Part One
THE LEISURELY THEOREMS

Only those who take leisurely what the people of the world are busy about can be busy about what the people of the world take leisurely.

TAOIST MAXIM

This book describes the general principles of engineering human competence, an undertaking that may seem audacious. Some will think that anyone who writes such a book must consider himself very competent indeed, but nothing could be farther from the truth. Investigators need not share the qualities of the things they investigate, or botanists would have to be flowers and physicians diseased. The system I describe here has been 20 years in the making, which alone should attest to my inefficiency. But my own incompetency has served me well, because in my years of refining and testing the system in the real world, I have learned even more from my many failures than I have from my few successes. Fortunately, I have had competent colleagues, students, and clients, and it is because of their increasing success in applying these principles that I have finally decided the system is sufficiently coherent to make a useful book.

But what manner of subject matter is human competence? psychology? economics? education? sociology? It is no one of these things, although it relates to all of them and to others as well. The best way I

know to introduce it to you is through an analogy from quite another area.

In the early 1960s many people became interested in something engineers call "total energy systems." To understand what "total energy" (TE) is, first imagine building an apartment house with engines in the basement to generate all the electricity the building requires. In the typical setup, these engines are fueled by the burning of natural gas. Part of the heat runs the generator, but most of it simply goes up the stack as waste heat. A TE system captures this waste heat and uses it for other things, such as heating, air conditioning, and hot water. If the system is designed carefully, much of this energy can be saved.

In 1960 a small firm—we'll call it Starbright and Wise—was hired to develop a training course to teach energy experts about TE engineering. This firm very quickly discovered that there really was no TE technology—only a lot of other technologies that had more or less application to TE. Engine specialists, for example, knew a great deal about generators, but virtually nothing about the considerable sociology of energy use or the heat loss of a building. Heating engineers knew a lot about computing heat loss, but next to nothing about electrical generation, generator controls, or the financing of such equipment. Energy financial specialists knew little about heat engineering or electrical generation. Put all together, these experts could not design the most efficient TE system. The parts of the elephant were well understood; but the assortment of experts, when asked to make one, usually had the trunk where the tail should be, or legs too small to support the beast.

The Starbright and Wise team was temporarily baffled. Still, a few people had designed excellent TE systems, although they insisted that their achievements were the result of an "art"—one they believed others could not be trained to copy. Undismayed, Starbright and Wise pursued these "artists" anyway and asked them to describe how they had designed their energy systems. Our team was not surprised to find that the descriptions of the artists did not at all match what had been done.

Starbright and Wise reasoned that if they were to teach TE technology they first had to "invent" it. They did such things as create worksheets to plot the "sociological" patterns of energy uses, optimal generating systems, and financial feasibility analysis. And the system they eventually developed became the standard for the industry. Not only could they teach ordinary people to design quite acceptable TE systems, but even some of the already successful "artists" acknowledged that their systems would have been substantially improved if they had followed the procedures of Starbright and Wise. In fact, the new system

so simplified things that much of the work that once required experts to perform could now be done by laypersons with very little training. One sure sign that a technology has been created is when technicians appear.

We can easily sort out what Starbright and Wise did and did not do. They certainly did not discover new facts about the principles of energy. They did not create new methodologies for designing engines or buildings or for financing and fueling them—although they did greatly simplify many procedures of analysis. What they did do was put into a single system some very diverse ways of looking at a complex subject. Their contribution could be judged by three standards: (1) by how broad and complex a range of problems it could help people solve—that is, by its usefulness; (2) by the simplicity of the system itself—the simpler they could make it without sacrificing its usefulness, the better; (3) and, finally, by its coherence—by how well it had put all those many vantage points together so that the new theory would have a certain elegant "unity." In short, we judge their theory of total energy by the age-old criteria that the philosophers of science have applied: utility, parsimony (simplicity), and elegance (coherence).

What Starbright and Wise did for total energy, I have tried to do for the subject of human competence. I have tried to create a useful, simple, and coherent system for engineering more worthy performance in individuals and especially in groups of people. In doing this, I have not discovered any new or startling facts about human conduct. I have simply put together some of the vast knowledge and many methods we already have that are relevant to competent human performance.

My method is a method of engineering and is, in many ways, just the opposite of the method of science. Once, when I was a young behavioral scientist working in the laboratory, I was (quite properly) impressed with how little we know about human conduct. Scientists approach their fields of study with humility, seeing themselves as small spots of intelligence "surrounded by a vast sea of ignorance," to quote Isaac Newton from memory. Gradually, I discovered that I did not have the temperament for science, because I was increasingly impressed by how much we know about human performance that we have never applied very well. I saw myself, unlike Newton, as a tiny spot of ignorance surrounded by a vast sea of intelligence. This is the proper attitude for the engineer. The scientist approaches nature as a little child does, to discover what it is like. The engineer approaches nature with a swagger, determined to change it into something it never has been and never would be if left to itself. The scientist has a well-developed methodology and follows it wherever it may lead; the engineer knows precisely where to go, and will use any available methodology to get there. I have summarized just some of their contrasting views:

Scientist	*Engineer*
Approaches nature with humility, for there is so much we do not know—we are surrounded by a vast sea of ignorance.	Approaches nature with assuredness, because there is so much we know that we have not applied—we are surrounded by a vast sea of intelligence.
Is content to find out what the world is like as it is.	Is intent on remaking the world.
Has a well-developed methodology, and will go wherever it leads.	Knows precisely where to go, and will use any methodology to get there.
Makes no value judgments of nature—it is what it is.	Begins with value judgments of nature—and seeks to create changes that people will value.
Sees knowledge as an end, valuable for its own sake; and worth great expenditures to gain it.	Sees knowledge as a costly means that should be applied efficiently if the costs are not to detract from the valuable ends.

Surely both points of view, as well as many others, are legitimate and useful, depending on our purpose. And some people must pursue each of them. In one sense, science lags behind engineering, because the engineer must use whatever knowledge is available. We did not wait for the knowledge required to develop the internal combustion engine before we designed the wheel and the cart. Yet engineering lags science, because it often requires a large amount of new knowledge before it can be put together to create new uses. We did not wait for someone to invent the automobile before we performed experiments on the heat engine.

But engineering is never really new; primitive people have designed really excellent energy systems for their times and purposes. Engineering can only get better—by applying new knowledge that science creates and by arranging existing knowledge into simpler and more powerful systems. People have also been engineering performance since the Year One. What I have to offer is a new way of looking at how we can do this.

In creating this method of engineering, however, I have used neither the method of science nor of engineering, but the method of philosophy. For some 16 years, since I left the laboratories and classrooms of the academy, I have experimented with the system I describe in this book, both in the world of work and the world of schools. These experiments have constituted a sort of "philosophical laboratory" for me; and although I have done the things I describe here, I have been

more interested in developing and testing the theory than in actually engineering human performance myself.

And what is philosophy? Its subject matter is, I believe, the vantage points that people can stand in. The true philosophers, from Adam to Zuckerman, have always sought ways of rearranging our points of view into more orderly, simpler systems for understanding and coping with the world. Unfortunately, we tend to see theories of philosophy and science as absolute truths or falsities rather than maturing human vantage points. Long ago the late James R. Simmons* taught me that it is not useful to see the history of philosophy and science as the history of error. Einstein did not prove Newton wrong, nor did Hume disprove Berkley. The history of science and philosophy (and, I might add, engineering) is the history of successive approximations to the "truth"—the gradual improvement in the ways we organize our vantage points.

So, what I offer here is not so audacious after all; it is simply another attempt to improve on the principles we have been applying in our long history of engineering human competence.

Those who hold to the "history-is-error" point of view could easily read this book as an attack on behaviorism. Nothing could be farther from the truth. I owe much of what I have learned to B. F. Skinner; as a *scientist* he has few peers. But I have found the methods of Skinner as an *engineer* wanting, and I believe I have ordered some principles that represent a decidedly superior approximation to where we want to go when we seek to create more competent cultures and institutions. Of course, the test of my claim to a superior approximation should be found in the greater usefulness, simplicity, and coherence of my system.

I am at least a behaviorist, and I have employed some of the methods of behaviorism as well as those of other subsidiary technologies. But even though I have borrowed freely where I have felt the need, the system I propose is no eclectic assortment of points of view; it emerges with a character all its own. Although eclectic systems may sometimes be useful, they seldom have the simplicity and never the elegance that I have held as criteria of success. It is not that eclectic systems are wrong; it is just that they have not resolved the apparent contradictions in the ideas they assemble. But eclectics do have one sensible quality that all who offer ideas might envy: They know there is more than one way to look at the world.

The "history-is-error" people not only tend to see systems as either all right or all wrong, but are also inclined to view the world as having only one truth. They are likely to take their "truths" home from work

*Jim Simmons was a Class D baseball player and a philosophy professor.

and insinuate their cyclopean viewpoint in every situation. There are psychotherapists who see their families as patients floating in a mass of unresolved motives. Even worse, in my own personal experience, are those behaviorists who see their homes as extensions of the animal laboratory, and treat their families accordingly.

In spite of all that I owe to the behaviorists—and chiefly to B. F. Skinner—the primary reason that the system I describe here is not behaviorism is that behavior is not my focal subject matter. This may sound surprising, because when I ask people if human competence is a function of human behavior, I always get a "yes" answer. I also get a "yes" when I ask this question: "If I want to know if people are competent, I have to observe how they behave, don't I?"

My answer to such questions is a firm "No!" I have had to reject behavior as my focus for a simple, practical reason: I was not making any real progress in developing a system of performance engineering.

Fortunately, there is some precedent for abandoning common-sense "imperatives." Advances in science and technology are often made when people turn cherished and seemingly undebatable "truths" upside down. Astronomy leaped light years ahead when we reversed the view that the earth was the center of the universe; and physics made comparable progress by moving the forces of motion from the inside of particles to the outside. Indeed, whenever technology seems locked in place or slow to move, it might be a good idea simply to scrap our fundamental assumptions and begin anew with their opposites. There are an incredible number of schools of thought about improving human competence, and some of them have seemed to have a hold on some edge of truth. But what has been missing is a "grand plan" that converts the many ideas we have about ourselves into a methodology for engineering our conduct—a methodology both systematic *and* acceptable.

Thus we can ask: "For all their differences, what is the common assumption of these many theories of human conduct—theories as diverse as behaviorism and transcendental meditation; as different as psychoanalysis and biofeedback?" If we can isolate that single common assumption, perhaps *it* will prove to be the barrier to progress; and by upending it, we may be able to go forth much more rapidly.

I began this book with an attempt to do just this—to invert the most unquestioned and seemingly unquestionable assumption about the nature of human competence. We should examine it again, because it seems so obviously true: Human competence, almost all of us agree, is found in human behavior. If you want to see whether people are competent, look at their behavior. There are, of course, a multitude of different viewpoints about *what* behavior to look at or *how* to look at it. But the fundamental assumption is nevertheless there: Begin by looking at people.

This viewpoint, for all its commanding plausibility, creates a disturbing and as yet unresolved dilemma. If human competence resides in behavior, then to set about to engineer human competence means that we must manipulate human behavior, since engineering is always a system of manipulating things. For some people, this conclusion alone is sufficient to disclaim any interest in engineering other people's performance. Whoever felt comfortable being known as a manipulator of people's minds? Not many of us.

More important, for all its plausibility, our basic assumption has not really gotten us very far toward a genuine system of engineering human performance—one that would be complete with basic theorems, agreeable and precise methods of measurement, and handbooks of procedure. Suppose we scrap it, then, and begin anew. We have little to lose except 3 million years of very little technical progress in this direction. First, however, we should investigate the nature of what I call the "great cult of behavior"—the egocentric view that competence somehow dwells within us—because I hope to convince you that it really has been the crippling assumption.

THE GREAT CULT OF BEHAVIOR

In the great cult of behavior* the appeal is to control or affect behavior in some way. There is little or no technology of ends and purposes. Indeed, behavior itself is viewed as an end rather than as a means to an end.

The great cult is rather neatly divided into three major subcults. The first is the subcult of *work*, which values the expenditure of human energy in the form of hard work, sacrifice, and self-denial. The second is the subcult of *knowledge*, which pays homage to those who possess great stores of information, theories, and skills. The third is the subcult of *motivation*, which esteems eagerness and the display of positive and amicable attitudes.

The behavior cult, of course, sees its enemy as people, because it puts great store on how people behave, their fashions, and their style of doing things, regardless of what they actually accomplish. Hard work and self-denial are virtues because they make great demands on behavior, which is the standard—the autonomous end of human competence. To be able to shape behavior and control the mind is considered the highest virtue.

I confess that I too was once devoted to classifying people by how they behave and making assumptions about their limited potential for behavior—through IQ tests and blinding "insights" into their urges.

*George Odiorne calls it the "activity trap." I have elevated his "trap" to the higher status of a cult. (See his *Management and the Activity Trap*, New York: Harper & Row, 1973.)

But as a reformed member of the behavior cult, I must now insist that the enemy is not people. Rather, it is a point of view, and one that attacks all of us, like an invisible germ, and distorts our outlook. It must be exorcised absolutely and completely, leaving no trace to multiply and reinfect us.

The Subcult of Work

One of the most powerful agents of the behavior cult is the subcult of work, which focuses on the amount of energy people expend. Not so long ago, the disease virulently attacked the White House—beginning, I think, with the Kennedy administration, where to be patriotic and do one's part a person had to work 6 days a week and 14 hours a day, and run 50 miles on Sunday. Those of us who lazed in the sun were made to feel like drones. The subcult of work rose to its pinnacle in the Nixon administration, when Sunday work was instituted, the swimming pool was converted to a press room, and even the 50-mile runs were considered self-indulgent escapes from labor. I believe it is no coincidence that what came out of the White House was a series of disastrous policies, from unnecessary war to crime in high places. After Nixon, the Ford administration wanted to make hard work and sacrifice the national policy. And President Carter seems equally devoted.

But the subcult of work was not invented by the Kennedy clan. I have a large collection of incidents in which people have been fired because they did not "work hard enough," although no one had ever assessed their accomplishments. And I have also compiled numerous instances in which people were promoted and rewarded because of the energy and time they gave to their jobs, regardless of what they accomplished. Unless you come to work on time and look busy, you are not interested—or so the work ethic says. This attitude can convert a perfectly legitimate business into an unpleasant "busyness." And, as I shall show, the subcult of work breeds sloth, wastefulness, inefficiency, inflation, and incompetence.

Labor unions are other victims of the work ethic. In these institutions, all value is placed on labor; and people's worth is equated to the energy they have for sale, not the accomplishments they can make. The unions work hand in hand with business to promote the work ethic, and they seek shorter work hours only as a means of increasing the value placed on labor—particularly through overtime pay. But the work ethic is, in the long run, the worst enemy of working people; and I shall show how they can actually work less and get paid more.

It is only recently that I have broken the habits demanded by the work cult. I was long pleased to imagine myself a "workaholic," doing grave damage not only to the English language but to good sense. What

a relief—and what a pleasant surprise—it was for me to learn that there is no special virtue in hard work.

The Subcult of Knowledge

In the great cult of behavior, knowledge is given the place of honor—knowledge for its own sake. Even to suggest a union of knowledge with accomplishment is to promote a marriage beneath its station. Instead, we place knowledge in museums, called universities; we enoble it with medals; and we house these museums with guards who are charged with making it difficult for common folk to touch it. We place such great value on knowledge for its own sake that, as if it were the Hope diamond, we lock it away in vaults and instead display counterfeit substitutes: complex rituals of speech, learned societies, academic robes and processions, arcane publications, and high-sounding titles. And the unwary traveler seeking knowledge in this land of Oz will, like the Scarecrow, be given a diploma instead.

It is easy to discover that human competence is not one of the qualities that the knowledge industry cares greatly about. Open your encyclopedia to *H* for "human competence," or to *C* for "competence." There are no entries. Search the file cards in the libraries, and pickings will be lean.* Or look under *A* for "accomplishment"; your eye will go unrewarded until it comes to rest on "accredited colleges."

Indeed, it is difficult to discover just how *quality* is determined in the behavior cult, until you remember how sly and insidious the cult really is. The person who is most knowledgeable, we then discover, is the one who knows the most. Quality is great heaps of unused knowledge stored in the endless, unreachable tiers of the libraries. And so important is quantity as a measure of quality that the vendors of knowledge, like the pushers of heroin, carefully dilute it when they place it up for sale.

The Subcult of Motivation

The subcult of motivation is perhaps the most pernicious of the enemy's agents. If people's behavior departs sufficiently from the fashionable standards of the behavior cult, we say that they are "sick" or "mentally ill"; the usual explanation is that their motivations are diseased and corrupted. But this is a dangerous explanation, and it has more dangerous consequences than being arrested for a crime. More people are locked behind bars without due process in so-called mental

*As this goes to press, a flurry of books on teachers' "competencies" are being produced. You will soon realize that my concept of competence differs sharply from that used by many educators.

hospitals than there are duly processed inmates in our prison system. Indeed, the subcult of motivation is the most subtle branch of the behavior cult, as well as the most dangerous.

Now, there is no denying that people have "problems of living," as Thomas Szasz* calls it; but we have only the word of certain professionals that the causes of these problems are "motivation." But these professionals have a vested interest: because of the "deep mysteries" our motivations hold, only the same people who diagnose the problems of living can get paid to "treat" them. There is, of course, no evidence that these professionals have been in the least successful in solving such problems. But that doesn't matter; the standards of their profession are behavioral and have nothing to do with accomplishments. What psychiatrists were ever defrocked because they were not successful in helping their patients? And how would anybody ever know? Yet if they placed notices in the newspapers to advertise the results of independent studies proving that they helped their patients, they *would* be defrocked. Such advertising is "unethical" (meaning "unfashionable")—it violates the canons of the subcult of motivation.

The leisurely reader will of course see through the guise of the subcult of motivation, and look to other explanations of incompetence: explanations such as not knowing what accomplishments are expected of us, or whether we are performing well or not; or not knowing how to perform; or being punished for performing well; or not having the leisure or the tools to perform well; or being judged by *how* we did something, not *how well.* Only when managers and teachers (and psychiatrists) have examined these possibilities does it make much sense to look to motivation. And then, they probably should not look at motives but at incentives.

COMPETENCE AND THE LEISURE ETHIC

These, then, are the big guns of the enemy, manned by mental sloth and ignorance, to force us into the servitude of devotion to hard work and of homage to knowledge and motivation. Gradually and painfully, I have come to a radically different point of view, and I call the system I have derived from it *teleonomics,* which combines the Greek words for the "laws" (*nomos*) of "ends" (*teleos*). Teleonomics is a particular system for studying, measuring, and engineering human competence. It begins by focusing on the results, or products, of behavior (and other events); and it views behavior as only one of the inputs or "causal" variables.

*See Thomas Szasz, *The Manufacture of Madness* (New York: Harper & Row, 1970). This is one of the great classics of social science.

Teleonomics, the system of performance engineering I describe, should itself begin with a purpose. What, we can ask, is the aim of performance engineering? I have said that all engineering systems have a fundamentally economic purpose; but that does not mean that the purpose of performance engineering is simply to "make money." Money is often a convenient measure of engineering success, and usually a required means. But the economic ends of engineering are not to be confused with money as a means and convenient measure. To confuse them is to fail to understand the fundamentals of engineering.

There is a word that once described the most desirable and valuable aim of any attempt to improve human competence: that word is *leisure*. In a world that puts great store by the display of activity, especially in the form of hard work, this once delightful word has lost much of its earlier meaning. Gradually, it has taken on the disreputable connotations of laziness and frivolity.

Leisure comes from an old French word that means "permission." When we are permitted a break from arduous labor, we have the opportunity to accomplish other things. The *Oxford English Dictionary* calls it "an opportunity afforded by freedom from occupations," and, again, "time allowed before it is too late." I especially like the second definition. We can reason from it that if we learn to get more leisure, and better use what leisure we have, it will not be too late so soon.

Alas, the notion of opportunity has slipped away from our use of *leisure*. Most of us now, when we hear the word, think only of the time component—a lot of time with no special opportunities at all. But the concept "the duration of opportunity"* remains a marvelous one, because what could people value more than both time and opportunity?

If (old-style) *leisure* is the product of time and opportunity, it is, indeed, the worthy aim of a system of performance engineering, and the one I consider to be its true purpose. But because the idle connotations of *leisure* have become so great, we need another term to express our meaning. In keeping with the economic properties of any system of engineering, I have chosen the more ponderous term *human capital* to do the duty for which *leisure*† would once have been adequate.

In summary, the purpose of performance engineering is to increase human capital, which can be defined as the product of time and opportunity. Opportunities without time to pursue them mean nothing. And time, dead on our hands, affording no opportunities, has even less

**Oxford English Dictionary.*

†I have not chosen to abandon this word completely; but wherever I use it, I do so only in the old and complete meaning.

value. The beginning point of performance engineering is therefore human potential; its end point is the increase of human capital. We can best convert human potential into human capital by proceeding in an orderly and sensible manner. All we mean by any technology is an orderly and sensible set of procedures for converting potential into capital.

These, admittedly, are great abstractions. The challenge I try to meet in this book is to give them precise and useful definitions and procedures. Only the reader can judge if I have met the criteria of simplicity, coherence, and usefulness.

Chapter One
A Leisurely Look at Worthy Performance

VANTAGE POINTS

The eye can travel to a star
So fast that Science cannot measure;
How vast a scope the eye can grasp—
Infinitudes of pounding pleasure.

And Science can little comprehend
What tiny things the eye can see:
Imaginary rebuffs of love—
Infinitesimal misery.

T.F.G.

The Summer of '49

The Capitol Grill slumped in an ill-smelling corner of Columbia, halfway between the elegance of the Old Campus and the grand old Capitol building, which still proudly bears the scars of Sherman's shells. The Grill served up the finest fried oysters in the Sandhills, plump and ever so lightly battered, and 50 cents the dozen. But only during "R" months, and this was July—no mistaking it. Few of the 50 T-shirted students had food in mind as they slouched around the front of the Grill in the mortal lock of the morning sun. They had gathered there to await the truck that would carry them out Two Notch Road, and then along the Dentsville back road into the piney woods, where they would begin a new job—for many of them, their first.

There among the longleaf and loblolly, they would dig for spent bullets, the refuse of soldier training on a Fort Jackson firing range, loosely dug into the bark and earth. At 75 cents an hour, this labor would buy a lot of food and beer back at the Capitol. In 9 years a million GIs had enfiladed these beach-white sands, leaving, we can imagine, a half-billion pieces of lead in their harmless targets.

Barton Hogg had achieved a dream he thought might be worthy of Midas. The contract to mine this easily accessible lode was the culmination of a frustrating apprenticeship in the politics of military contracts. He might have reflected, as he stood with his beefy red hands and neck sticking from his khaki boss-man's shirt, that all his failures were a reasonable investment toward this moment. There must be $100,000 lying there for him, just for the sifting. That would be a lot of pewter for Hogg, who had found the sudden riches of the 1940s eluding him.

But he was worried. The 60 laborers he had found by scraping the countryside weren't getting the lead out fast enough. He had hoped to have all that money in the bank before the dog days had passed. But he would have to admit that his overalled regiment looked busy enough, bent over their shovels and sieves in a long line, just as he had deployed them. He had them working in cadence: a shovel of bleached sand into the hardware-cloth box, a sifting of the box, and then the thudding dump into the milk pails he had bought from army salvage. He had worked out the cadence himself, and was quite pleased with it. Now, if the 50 college students he had had the inspiration to hire could work as well, perhaps he could escape this awful sun a rich man.

The truck arrived annoyingly late, and the platoon poured off in shouting disarray. Hogg's heart sank as he watched this undisciplined crew, hands too soft for labor, form into a scraggly group. My God! A few of them even carried portable radios, and some had newspapers under their arms; not a pair of overalls among them. Suddenly, Hogg had to identify himself with his laborers, who had paused in their cadence to watch. He had not been to college, and he resented people who had. Well, he would give that crew an education all right. He would teach them how to dig for lead.

They listened to Hogg's instructions with the same blank inattention they had learned to give their professors—and they followed his instructions just as poorly. Straggling off into groups (the radios seemed to form the social nucleus), they proceeded to work completely out of cadence. Most were soon on their haunches and shouting blasphemies, radios blaring, with no hint of order. Soon the shovels were discarded, and they were scraping the sieves directly into the sand. Jokes and ribaldry poured out faster than the lead. Hogg ran from one student to another, shouting each to his feet and inserting the shovel back into his hands. This went on all morning, and to no avail. Shaping these guys up was like sculpting in mercury. Derisive hoots chased him into retreat.

Come lunch, he slunk into the woods to devise a new strategy for appealing to these thieves. He would appeal to their honor—to their sense of capitalism. He gathered the throng for his lecture. Hadn't he fed them well? two large sandwiches of good barbecued pork with tomatoes and plenty of iced tea? Didn't they, like their affluent families, believe in an honest day's work? the dreams of capitalism?

Then Hogg played his ace. He appealed to the opinion of "Joe." Joe was a football hero from the 1930s, and the proprietor of the Capitol Grill. It was

Joe, plastering ads and passing the word, who had recruited them. "What would Joe think?" Hogg pleaded with this larcenous gang. And a burly GI-biller retorted "Who the hell is Joe?" to establish a refrain taken up by 50 pairs of lungs. "Who the hell is Joe?"

Defeated, Hogg spent the rest of the afternoon in the shade of a truck, visions of Midas shattered. That evening he called them together once more; and in anger and tears, he fired them, every last one of them, with a bitter diatribe on the lack of morals of a lost generation.

The next morning, beneath the unrelenting sun, he decided he would make a point to his friend Joe. Buckets of lead, left at odd angles in the sand, attested to the rout of the incompetent students. He would count the lead they had mined and report it to Joe. For whatever that was worth. *But the unruly gang had sifted out three times as much lead per labor-hour as the cadenced crew!*

Back at the Capitol Grill he tried again to recruit the students, but the word was out. Bart Hogg was boycotted, even by his friend Joe. He lost money on his contract, and spent the next 25 years working in an assembly plant near Hartsville. The Grill has since been replaced by a high-rise, and you have to go all the way to Charleston to get really good fried oysters.

The story of Barton Hogg is true and only slightly embellished. His lesson was too late for him, but it can be instructive for us because his fundamental error is not uncommon: When we make judgments about the competence of human conduct, we often look at performance from the wrong vantage point. We often confuse behavior with performance. And that is the main problem of investigating human competence. Many vantage points are available to us, and we must learn to decide which ones to use. We can measure performance in so many ways that we shall talk at cross purposes unless we make explicit just how we are measuring it. In order to know what we are doing and to avoid Hogg's error, we need to define performance quite carefully.

The system this book describes is based on three theorems summarizing my major assumptions about the nature of human competence. I call them Leisurely Theorems, using *leisure* as a synonym for *human capital,* which is the product of time and opportunity. This chapter presents the First Leisurely Theorem, defining *human competence* and *worthy performance;* it also demonstrates the importance of distinguishing between behavior and accomplishment.

WORTHY PERFORMANCE

Behavior is a necessary and integral part of performance, but we must not confuse the two. Unfortunately, we often do. To equate behavior and performance is like confusing a sale with the seller. Naturally, we

cannot have one without the other. But the sale is a unitary transaction, with properties all of its own; and we can know a great deal about it even though we know little—perhaps nothing at all—about the seller.

Suppose we focus on some particular behavior for a moment—say, the behavior of a young man who fancies himself a hunter. We watch him lift his gun to his shoulder, take sight, and pull the trigger. We are observing the more overt aspects of some rather complex behavior. Now we can observe the same pattern again; but this time we shall measure it: the speed with which the gun is lifted, the width of the hunter's stance, the pressure on the trigger, and (with electrodes) the pulse and brain waves of the rifleman. And so on. We can even interview the hunter in depth to get an account of his feelings as he fired the gun. But no matter how often or how exhaustively we measure this behavior, we cannot tell what kind of performance it is. Is it murder, food gathering, or target practice? Is it legal, ethical, effective, valuable?

To answer these questions, we must first look away from the behavior, to see what effect it has upon the world. Did the hunter kill a person or shoot a rabbit; hit a target; or fail to hit anything at all? When we observe the whole transaction, including both the hunter's behavior and what he accomplished by it, we are observing performance. And the performance of hitting the bullseye of a target is quite different from the performance of killing a person, even if the behaviors in both cases were identical. In contrast, the identical performance of killing a person can be produced by enormous varieties of behavior. Our young hunter could shoot a person with a pistol held between his legs, or a blunderbus held above his head, without markedly changing his performance. Performance (P), then, is a transaction involving both behavior (B) and its consequence (C). Or, in shorthand,

$$P = B \rightarrow C$$

In performance, behavior is a means, and its consequence is the end. And we seldom have any reason to try to modify other people's behavior in complete isolation of consequences. About the only reason would be to study it. By viewing behavior in convenient isolation we can learn many things about it, ranging from measures of visual acuity to useful information about the perseveration of habits. But those things *by themselves* tell us very little about performance.

Nor do we have much reason to modify people's performance in isolation from its context. Is the performance of killing legal and moral—or is it a heinous crime? We cannot tell this merely by observing the whole performance transaction. We can measure the frequency or accuracy of striking the target; we can measure how many

bullets were used. We can even correlate these measures with our measures of behavior. But none of these measures will tell us whether the performance is valuable, legal, or moral.

No sensible person tries to modify other people's behavior just because it is there, or their performance just because it can be done. When we set about to engineer performance, we should view it in a context of value. We should not train someone to do something differently unless we place a value on the consequence—unless we see that consequence as a valuable *accomplishment* (A).[1] So, the kind of performance we want to engineer is *valuable performance*, which can be expressed in shorthand as

$$P = B \rightarrow A$$

Now we have limited our definition of performance to valuable performance. If, for example, we can change the way our hunter handles his gun so that he can hit the rabbits we value, we have engineered valuable performance.

But is the performance worth it? Suppose that we really do value the rabbits we have taught the hunter to kill. But our hunter requires an expensive rifle, charges us heavily for his services, and uses a lot of ammunition. Although we may value his accomplishment, we will not find the performance worthy because his behavior costs us too much. Our engineering, then, is a failure. So, what we really want to engineer is not just valuable performance, but *worthy performance*—in which the value of the accomplishment exceeds the cost of the behavior.

All engineering begins with the simple economic purpose of creating valuable results at a cost that makes those results worth it. Worth, then, is the net we have when we subtract the costs from the values: $W = V - C$. Or, we can express worth in another way: as the ratio of value to cost:

$$\text{Worth} = \frac{\text{Value}}{\text{Cost}}$$

Which says only that worth gets greater as value increases and cost decreases.

When we set out to engineer human performance, it is axiomatic that we place value on accomplishments but that the behavior costs us something. We may value the rabbit; but we must pay for the hunter's work, knowledge, and incentives, as well as for his gun and ammunition. We value the crop but pay for the plow and the plowman.

Roughly speaking, *competent* people are those who can create valuable results without using excessively costly behavior.

THE FIRST LEISURELY THEOREM

I define human competence, then, as a function of worthy performance. This is the First Leisurely Theorem:

> **Human competence is a function of worthy performance (*W*), which is a function of the ratio of valuable accomplishments (*A*) to costly behavior (*B*).**

A shorthand way of expressing the theorem[3] is

$$W = \frac{A}{B}$$

Since the remaining leisurely[3] theorems are derived from this one, and since it is the key to a system of engineering human competence, it is important to understand what it tells us:

1. It tells us that the way to achieve human competence is to increase the value of our accomplishments while reducing the energy we put into the effort. The true value of competence is derived from accomplishment, not from behavior.
2. It tells us that great quantities of work, knowledge, and motivation, in the absence of at least equal accomplishment, are unworthy performance. And this says, in turn, that knowledge, motivation, and work, when used competently, are to be husbanded and spent wisely.
3. It tells us that great accomplishments are not worthy if the cost in human behavior is also very great. In my opinion, the Egyptian pyramids stand as silent monuments to worthless achievement, although the subcult of knowledge would have us honor them. A really worthy, though less honored, achievement of the early Arabs was the alphabet, a labor-saving device of incalculable worth.
4. Money, energy, or time invested in reducing the behavior required of performance can pay off splendidly. Later, we shall see that these efforts can simultaneously increase the numerator (accomplishment) as they decrease the denominator (behavior), so that we are doubly rewarded. On the other hand, we shall also see that an increase in behavior requirements often decreases the unit value of

accomplishments, so that we are doubly duped. (See Chapter 9 and the "Law of Training.")

5. A system that rewards people for their behavior (work, motivation, or knowledge) encourages incompetence. And a system that rewards people only for their accomplishments, and not for the net worth of their performance, is an incomplete system that fails to appreciate human competence. When such a system is used by managers in the world of work, and teachers in the world of schools, it invites them to squander other people's energies.
6. Human capital can be best achieved through worthy performance only if we measure and respond directly to human competence. And human competence is found in overt performance, not in hidden behavior.

The First Leisurely Theorem identifies the subject matter of human competence, then, and it warns us against confusing the plow (behavior) with the crop (accomplishment).

DISTINGUISHING BEHAVIOR AND ACCOMPLISHMENT

Nothing better illustrates the importance of distinguishing behavior and accomplishment than a study of the ways in which we can measure performance. When we think of measuring performance, we usually think of tests. And psychologists have certainly provided us with enough of those. By the traditional view, the way to assess performance is to administer tests of apparent job or school relevance (e.g., mathematics, spatial relations, mechanical aptitude), and then to establish a cut-off score for the selection of employees or the advancement of students.

This traditional view is mistaken in two ways. First, traditional tests, at their best, are only crude statistical instruments, usually poorly correlated with the economic realities of performance. For example, personality tests for salespeople have been correlated with such supervisory ratings as "interpersonal effectiveness" and "ability to conduct an interview," but never, to my knowledge, with the quality of sales prospecting. Very often those things so easily assumed to be correlatives of actual performance simply are not. As a matter of fact, the best salesperson (by dollar volume) I have ever seen never smiled and had a fish-like handshake; and a leading medical photographer I once knew is color-blind, one-eyed, and severely astigmatic in the one "good" eye.

Second, tests are unfair in that the people who score poorly on them

have far more potential for successful job and school performance than we have been able to tap. A test score rates people low on the *assumed* correlatives of the job or school requirements; but it does not identify precisely what must be developed in them for us to make good their potential. Tests are usually too indirect; we need to go more directly to performance. And that is what psychological testing has helped prevent us from doing. That is also why psychological test batteries have been so half-heartedly accepted in industry. They have been better accepted in the schools, but only because the schools have been so little concerned with the worldly use of human performance.

Assessment of human performance has teetered on a dilemma. Here are its horns:

1. We all know that there are great individual differences among people (the statistical "science" of psychological testing is grounded in this assumption).
2. But we know equally well that people are pretty much alike (or there could be no science of humans beings, biological or psychological).

Now, I believe both of these propositions, and so does everyone else I have ever talked to about them. But their contradiction is clear and surely needs a resolution. The system of performance analysis described here has emerged from a resolution of this dilemma—from realizing how both of these commanding, yet seemingly contradictory, beliefs about differences in human performance can be true but not contradictory.

Let me summarize here a bit of the theory that has led me away from the statistical view of human performance assessment and to a satisfactory resolution. Table 1-1 summarizes the performance measures of two hypothetical people, Mr. Quik and Mr. Sloe, on several tasks. Two different kinds of performance measures, which I shall call measure *A* and measure *B*, are given for each task. Even before we take the measurements, we confirm that Mr. Quik is supposed to be an expert at all four tasks, whereas Mr. Sloe is known as a complete novice at each. Both measures *A* and *B* confirm Quik's expertise, but only measure *A* discloses Sloe's total ineptness. Although both are direct, valid, and useful measures of performance, the *B* measures tend to substantiate our belief that people are pretty much alike, whereas the *A* measures reflect great differences among individuals. Then why the discrepancy? To answer that, we must know what is common to the *B* measures, what is common to the *A* measures, and how these measures differ.

It is really quite simple. In *all* of the *B* measures, we get a score by looking directly at the *B*ehavior of the person performing the task. In

TABLE 1-1 COMPARISON OF TWO DIFFERENT KINDS OF PERFORMANCE MEASURES

	Tasks	*Measure A*	*Scores*		*Measure B*	*Scores*	
			Quik	*Sloe*		*Quik*	*Sloe*
I.	Rifle marksmanship	Target scores	100	0	Checklist of rifle-handling behaviors	100%	98%
II.	Long division	Number of correct answers in 100 problems	100	0	Percentage of long-division operations performed correctly	100%	98%
III.	Insurance sales	Percentage of sales volume quota sold	100%	0	Ratings of sales techniques, scale 1–10	10	7
IV.	Speaking Spanish	Percentage of instructions that a Spaniard can follow	100%	0	Percentage of language elements in repertory	94%	70%

the *A* measures, we never need to look at the behavior of the performer, but at something else: the product of this behavior, or the effect that this behavior has on the world—the *A*ccomplishment. But why do the *B* measures seem to deceive us about Sloe's capability? First, they need not deceive us at all; rather, they can sometimes reveal the causes of a poor showing on the *A* measures. Suppose we look at the *B* measures more closely, watching Mr. Sloe go through each bit of behavior on a checklist. Say Mr. Sloe performed beautifully with the rifle: He put the stock to his shoulder, the barrel out, index finger on the trigger; he closed his left eye, pointed the rifle in the direction of the target, sighted along the gun-sights, and squeezed the trigger. Only in this last bit of behavior do we see something amiss: He failed to hold the rifle steady as he squeezed the trigger. As a result, he never hit the target at all.

We also watch Mr. Sloe perform each behavior (*B* measure) required in doing long division. Mr. Sloe set up the problem according to the conventional algorithm, estimated various quotients accurately, multiplied well enough to convince us he knows the multiplication table, correctly subtracted all manner of number combinations, borrowed, carried, properly indicated the remainder, correctly positioned the integers, and precisely identified the decimal point. Only in setting up

the problem initially did he make a tiny mistake: He confused the dividend and the divisor. When he saw 23 ÷ 12, he set it up like this: $23\sqrt{12}$. Obviously, he never got the right answer—and this accounts for his score of 0 in long division by the *A* measure.

Similarly, in selling insurance, as we follow Sloe around, we are impressed with his *B* measures—his poise, his arguments, and his persistence. He seemed to have only one major weakness to warrant a 7 rather than a 10: He failed to get the information needed to qualify the people he called on as serious sales prospects. Now we know why he failed to sell any insurance.

Or take Spanish. Mr. Sloe says he knows nothing of Spanish. But when we compared his language repertory with that of a Spaniard, as in the *B* measure, we concluded differently. He does know how to pronounce the "difficult" Spanish *r;* and he does this every time he utters the *tt's* in the word *butter.* Because English syntax and grammar are more like Spanish than they are unlike it, his grammatical knowledge of Spanish was considerable even before he began to master the language. And common linguistic roots put him far beyond zero in his mastery of Spanish vocabulary. Yet the relatively little he does not know is so essential to communication that he cannot have the desired effect on a listener: Spaniards do not understand him. As a result, his *A* scores are zero.

So we can say that Mr. Sloe *knows* a great deal (*B* scores), but has *accomplished* nothing (*A* scores). The *B* scores are direct measures of the *B*ehavior that goes into the task, and the *A* scores are measures of the product—the effects on the world—*A*ccomplished by the task.

If we generalize from these examples, we find the resolution to our dilemma: People are very much alike in their behavior repertories (*B* measures), but there are great individual differences in what they accomplish (*A* measures).

COROLLARIES OF THE FIRST LEISURELY THEOREM

By seeing that performance has at least two aspects, behavior and accomplishment, we not only resolve the dilemma of individual differences, but we also arrive at some useful corollaries of the First Leisurely Theorem to help us measure performance meaningfully.

One important corollary of the distinction between measures of accomplishment and measures of behavior is that *if we know what we are doing, education must be highly economical.* Only one of the two measures reflects value to those who propose to improve performance; the *A* measures alone can be translated into a dollar return. In other words, we do not care how people hold the gun if they hit the target;

nor do we care how they behave while selling so long as they get sales and satisfied customers. Accomplishments alone have direct value to us. And because we must make an investment in order to get those accomplishments, behavior changes are simply things that cost us money.

But if small changes in behavior can produce great changes in accomplishment, then small investments in cost can generally produce great returns in value. If we view any program to mold performance as an economic issue, we can see that to decide whether it is worthwhile to launch the program is a function of the ratio of expected value return to the expected cost. If this ratio is greater than 1, we can expect a return on our investment. Because *V*alue is a function of the *A* measures, and *C*ost is a function of the *B* measures, worth is essentially a reflection of the ratio of expected changes in *A*ccomplishment (*A*) to the needed changes in *B*ehavior (*B*):

$$W = \frac{A}{B} = \frac{V}{C}$$

This brings us to a second corollary of the distinction between behavior and accomplishment: *We have no need to measure behavior until we have measured accomplishment.* Even then, we may never need to measure behavior. Accordingly, there can be no purpose in identifying deficiencies in rifle handling until we have established that there are deficiencies in hitting the target. And we have no reason to measure a person's repertory of Spanish until we have determined that this person has a problem in communicating to other Spanish-speaking people. Or, to relate this to the preceding economic corollary, we can say that we sensibly should look for a potential value return (*A* measures) before we inquire into the cost of the investment (*B* measures).

The sense of this second corollary may seem obvious. But its good sense has little currency in most present-day programs for the assessment of performance. Unfortunately, most of these programs set about to measure the individual's behavior (and therefore *B* measures) without making any attempt to determine just *how* (or even *whether*) this individual is deficient in accomplishments.

This leads us to a third corollary, which I shall give in two parts. The first part says: *Quantitative expressions of behavior (B measures), except for special purposes, are often misleading indices of performance.* Which is to say that most[4] test scores are misleading. What we want as a result of measuring the behavioral side of performance is a list of deficiencies that are significant only because they lead to important accomplishment deficiencies.

That test scores are usually misleading can be illustrated by the performance of two children with an equal "amount" of arithmetic behavior deficiency. Dorsey cannot subtract zeros from other numbers. (Dorsey's reasoning is, "You can't take 'nothing' away.") Thomasina cannot subtract from zero. (The reasoning here is, "You can't take something from nothing.") Yet Dorsey gets most of his long division answers correct, since relatively few zeros occur as subtrahends in division. On the other hand, Thomasina gets most of her answers wrong, because zeros repeatedly appear as minuends whenever the quotient has a fraction ("bring down the zero"). So, Dorsey may get a score of 90 on the test, whereas Thomasina gets only 10. Yet these scores give not even the faintest clue to the problem of either child, or to their nearly equal abilities. In fact, they obscure the real difference between the children, which has nothing to do with the "amount of knowledge" either one has.

To make matters worse, tests—especially verbal tests—are usually constructed so that differences among people are arbitrarily emphasized. Say you answer twice as many questions about vocabulary as I do; that does not mean that you have twice my vocabulary. Indeed, the real ratio of our differences must be very small, or else we wouldn't be able to communicate. This is one of the reasons that many tests unfairly discriminate against minority groups in a culture: They magnify really small, insignificant differences in behavior, and give them excessive weight. This greatly advances the cause of social prejudice, which itself is an inevitable product of the behavior cult. For example, among those whom we call the "disadvantaged," we would probably find that there are relatively few behavior deficiencies, but these deficiencies can have disproportionate effects on the majority culture. I know of a student from a poor black college who learned never to dangle participles, but he spelled the word *because* as *BECAWSE*. His mastery of participles seems somehow quantitatively a much greater achievement than that of his white counterpart who dangles participles all the time but has mastered the spelling of *because*. Indeed, we could say that the black student has even mastered six-sevenths of the spelling of this word, because he misses only one of the seven letters. After ridding ourselves of dangled participles (you will, of course, recognize this as a dangled participle), the world's response to our improvement is very small; yet when we change the way we spell *because*, we may be transformed in the world's view from illiterates to acceptably educated people.

The second part of the third corollary says: *It is frequently useful to quantify measures of accomplishment, and these measures should have economic correlatives.* There are many different behaviors that cause performance failure, and these should be listed for identifica-

tion, not obscured by summations. The "number" of them does not matter. But failures of accomplishments are directly correlated with the loss of value to someone. For this reason, it is often useful to quantify accomplishments. Indeed, measures of accomplishment have no real validity until they reflect value to someone, and the dollar currency is one excellent way to express this value. We can show, for instance, that it is valuable to learn to read by showing that literate employees are better compensated or that literate people will buy books.

Problems in household plumbing provide a good example of why we should want to quantify accomplishments, but not behavior.[5] If a water faucet is not working, we report to the plumber essentially quantifiable facts about the running water. We say that not enough water is coming through, or that it is coming through too slowly, or that it is not hot enough. We could attach a value to the volume, rate, and temperature of water; and we could even specify how much of each of these quantities we want—and how much we are willing to pay for them. Water is the output, the accomplishment.

But when the plumber comes to fix our water pipes, we expect the expert to identify the precise cause of our problem. We would be angry indeed if this expert inspected our pipes with a list of true-false questions (T-F "The elbow joint is leaking," etc.), and then gave us an achievement score as a measure of our system. "Sir, your plumbing system scored a 68, which is not passing—it needs a complete overhaul. I was hoping it would score a 75 and not cost you so much to repair." You see, we don't care how many things are wrong, or how the plumber scores the severity of the troubles. We simply want to know exactly what is wrong that can be changed to supply us the water we need. We want the plumber to isolate a "list" of problem behaviors and tell us how much it will cost to fix them.

It is the accomplishments we value and pay for. The utility company charges us for the actual number of gallons of water we get out of the tap, not for how smoothly our tap works. This means that accomplishment measures, although they are direct performance measures (e.g., targets hit, cases won in court, successful students, number of qualified sales prospects), must eventually be translated into economic terms if we are to establish their true value. And I will do this in Chapter 2.

NOTES

1. Accomplishment carries the connotation of "competence." For example, we speak of an "accomplished pianist."

2. Some readers will miss the function sign. Properly written, the equation should read:

$$W = f\left(\frac{V}{C}\right) \quad \text{or} \quad W = f\left(\frac{A}{B}\right)$$

I have left out function signs simply because I have found that they confuse many readers. Sophisticated readers can supply their own function signs.

3. The definition shows that leisure is the product of time and opportunity. In shorthand:

$$L = T \times O$$

Without opportunity, there is no leisure, just as there is no leisure without time. Dead time, then, or time we don't know what to do with, is not leisure at all.

Next, to show the relationship between leisure and worthy performance, we can make some substitutions in our definitions. If opportunity is the potential for accomplishment (pA), then leisure can be described as

$$L = T \times pA$$

Now we need only one further substitution. We need to see that behavioral inefficiencies consume the "time allowed before it is too late." "Time allowed" (T), therefore, is inversely proportional to the behavior required, or

$$L = \frac{1}{B} \times pA = \frac{pA}{B}$$

From our First Leisurely Theorem, then, leisure (or human capital) becomes the potential for worthy performance:*

$$L = pW$$

By the same simple substitution process, we can see that, conversely, worthy performance is the potential for leisure—if we define *accomplishment* as the potential for opportunity. And indeed we must, to be consistent with the way in which we actually live and strive for goals. Practically all the goals we set for ourselves we see, on analysis, as subgoals aimed at some greater opportunity, and the accomplishment of each goal opens up opportunity for new accomplishments. The very purpose of competent human performance, then, is leisure itself.

Thus, leisure, or human capital, is not only the goal of worthy performance; it is also the starting point—or, better, the point at which we begin again. It is a renewal—the rebirth of hope. To equate leisure with, say, an orgy, is to forget that one of the most hopeless and forlorn human experiences is to discover that the party is over and all resources for a new one have been used up. Leisure is not only the end of worthy performance; it is a necessary condition.

*This derivation makes use of the famous German *Zunge-in-Wange* method of mathematics.

4. In Chapter 2, we shall see that this is an important qualifier, but it does not detract from the main argument.

5. This does not mean that we never take measures of the input system. The plumber may take a measure of the force of a pump in the system to determine if it is below some critical value. We might reasonably find a number to express a behavior input, such as the force with which a logger applies the ax. But we are not served by counting the number of different behavior elements in a logger's repertory. Most psychological testing—and the worst of it—counts up a number of diverse behaviors, truly adding apples and alligators.

   Special education teachers are well aware of the value of a "list" rather than a number. Several of these teachers have remarked to me that they wished that all tests were scored that way.