

"The Pi-Shaped Person"

excerpt (pp. 426-430) from *Artful Design*,
Chapter 8 "Manifesto"



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ALL THE WHILE, NO MATTER HOW DIRE THINGS SEEM, IT IS **MUSIC** AND THE **ARTFUL** THAT PULL US BACK FROM THE **BRINK** AND **CALM** THE SAVAGE INSIDE, OFFERING SANCTUARY AND ALLOWING US TO **TRANSCEND** BRIEFLY OUR **PETTY STRUGGLES**. HUMANS WILL ALWAYS MAKE ARTFUL THINGS, EVER STRIVING TO UNDERSTAND OURSELVES, AND TO **REACH** FOR SOMETHING **BETTER** THAN OURSELVES. IT IS THROUGH THE ARTFUL THAT WE ARE **AUTHENTICATED**, NOT SO MUCH BY ITS **GREATNESS**, BUT BY THE FACT THAT WE MAKE IT **AT ALL**.

THIS **AESTHETIC DIMENSION** IS NOT SEPARATE FROM LIFE -- IT **IS** LIFE. PERHAPS IT'S WHY WE BOTHER TO DESIGN **BEAUTY** INTO **USEFUL** THINGS, AND WHY WE STRIVE FOR **TRUTH** IN THE SHAPING OF **TECHNOLOGIES** THAT CONTINUE TO TRANSFORM OUR LIVES. TECHNOLOGY WITHOUT **POETRY** IS BUT A **BLUNT INSTRUMENT**, WHEREAS AESTHETICS WITHOUT UNDERSTANDING OF TECHNOLOGY IS LIKE **SOUL** WITHOUT A **BODY**. EVEN **PURE ART** NEED A MEDIUM.

IN THIS UNION OF AESTHETICS AND TECHNOLOGY, WE FIND A **THIRD THING** THAT IS NEITHER **PURE ART** NOR **PURE ENGINEERING**, BUT A **SYNTHESIS** OF TWO SEEMINGLY DISPARATE HUMAN ENDEAVORS...

THIS IS A CALL -- **NOT FOR A NEW WORLD** OR **NEW SYSTEMS** OR **NEW COMPANIES**, BUT FOR A **NEW KIND OF INDIVIDUAL**; A **DEEP HYBRID** BETWEEN ENGINEER, ARTIST, AND HUMANIST; A **BUILDER** WHO CAN IMBUE HUMAN **VALUES** INTO OUR **CREATIONS**. I WANT TO CALL SUCH AN INDIVIDUAL...

YOU... THE HUMANIST ENGINEER!



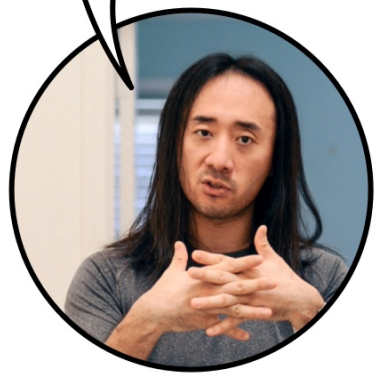
...AND YES, THE ARTFUL DESIGNER!

DEFINITION 8.13

"IF IT IS **REASON** THAT MAKES MAN, IT IS **SENTIMENT** THAT GUIDES HIM."
-- ROUSSEAU

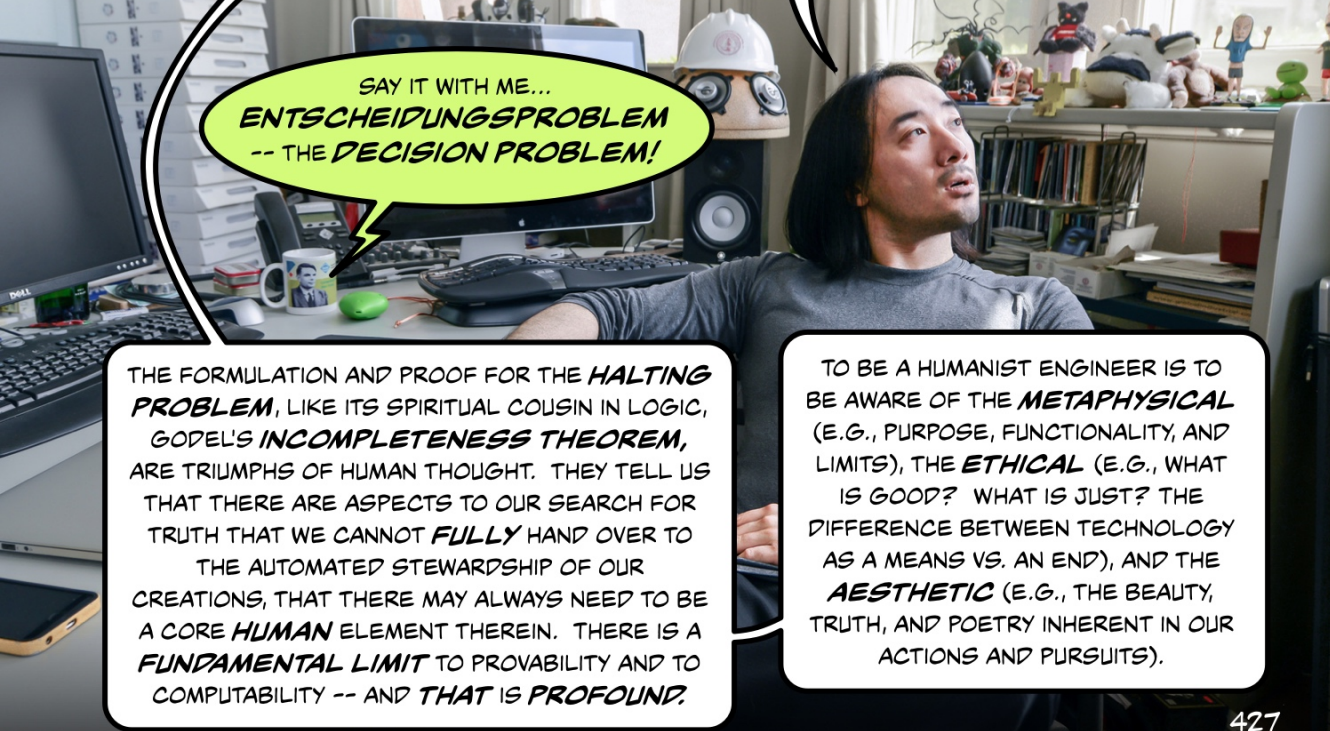
THE ENGINEER NEEDS MORE THAN PRACTICAL TOOLS AND TECHNIQUES, THE ENGINEER NEEDS **CRITICAL** TOOLS (TO QUESTION, INQUIRE, REFLECT, INTERPRET, ANALYZE, AND ARGUE) AND **EMOTIONAL** TOOLS (TO FEEL, WONDER, AND EXPRESS). THE PATH FORWARD HAS TO COME FROM **WITHIN** OURSELVES, BY FOSTERING A NEW KIND OF **HYBRID HUMAN** THAT CAN **GROK** TECHNOLOGY, ART, HUMANISM -- AS PARTS OF A SINGLE PURSUIT.

SUCH **MULTI-FACETED** HYBRIDS ARE NOT NEW. THEY HAVE PLAYED PIVOTAL ROLES THROUGHOUT HUMAN HISTORY BECAUSE THEY ARE **SYNTHESIZERS** -- DESIGNERS CAPABLE OF **FUSING** THE **PRACTICAL** WITH THE **AESTHETIC**, THE **PRAGMATIC** WITH THE **IDEALISTIC**, THE **LOGICAL** WITH THE **PHILOSOPHICAL**.



SUCH **HYBRIDS** DO NOT NEED TO BE THE FUTURE LEADERS OF THE WORLD, NOR ITS SO-CALLED **GENIUSES** OR **SAVANTS**. THEY ARE SIMPLY ITS **DENIZENS** AND **CITIZENS**.

YEARS AGO, AS A COMPUTER SCIENCE UNDERGRAD, I FIRST ENCOUNTERED THE IDEA THAT CERTAIN WELL-DEFINED PROBLEMS (SUCH AS "WRITE A COMPUTER PROGRAM THAT, GIVEN A SECOND COMPUTER PROGRAM, DETERMINES WHETHER THE LATTER WILL **HALT** OR LOOP FOREVER"), PROVABLY, CAN **NEVER** BE SOLVED BY OUR NOTION OF COMPUTERS. IT WAS A **PHILOSOPHICAL** AND **AESTHETIC** MOMENT THAT MADE ME APPRECIATE THE COMPUTER ALL THE MORE... BECAUSE ON THAT DAY I UNDERSTOOD SOMETHING ABOUT WHAT IT **IS** AND WHAT IT'S **NOT**, AND THAT MORE CLEARLY DEFINED ITS TRUE NATURE. MOST OF ALL IT MADE ME A WITNESS AND PARTICIPANT TO A CERTAIN **POETRY** INHERENT IN THE DISCIPLINE OF COMPUTER SCIENCE, THAT IT IS A **HUMAN** INQUIRY, MEDIATED BY TECHNOLOGY -- **NOT** THE OTHER WAY AROUND...



SAY IT WITH ME...
ENTSCHEIDUNGSPROBLEM
-- THE **DECISION PROBLEM!**

THE FORMULATION AND PROOF FOR THE **HALTING PROBLEM**, LIKE ITS SPIRITUAL COUSIN IN LOGIC, **GODEL'S INCOMPLETENESS THEOREM**, ARE TRIUMPHS OF HUMAN THOUGHT. THEY TELL US THAT THERE ARE ASPECTS TO OUR SEARCH FOR TRUTH THAT WE CANNOT **FULLY** HAND OVER TO THE AUTOMATED STEWARDSHIP OF OUR CREATIONS, THAT THERE MAY ALWAYS NEED TO BE A **CORE HUMAN** ELEMENT THEREIN. THERE IS A **FUNDAMENTAL LIMIT** TO PROVABILITY AND TO COMPUTABILITY -- AND **THAT IS PROFOUND**.

TO BE A HUMANIST ENGINEER IS TO BE AWARE OF THE **METAPHYSICAL** (E.G., PURPOSE, FUNCTIONALITY, AND LIMITS), THE **ETHICAL** (E.G., WHAT IS GOOD? WHAT IS JUST? THE DIFFERENCE BETWEEN TECHNOLOGY AS A MEANS VS. AN END), AND THE **AESTHETIC** (E.G., THE BEAUTY, TRUTH, AND POETRY INHERENT IN OUR ACTIONS AND PURSUITS).

DEFINITION 8.14

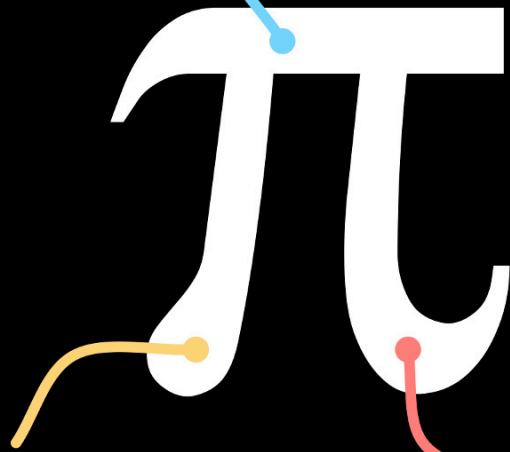
THE π -SHAPED PERSON

THE **HUMANIST ENGINEER** IS AN INDIVIDUAL WHO IS ABLE TO INTEGRATE **DEEP ENGINEERING** KNOWLEDGE WITH A BROADER **HUMANISTIC CONTEXT** (AESTHETIC, MORAL-ETHICAL, PHILOSOPHICAL). MORE THAN A SPECIALIST, THIS IS SOMEONE WHO IS CAPABLE OF SHAPING THE WORLD FROM NOT ONLY **PRACTICAL NEEDS**, BUT ALSO FROM THE UNDERLYING **VALUES**.

TRANSLATED INTO AN **EDUCATIONAL CONTEXT**, THE **CRAZY IDEA** HERE IS TO TEACH **AESTHETICS**, **HUMANITIES**, AND **ENGINEERING** IN **CONJUNCTION**, EMPHASIZING THE DEEP **INTERPLAY** BETWEEN THEM. IN HIGHER EDUCATION, WE SPEAK OF THE NOTION OF A "**TI-SHAPED STUDENT**," WHERE THE LETTER **TI** REPRESENTS **DISCIPLINARY EXPERTISE** ON ONE LEG (E.G., COMPUTER SCIENCE) AND **DOMAIN EXPERTISE** ON THE OTHER (E.G., PUBLIC HEALTH OR MUSIC); THE **HORIZONTAL BAR** REPRESENTS AN **AESTHETIC LENS** THAT GIVES **BROADER CONTEXT** IN BRIDGING THE TWO LEGS.

AESTHETIC LENS

PHILOSOPHICAL, ARTISTIC, MORAL LENS THAT GIVES **BROADER MEANING AND CONTEXT** IN BRIDGING THE TWO LEGS!



DISCIPLINARY EXPERTISE

E.G., COMPUTER SCIENCE

DOMAIN EXPERTISE

E.G., PUBLIC HEALTH OR MUSIC

MANTRA 8.15

DO. THINK. FEEL.

DOING WITHOUT THINKING IS **DANGEROUS**.
THINKING WITHOUT FEELING IS **BANEFUL**.
FEELING WITHOUT DOING IS **POWERLESS**.

...**MUST COMBINE!**



~AHEM~

THAT'S **CRAZY TALK!** TO COMBINE THE **UNCOMPROMISING IDEALISM** OF ART WITH THE **UNSWERVING PRAGMATISM** OF ENGINEERING...

BUT THEN AGAIN...

IT WOULD BE **MADNESS** TO **EXPECT** TO ACHIEVE RESULTS NEVER BEFORE ACCOMPLISHED -- EXCEPT THROUGH A **MEANS** NEVER BEFORE ATTEMPTED!



FRANCIS BACON

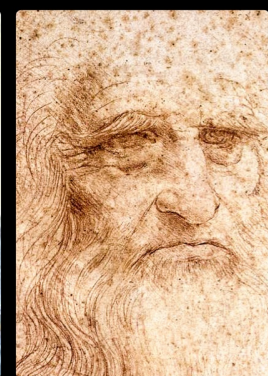
IN ORDER FOR US TO TRULY MOVE FORWARD, THE **NARRATIVE** OF OUR **EDUCATIONAL** AND **TECHNOLOGICAL** INSTITUTIONS MUST **EVOLVE** -- FROM A PRIMARILY **NEED-DRIVEN AND PROBLEM-SOLVING** NARRATIVE TO A **VALUE-BASED, SELF-DEFINING** (AND STILL PROBLEM-SOLVING) ETHOS. AS AN ENGINEER MYSELF, I OBVIOUSLY **CHAMPION** PROBLEM SOLVING, BUT A CORE ISSUE WITH THE SOLUTION-CENTRIC NARRATIVE IS THAT MUCH OF THE **HUMANITIES** AND **ARTS** (AND **LIFE** ITSELF) IS **NOT** ABOUT SOLVING PROBLEMS (E.G., MUSIC, PHILOSOPHY, HISTORY AREN'T "PROBLEMS TO BE SOLVED"). RATHER, THEY ARE ABOUT EVER MORE FULLY **UNDERSTANDING** AND **EXPRESSING** OURSELVES AS HUMAN BEINGS. AT THE SAME TIME, I, FOR ONE, BELIEVE **ENGINEERING** IS CAPABLE OF **MORE** THAN "SIMPLY" SOLVING PROBLEMS. THROUGH **HOW** WE SHAPE THE WORLD, WE CAN SPEAK AUTHENTICALLY TO WHO WE ARE (NOT UNLIKE ART AND THE HUMANITIES). THE **ETHOS** OF THE HUMANIST ENGINEER TIES THIS TOGETHER!

PATRON SAINTS OF HUMANIST ENGINEERING

THE IDEA OF COMBINING **ART**, THE **HUMANITIES**, AND **ENGINEERING** IS NOT **NEW**. RATHER, IT IS SOMETHING WE HAVE TO **RECOVER**, SOMETHING WE MAY HAVE **LOST** IN OUR QUEST FOR **SPECIALIZATION**. **BUCKMINSTER FULLER** HAD THE NOTION OF A **COMPREHENSIVE ANTICIPATORY DESIGN SCIENTIST** -- "AN EMERGING SYNTHESIS OF ARTIST, INVENTOR, MECHANIC, OBJECTIVE ECONOMIST, AND EVOLUTIONARY STRATEGIST." THERE ARE **ECHOES** OF SUCH **HYBRIDS** THROUGHOUT HISTORY -- ARISTOTLE, DA VINCI, MICHELANGELO, ADA LOVELACE, AND MANY OTHERS WHO NATURALLY BRIDGED WHAT WE THINK OF TODAY AS "SEPARATE DISCIPLINES"...



ARISTOTLE
THE LOGICAL ETHICIST



LEONARDO
THE INVENTOR ARTIST



ADA LOVELACE
THE POETICAL PROGRAMMER



AND... **WILE E. COYOTE!** (THE **UNRELENTING DESIGNER!**)

YES! THE PATRON SAINT OF BUILDERS, HACKERS, AND THOSE WHO **PERSEVERE!**

"If it is reason that makes man, it is sentiment that guides him."

—**Jean-Jacques Rousseau** (1761)

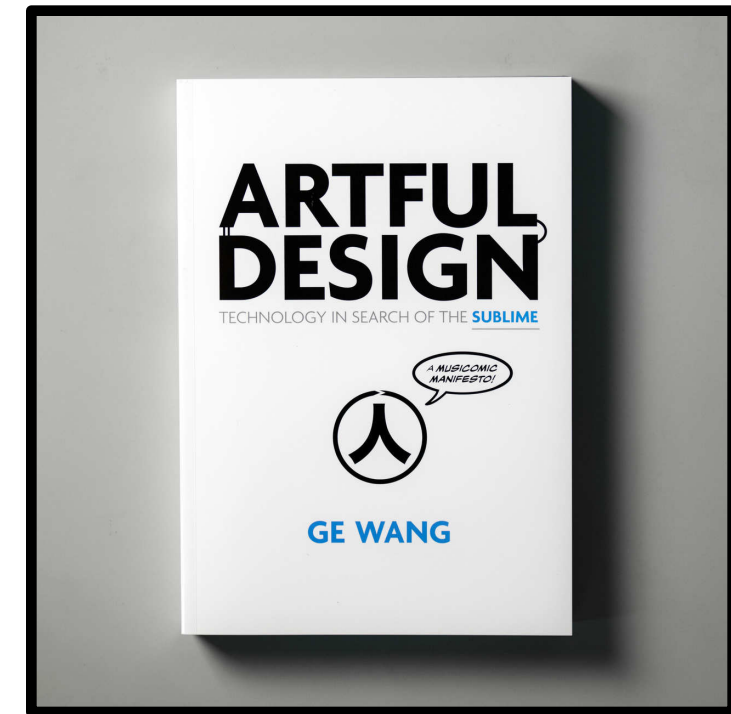
Julie, or the New Heloise

AESTHETICS FIRST

It may seem a radical idea to prioritize **aesthetics**—before science, technology, engineering, even before ethics and morality. And yet aesthetics—the intellectual-emotional recognition of beauty not only artistic but broadly humanistic—provides the human context and impetus to learn subjects requiring advanced logic and reason, in a way that is not anchored solely in the calculus of need, but with an artfulness that can only be human. To value things for their intrinsic worth, beyond pure function, may well be to appreciate a core condition of being human.

In our increasingly technological society, we lack an aesthetic dimension—a baseline awareness of shared humanity and the beauty underlying our capacity for reason, civility, and morality. If there is truth to this line of thinking, then today's engineer may need to become much more than a specialist and evolve into a synthesis of a technological artist, a moral-ethical inventor, and a compassionate system designer.

Although aesthetics is not the direct conduit for knowledge, discovery, innovation, civil society, or governance, it supplies a common humanity that stands to make us capable and worthy of such achievements. Alongside **science**, **technology**, **engineering**, **mathematics**, we need to educate ourselves in **aesthetics**. Before we can truly know other things, we must learn to be human beings.



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