order is larger than its contribution to the result. Whoever calculates a steel beam to the seventh order does not get a more precise beam — he gets a beam that is never built, because the design has collapsed under its own arithmetic.

This principle lies at the foundation of every sound engineering practice. It has three related forms, all three developed in the twentieth century, all three now forgotten outside their original disciplines.

Ishikawa and Japanese quality control

In 1968 Kaoru Ishikawa wrote his *Guide to Quality Control*, a manual for shop-floor teams in Japanese factories. The book was deliberately written for people without a university education. The seven instruments Ishikawa describes — control chart, histogram, scatter diagram, stratification, checklist, fishbone analysis, and Pareto chart — are all built on one shared assumption: of the ten factors at play in a production defect, two or three carry the weight of the effect. The rest is noise. Whoever isolates the dominant factors and acts on them solves the problem. Whoever tries to improve all factors simultaneously achieves nothing.

It is not a statistical trick. It is a working principle that acknowledges that reality is distributed unequally. Eight times out of ten, two causes together account for eighty per cent of the effect. Those eight times are not coincidental — they represent the average pattern of a world in which consequences are not flat functions but powers.

Japanese industry was built on this principle. Toyota, Honda, the semiconductor sector of the nineteen-eighties, the optics industry, the shipbuilding policy in Korea that copied the same tradition. Nothing about this principle is mystical. It is arithmetic. But it is arithmetic *with respect for distribution*.

The 20–73 rule

A related tradition comes from a different field. In criminology, research consistently shows that a small group of offenders is responsible for the overwhelming majority of crimes. Twenty per cent of offenders, seventy-three per cent of thefts — varying by city and offence type, but always in the same unequal ratio. The same distribution appears in arson, in traffic violations, in hospital admissions, in tax evasion. Two institutions, two disciplines, one pattern.

The practical conclusion is plain: whoever combats crime by treating every citizen identically misses the main body of it. Whoever targets the twenty per cent reaches the seventy-three. But the political conclusion is less straightforward, because equality before the law is a great good.

The dilemma is real and remains unresolved in every democracy. That is precisely why naming the pattern is so useful: it prevents us from running, with the best of intentions, straight into a mathematical wall.

The Italian economist and the English jewel

For the third tradition I must go back to 1906. Vilfredo Pareto, Italian economist, established that in his country twenty per cent of the population owned eighty per cent of the land. He discovered the same pattern in incomes, in the harvests from his kitchen garden, in the number of published scientific papers per researcher. He gave it a name that would occupy the twentieth century: the law of unequal distribution.

In 1951 the Romanian-American quality specialist Joseph Juran incorporated Pareto's observation into factory practice. *Vital few, trivial many*, he called it. Twenty per cent of the causes produce eighty per cent of the problems. It has become the foundation of modern quality control in healthcare, aviation, and the process industries. Whoever knows Pareto knows what to tackle.

Three traditions, one principle

Ishikawa, 20–73, Pareto–Juran. Three disciplines that were unacquainted with one another, all three arriving at the same conclusion. *Reality is hierarchically distributed, and the hierarchy has a threshold.* Below a factor of five relative to the dominant factor, a cause disappears into the margin. There it must remain. Whoever pulls it from the margin to the centre loses not only time — he squanders attention that is needed elsewhere.

That principle can be seen in a single diagram.

Three traditions, three bars, one line. The first order dominates. The second lies a factor of five to ten lower. The third vanishes into the margin. Whoever calculates down to the margin in his policy governs against the arithmetic.

What remains of it in the Netherlands

In Dutch governance this principle has disappeared. Not through stupidity — through something more deliberate: through an overriding commitment to equal treatment. The moment a civil servant says "these three factors account for eighty per cent, we disregard the rest," he is charged with arbitrariness. So he weighs everything. And once he weighs everything without distinction of weight, he ends up giving most influence to whatever is most precisely formulable on paper — not to whatever contributes most to the outcome.

The Toeslagenaffaire (the Dutch childcare-benefits scandal) is the textbook example. The Dutch tax authority (Belastingdienst) algorithm weighted indicators for and against equally. A proxy variable that made no statistical contribution to fraud detection — dual nationality, a name that differed from the norm — was in practice assigned the weight of a primary factor. The deviation was weighted more heavily than the actual question of whether fraud had occurred. First order displaced by third order, for twenty thousand families.

It can be otherwise. In the world of construction in which I grew up, it can be otherwise. On the factory floor where Ishikawa started, it can be otherwise. Among judges who understand their

work, it can be otherwise. But it requires the rehabilitation of a simple instrument that our society has discarded because it seemed unequal.

It is not unequal. It is calibrated to a reality that *is* unequally distributed. The one is justice; the other is arithmetical discipline. Whoever confuses the two governs blind.
