Part 2 – Challenges to Quality

Based on excerpts from *Zen and the Art of Motorcycle Maintenance*

**Excerpt 4: Getting Stuck**

"I want to write a letter to Mom," Chris says. That sounds good to me. I go to the desk and get some of the lodge stationery. I bring it to Chris and give him my pen. He puts the paper in front of him, grabs the pen in a heavy grip and then concentrates on the blank paper for a while.

He looks up. "What day is it?" I tell him. He nods and writes it down. Then I see him write, "Dear Mom:" Then he stares at the paper for a while. Then he looks up. "What should I say? ...help me," he says.

"Okay," I say. I tell him getting stuck is the commonest trouble of all. Usually, I say, your mind gets stuck when you’re trying to do too many things at once. What you have to do is try not to force words to come. That just gets you more stuck. What you have to do now is separate out the things and do them one at a time. You’re trying to think of what to say and what to say first at the same time and that’s too hard. So separate them out. Just make a list of all the things you want to say in any old order. Then later we’ll figure out the right order.

… Stuckness is a common problem with motorcycle maintenance … a mental stuckness that accompanies the physical stuckness of whatever it is you’re working on. A screw sticks, for example, on a side cover assembly. You check the manual to see if there might be any special cause for this screw to come off so hard, but all it says is "Remove side cover plate" in that wonderful terse technical style that never tells you what you want to know. There’s no earlier procedure left undone that might cause the cover screws to stick.

If you’re experienced you’d probably apply a penetrating liquid and an impact driver at this point. But suppose you’re inexperienced and you attach a self-locking plier wrench to the Shank of your screwdriver and really twist it hard, a procedure you’ve had success with in the past, but which this time succeeds only in tearing the slot of the screw.

Your mind was already thinking ahead to what you would do when the cover plate was off, and so it takes a little time to realize that this irritating minor annoyance of a torn screw slot isn’t just irritating and minor. You’re stuck. Stopped. Terminated. It’s absolutely stopped you from fixing the motorcycle. This isn’t a rare scene in science or technology. This is the commonest scene of all. Just plain stuck. In traditional maintenance this is the worst of all moments, so bad that you have avoided even thinking about it before you come to it.

The book’s no good to you now. Neither is scientific reason. You don’t need any scientific experiments to find out what’s wrong. It’s obvious what’s wrong. What you need is an hypothesis for how you’re going to get that slotless screw out of there and scientific method doesn’t provide any of these hypotheses. It operates only after they’re around. This is the zero moment of consciousness. Stuck. No answer. Honked. Kaput. It’s a miserable experience emotionally. You’re losing time. You’re incompetent. You don’t know what you’re doing. You should be ashamed of yourself. You should take the machine to a real mechanic who knows how to figure these things out.

It’s normal at this point for the fear-anger syndrome to take over and make you want to hammer on that side plate with a chisel, to pound it off with a sledge if necessary. You think about it, and the more you think about it the more you’re inclined to take the whole machine to a high bridge and drop it off. It’s just outrageous that a tiny little slot of a screw can defeat you so totally. What you’re up against is the great unknown, the void of all Western thought. You need some ideas, some hypotheses. Traditional scientific method, unfortunately, has never quite gotten around to say exactly where to pick up more of these hypotheses. Traditional scientific method has always been at the very best, 20-20 hindsight. It’s good for seeing where you’ve been. It’s good for testing the truth of what you think you know, but it can’t tell you where you ought to go, unless where you ought to go is a continuation of where you were going in the past. Creativity, originality, inventiveness, intuition, imagination..."unstuckness," in other words...are completely outside its domain.

We’re still stuck on that screw and the only way it’s going to get unstuck is by abandoning further examination of the screw according to traditional scientific method. That won’t work. What we have to do is examine traditional scientific method in the light of that stuck screw. We have been looking at that screw "objectively." According to the doctrine of "objectivity," which is integral with traditional scientific method, what we like or don’t like about that screw has nothing to do with our correct thinking. We should not evaluate
what we see. We should keep our mind a blank tablet which nature fills for us, and then reason disinterestedly from the facts we observe. But when we stop and think about it disinterestedly, in terms of this stuck screw, we begin to see that this whole idea of disinterested observation is silly. Where are those facts? What are we going to observe disinterestedly? The torn slot? The immovable side cover plate? The color of the paint job? The speedometer? The sissy bar? As Poincaré would have said, there are an infinite number of facts about the motorcycle, and the right ones don’t just dance up and introduce themselves. The right facts, the ones we really need, are not only passive, they are damned elusive, and we’re not going to just sit back and "observe" them. We’re going to have to be in there looking for them or we’re going to be here a long time. Forever. As Poincaré pointed out, there must be a subliminal choice of what facts we observe.

The difference between a good mechanic and a bad one, like the difference between a good mathematician and a bad one, is precisely this ability to select the good facts from the bad ones on the basis of quality. He has to care! This is an ability about which formal traditional scientific method has nothing to say. It’s long past time to take a closer look at this qualitative preselection of facts which has seemed so scrupulously ignored by those who make so much of these facts after they are "observed." I think that it will be found that a formal acknowledgment of the role of Quality in the scientific process doesn’t destroy the empirical vision at all. It expands it, strengthens it and brings it far closer to actual scientific practice. I think the basic fault that underlies the problem of stuckness is traditional rationality’s insistence upon "objectivity," a doctrine that there is a divided reality of subject and object. For true science to take place these must be rigidly separate from each other. "You are the mechanic. There is the motorcycle. You are forever apart from one another. You do this to it. You do that to it. These will be the results."

To put it in more concrete terms: If you want to build a factory, or fix a motorcycle, or set a nation right without getting stuck, then classical, structured, dualistic subject-object knowledge, although necessary, isn’t enough. You have to have some feeling for the quality of the work. You have to have a sense of what’s good. That is what carries you forward. This sense isn’t just something you’re born with, although you are born with it. It’s also something you can develop. It’s not just "intuition," not just unexplainable "skill" or "talent." It’s the direct result of contact with basic reality, Quality, which dualistic reason has in the past tended to conceal.

Stuckness shouldn’t be avoided. It’s the psychic predecessor of all real understanding. An egoless acceptance of stuckness is a key to an understanding of all Quality, in mechanical work as in other endeavors. It’s this understanding of Quality as revealed by stuckness which so often makes self-taught mechanics so superior to institute-trained men who have learned how to handle everything except a new situation.

Normally screws are so cheap and small and simple you think of them as unimportant. But now, as your Quality awareness becomes stronger, you realize that this one, individual, particular screw is neither cheap nor small nor unimportant. Right now this screw is worth exactly the selling price of the whole motorcycle, because the motorcycle is actually valueless until you get the screw out. With this reevaluation of the screw comes a willingness to expand your knowledge of it. With the expansion of the knowledge, I would guess, would come a reevaluation of what the screw really is. If you concentrate on it, think about it, stay stuck on it for a long enough time, I would guess that in time you will come to see that the screw is less and less an object typical of a class and more an object unique in itself. Then with more concentration you will begin to see the screw as not even an object at all but as a collection of functions. Your stuckness is gradually eliminating patterns of traditional reason.

In the past when you separated subject and object from one another in a permanent way, your thinking about them got very rigid. You formed a class called "screw" that seemed to be inviolable and more real than the reality you are looking at. And you couldn’t think of how to get unstuck because you couldn’t think of anything new, because you couldn’t see anything new. Now, in getting that screw out, you aren’t interested in what it is. What it is has ceased to be a category of thought and is a continuing direct experience. It’s not in the boxcars anymore, it’s out in front and capable of change. You are interested in what it does and why it’s doing it. You will ask functional questions. Associated with your questions will be a subliminal Quality discrimination identical to the Quality discrimination that led Poincaré to the Fuchsian equations.
What your actual solution is is unimportant as long as it has Quality. Thoughts about the screw as combined rigidness and adhesiveness and about its special helical interlock might lead naturally to solutions of impaction and use of solvents. That is one kind of Quality track. Another track may be to go to the library and look through a catalog of mechanic’s tools, in which you might come across a screw extractor that would do the job. Or to call a friend who knows something about mechanical work. Or just to drill the screw out, or just burn it out with a torch. Or you might just, as a result of your meditative attention to the screw, come up with some new way of extracting it that has never been thought of before and that beats all the rest and is patentable and makes you a millionaire five years from now. There’s no predicting what’s on that Quality track. The solutions all are simple...after you have arrived at them. But they’re simple only when you know already what they are.

Individual Assignment 3:
0. Read the entire selection above, and think about what the author says about getting stuck and how it relates to situations you have encountered in engineering school, in conceptual design, and in everyday problem solving.
1. Give examples from your experience where you or someone you know experienced being stuck. Describe the experience and the outcome, and any lessons learned or understandings that emerged from the experience of being stuck.
2. Thinking back on the examples you gave about being stuck, can you identify any actions or approaches that have helped or could help you get un-stuck?

Group Assignment 3:
1. Discuss each member’s responses to items 1 and 2 from Individual Assignment 3, and record the best example(s) from your group of someone being stuck, and the best ideas from the group for actions or approaches to get un-stuck.

Excerpt 5: Gumption Traps

I like the word "gumption" because it’s so homely and so forlorn and so out of style it looks as if it needs a friend and isn’t likely to reject anyone who comes along. It’s an old Scottish word, once used a lot by pioneers, but which, like "kin," seems to have all but dropped out of use. I like it also because it describes exactly what happens to someone who connects with Quality. He gets filled with gumption.

The Greeks called it enthousiasmos, the root of "enthusiasm." which means literally "filled with theos," or God, or Quality. See how that fits? A person filled with gumption doesn’t sit around dissipating and stewing about things. He’s at the front of the train of his own awareness, watching to see what’s up the track and meeting it when it comes. That’s gumption.

The gumption-filling process occurs when one is quiet long enough to see and hear and feel the real universe, not just one’s own stale opinions about it. But it’s nothing exotic. That’s why I like the word. You see it often in people who return from long, quiet fishing trips. Often they’re a little defensive about having put so much time to "no account" because there’s no intellectual justification for what they’ve been doing. But the returned fisherman usually has a peculiar abundance of gumption, usually for the very same things he was sick to death of a few weeks before. He hasn’t been wasting time. It’s only our limited cultural viewpoint that makes it seem so.

If you’re going to repair a motorcycle, an adequate supply of gumption is the first and most important tool. If you haven’t got that you might as well gather up all the other tools and put them away, because they won’t do you any good. Gumption is the psychic gasoline that keeps the whole thing going. If you haven’t got it there’s no way the motorcycle can possibly be fixed. But if you have got it and know how to keep it there’s absolutely no way in this whole world that motorcycle can keep from getting fixed. It’s bound to happen. Therefore the thing that must be monitored at all times and preserved before anything else is the gumption.
But there’s another kind of detail that no shop manual goes into but that is common to all machines and can be given here. This is the detail of the Quality relationship, the gumption relationship, between the machine and the mechanic, which is just as intricate as the machine itself. Throughout the process of fixing the machine things always come up, low-quality things, from a dusted knuckle to an accidentally ruined "irreplaceable" assembly. These drain off gumption, destroy enthusiasm and leave you so discouraged you want to forget the whole business. I call these things "gumption traps."

In nondualistic maintenance gumption isn’t a fixed commodity. It’s variable, a reservoir of good spirits that can be added to or subtracted from. Since it’s a result of the perception of Quality, a gumption trap, consequently, can be defined as anything that causes one to lose sight of Quality, and thus lose one’s enthusiasm for what one is doing. As one might guess from a definition as broad as this, the field is enormous and only a beginning sketch can be attempted here. As far as I can see there are two main types of gumption traps. The first type is those in which you’re thrown off the Quality track by conditions that arise from external circumstances, and I call these "setbacks." The second type is traps in which you’re thrown off the Quality track by conditions that are primarily within yourself. These I don’t have any generic name for..."hang-ups" I suppose. I’ll take up the externally caused setbacks first.

As the course description of gumptionology indicated, this internal part of the field can be broken down into three main types of internal gumption traps: those that block affective understanding, called "value traps"; those that block cognitive understanding, called "truth traps"; and those that block psychomotor behavior, called "muscle traps." The value traps are by far the largest and the most dangerous group.

Of the value traps, the most widespread and pernicious is value rigidity. This is an inability to revalue what one sees because of commitment to previous values. In motorcycle maintenance, you must rediscover what you do as you go. Rigid values make this impossible. The typical situation is that the motorcycle doesn’t work. The facts are there but you don’t see them. You’re looking right at them, but they don’t yet have enough value. Quality, value, creates the subjects and objects of the world. The facts do not exist until value has created them. If your values are rigid you can’t really learn new facts.

This often shows up in premature diagnosis, when you’re sure you know what the trouble is, and then when it isn’t, you’re stuck. Then you’ve got to find some new clues, but before you can find them you’ve got to clear your head of old opinions. If you’re plagued with value rigidity you can fail to see the real answer even when it’s staring you right in the face because you can’t see the new answer’s importance. The birth of a new fact is always a wonderful thing to experience. It’s dualistically called a "discovery" because of the presumption that it has an existence independent of anyone’s awareness of it. When it comes along, it always has, at first, a low value. Then, depending on the value-looseness of the observer and the potential quality of the fact, its value increases, either slowly or rapidly, or the value wanes and the fact disappears. The overwhelming majority of facts, the sights and sounds that are around us every second and the relationships among them and everything in our memory...these have no Quality, in fact have a negative quality. If they were all present at once our consciousness would be so jammed with meaningless data we couldn’t think or act. So we preselect on the basis of Quality, or the track of Quality preselects what data we’re going to be conscious of, and it makes this selection in such a way as to best harmonize what we are with what we are becoming.

What you have to do, if you get caught in this gumption trap of value rigidity, is slow down...you’re going to have to slow down anyway whether you want to or not...but slow down deliberately and go over ground that you’ve been over before to see if the things you thought were important were really important and to—well—just stare at the machine. There’s nothing wrong with that. Just live with it for a while. Watch it the way you watch a line when fishing and before long, as sure as you live, you’ll get a little nibble, a little fact asking in a timid, humble way if you’re interested in it. That’s the way the world keeps on happening. Be interested in it. At first try to understand this new fact not so much in terms of your big problem as for its own sake. That problem may not be as big as you think it is. And that fact may not be as small as you think it is. It may not be the fact you want but at least you should be very sure of that before you send the fact away. Often before you send it away you will discover it has friends who are right next to it and are watching to see what your response is. Among the friends may be the exact fact you are looking for.
After a while you may find that the nibbles you get are more interesting than your original purpose of fixing the machine. When that happens you’ve reached a kind of point of arrival. Then you’re no longer strictly a motorcycle mechanic, you’re also a motorcycle scientist, and you’ve completely conquered the gumption trap of value rigidity.

All kinds of examples from cycle maintenance could be given, but the most striking example of value rigidity I can think of is the old South Indian Monkey Trap, which depends on value rigidity for its effectiveness. The trap consists of a hollowed-out coconut chained to a stake. The coconut has some rice inside which can be grabbed through a small hole. The hole is big enough so that the monkey’s hand can go in, but too small for his fist with rice in it to come out. The monkey reaches in and is suddenly trapped...by nothing more than his own value rigidity. He can’t revalue the rice. He cannot see that freedom without rice is more valuable than capture with it. The villagers are coming to get him and take him away. They’re coming closer—closer! -- now! What general advice...not specific advice...but what general advice would you give the poor monkey in circumstances like this? Well, I think you might say exactly what I’ve been saying about value rigidity, with perhaps a little extra urgency. There is a fact this monkey should know: if he opens his hand he’s free. But how is he going to discover this fact? By removing the value rigidity that rates rice above freedom. How is he going to do that? Well, he should somehow try to slow down deliberately and go over ground that he has been over before and see if things he thought were important really were important and, well, stop yanking and just stare at the coconut for a while. Before long he should get a nibble from a little fact wondering if he is interested in it. He should try to understand this fact not so much in terms of his big problem as for its own sake. That problem may not be as big as he thinks it is. That fact may not be as small as he thinks it is either. That’s about all the general information you can give him.

The next one is important. It’s the internal gumption trap of ego. Ego isn’t entirely separate from value rigidity but one of the many causes of it. If you have a high evaluation of yourself then your ability to recognize new facts is weakened. Your ego isolates you from the Quality reality. When the facts show that you’ve just goofed, you’re not as likely to admit it. When false information makes you look good, you’re likely to believe it. On any mechanical repair job ego comes in for rough treatment. You’re always being fooled, you’re always making mistakes, and a mechanic who has a big ego to defend is at a terrific disadvantage. If you know enough mechanics to think of them as a group, and your observations coincide with mine, I think you’ll agree that mechanics tend to be rather modest and quiet. There are exceptions, but generally if they’re not quiet and modest at first, the work seems to make them that way. And skeptical. Attentive, but skeptical. But not egoistic. There’s no way to bullshit your way into looking good on a mechanical repair job, except with someone who doesn’t know what you’re doing.

I was going to say that the machine doesn’t respond to your personality, but it does respond to your personality. It’s just that the personality that it responds to is your real personality, the one that genuinely feels and reasons and acts, rather than any false, blown-up personality images your ego may conjure up. These false images are deflated so rapidly and completely you’re bound to be very discouraged very soon if you’ve derived your gumption from ego rather than Quality. Anxiety, the next gumption trap, is sort of the opposite of ego. You’re so sure you’ll do everything wrong you’re afraid to do anything at all. Often this, rather than “laziness,” is the real reason you find it hard to get started. This gumption trap of anxiety, which results from overmotivation, can lead to all kinds of errors of excessive fussiness. You fix things that don’t need fixing, and chase after imaginary ailments. You jump to wild conclusions and build all kinds of errors into the machine because of your own nervousness.

These errors, when made, tend to confirm your original underestimation of yourself. This leads to more errors, which lead to more underestimation, in a self-stoking cycle.

The best way to break this cycle, I think, is to work out your anxieties on paper. Read every book and magazine you can on the subject. Your anxiety makes this easy and the more you read the more you calm down. You should remember that it’s peace of mind you’re after and not just a fixed machine.

When beginning a repair job you can list everything you’re going to do on little slips of paper which you then organize into proper sequence. You discover that you organize and then reorganize the sequence again and again as more and more ideas come to you. The time spent this way usually more than pays for itself in time saved on the machine and prevents you from doing fidgety things that create problems later on. You can reduce your anxiety somewhat by facing the fact that there isn’t a mechanic alive who doesn’t louse up a job
once in a while. The main difference between you and the commercial mechanics is that when they do it you
don’t hear about it...just pay for it, in additional costs prorated through all your bills. When you make the
mistakes yourself, you at least get the benefit of some education.

Boredom is the next gumption trap that comes to mind. This is the opposite of anxiety and commonly
goes with ego problems. Boredom means you’re off the Quality track, you’re not seeing things freshly, you’ve
lost your "beginner’s mind" and your motorcycle is in great danger. Boredom means your gumption supply is
low and must be replenished before anything else is done. When you’re bored, stop! Go to a show. Turn on the
TV. Call it a day. Do anything but work on that machine. If you don’t stop, the next thing that happens is the
Big Mistake, and then all the boredom plus the Big Mistake combine together in one Sunday punch to knock
all the gumption out of you and you are really stopped.

Impatience is close to boredom but always results from one cause: an underestimation of the amount
of time the job will take. You never really know what will come up and very few jobs get done as quickly as
planned. Impatience is the first reaction against a setback and can soon turn to anger if you’re not careful.
Impatience is best handled by allowing an indefinite time for the job, particularly new jobs that require
unfamiliar techniques; by doubling the allotted time when circumstances force time planning; and by scaling
down the scope of what you want to do. Overall goals must be scaled down in importance and immediate goals
must be scaled up. This requires value flexibility, and the value shift is usually accompanied by some loss of
gumption, but it’s a sacrifice that must be made. It’s nothing like the loss of gumption that will occur if a Big
Mistake caused by impatience occurs.

My favorite scaling-down exercise is cleaning up nuts and bolts and studs and tapped holes. I’ve got a
phobia about crossed or jimmed or rust-jammed or dirt-jammed threads that cause nuts to turn slow or hard;
and when I find one, I take its dimensions with a thread gauge and calipers, get out the taps and dies, recut the
threads on it, then examine it and oil it and I have a whole new perspective on patience. Another one is
cleaning up tools that have been used and not put away and are cluttering up the place. This is a good one
because one of the first warning signs of impatience is frustration at not being able to lay your hand on the tool
you need right away. If you just stop and put tools away neatly you will both find the tool and also scale down
your impatience without wasting time or endangering the work.

Time to switch to the psychomotor traps. This is the domain of understanding which is most directly
related to what happens to the machine. Here by far the most frustrating gumption trap is inadequate tools.
Nothing’s quite so demoralizing as a tool hang-up. Buy good tools as you can afford them and you’ll never
regret it. If you want to save money don’t overlook the newspaper want ads. Good tools, as a rule, don’t wear
out, and good secondhand tools are much better than inferior new ones. Study the tool catalogs. You can learn
a lot from them.

Apart from bad tools, bad surroundings are a major gumption trap. Pay attention to adequate lighting.
It’s amazing the number of mistakes a little light can prevent. Some physical discomfort is unpreventable, but
a lot of it, such as that which occurs in surroundings that are too hot or too cold, can throw your evaluations
way off if you aren’t careful. If you’re too cold, for example, you’ll hurry and probably make mistakes. If
you’re too hot your anger threshold gets much lower. Avoid out-of-position work when possible. A small stool
on either side of the cycle will increase your patience greatly and you’ll be much less likely to damage the
assemblies you’re working on.

There’s one psychomotor gumption trap, muscular insensitivity, which accounts for some real
damage. It is related to "mechanic’s feel," which is very obvious to those who know what it is, but hard to
describe to those who don’t. With nuts and bolts you’re in the range of large mechanical forces and you
should understand that within these ranges metals are elastic. When you take up a nut there’s a point called
"finger-tight" where there’s contact but no takeup of elasticity. Then there’s "snug," in which the easy surface
elasticity is taken up. Then there’s a range called "tight," in which all the elasticity is taken up. The force
required to reach these three points is different for each size of nut and bolt, and different for lubricated bolts
and for locknuts. The forces are different for steel and cast iron and brass and aluminum and plastics and
ceramics. But a person with mechanic’s feel knows when something’s tight and stops. A person without it
goes right on past and strips the threads or breaks the assembly.
Maybe it’s just the usual late afternoon letdown, but after all I’ve said about all these things today I just have a feeling that I’ve somehow talked around the point. Some could ask, "Well, if I get around all those gumption traps, then will I have the thing licked?" The answer, of course, is no, you still haven’t got anything licked. You’ve got to live right too. It’s the way you live that predisposes you to avoid the traps and see the right facts. You want to know how to paint a perfect painting? It's easy. Make yourself perfect and then just paint naturally. That’s the way all the experts do it. The making of a painting or the fixing of a motorcycle isn’t separate from the rest of your existence... It all goes together...What I’m trying to come up with on these gumption traps I guess, is shortcuts to living right...ways to avoid the tendency to do what is "reasonable" even when it isn’t any good.

The real cycle you’re working on is a cycle called yourself. The machine that appears to be "out there" and the person that appears to be "in here" are not two separate things. They grow toward Quality or fall away from Quality together.

**Individual Assignment 4:**
1. Read the entire selection above, and provide your perspective on the importance of gumption to Quality. Also, highlight one or more gumption traps that present the largest challenge for you.
2. Are there any gumption traps listed in this book excerpt that you would remove from the list, or can you think of any items not included that are a challenge to you that should be added to the list?
3. Re-read the final paragraphs (in bold), indicate whether you agree or disagree with the basic claim (that quality and excellence are as much tied to who you are as to what you do), and discuss why you agree or disagree with this claim.

**Group Assignment 4:**
1. Each group member should share their response to items 1 and 2 from Individual Assignment 4, and based on your group discussion, identify the gumption traps that present the largest challenge for your group members. One group member should write a short summary of the group discussion on the group sheet.
2. Discuss each member’s response to item 3 from Individual Assignment 4, and record your group’s consensus (agree or disagree) about the basic claim that quality and excellence are as much tied to who you are as to what you do, and explain why your group agreed or disagreed. One group member should write out the group statement on the group sheet.
3. Create a group statement about the best ways to overcome the challenges described in excerpts 4 and 5 and develop a personal integrity that produces quality work and a quality life. One group member should write out the group statement on the group sheet.