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## Chapter One

### The Idea of Contingent Being: The Chance “We” All Took

#### How Did We Get Here?

If a man gains consciousness on an isolated beach and looks back over his shoulder to discover that his footprints in the sand lead back through the surf into the sea, he must conclude that somehow he exited that body of water. That the footprints of man and of his predecessors wander around for a few hundred million years on solid ground before doing essentially the same thing does not weaken that conclusion. Life evolved in the oceans of this planet, and our ancestors crawled out of the sea. The iodine that our cells can no longer absorb from ocean water, we add to table salt. We are multicelled derivatives of the deep, salt-water aquaria standing on street corners waiting for traffic lights to change.

This is what science tells us. The average person, however, is somewhat uncomprehending of exactly how long four billion years is and what can evolve by random mutation and natural selection over such a period. Many of us are therefore unsympathetic to the view that biological evolution should be accepted as fact. Moreover, the ultimate truth that evolution implies is not a comfortable one: We suddenly become mortal.

To look naively at nature is to see such a degree of physical complexity and organizational coherence that ninety percent of us feel compelled to mandate a divine

architect or “watchmaker”<sup>\*</sup> for its creation. But to look at the earth and the universe with the jaundiced eye of a pragmatic scientist is to see only a very large jigsaw puzzle, one that *Homo sapiens* has almost completed. Man *qua* scientist is close to comprehending how the matter and the energy of the universe can exist *ex nihilo*—out of nothing. He can outline how the four fundamental forces of nature were likely born of one, and how galaxies such as our Milky Way collapsed into being from the hydrogen and helium that exited the big bang. With the Hubble telescope he has photographed more clearly than ever before stars being born in the nebular nurseries of majestic gas clouds, and he routinely solves the dynamic equations of solar systems spun from the yarn of dead first-generation stars. He understands how the earth and its iodine-“tainted” oceans came to be. While he cannot yet explain with absolute certainty the detailed steps from the first replicating molecule to the first cell, nature herself did not ascend this particular staircase very rapidly, and man does have the major portions of the remaining evolutionary process fairly well worked out. Everything one can see from the top of a mountain (or a skyscraper), or through the eyepiece of a microscope or a telescope, no matter how complicated or intimidating, now has a satisfactory secular explanation—whether the explanation is socially acceptable or not.

Science has accumulated these stunning successes in describing nature and our generic origins very tediously. How? By steadfastly accepting only two operant causes in the universe: determinism and the invisible but equally efficacious entity of chance. Science rigidly mandates that every event and process that transpires in the universe is attributable in a causal sense to either physical determinism or to pure chance—not to watchmakers.

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<sup>\*</sup> The eighteenth-century theologian William Paley assessed the complexity of living things and compared their functions to those of an intricate watch. The Reverend concluded that living things also showed evidence of being designed and attributed that design to a divine entity—a “watchmaker.”

But does this statement also apply to us? Look in a mirror. Can science explain what you see using only these two causal factors? If what you perceive is a generic member of the species *Homo sapiens*, then yes, biology can explain the origin of the image in the mirror, and the charting of that evolutionary process is detailed persuasively in the literature. But if what you see is a generic biological container of consciousness hosting an individual first-person point of view that happens to be “you”—but did not have to be—then the literature of science has little to say about how this correspondence occurred. Why does this particular container substrate “you”? Why are “you” not someone else? Why does your subjectivity exist at this particular moment in time? Leaving science, we discover that philosophy attempts to say more about the etiology of individual self-awareness, but after shelves of effort, it too leaves these questions essentially unresolved. One has only to read the comics in the newspaper to see that after six thousand years of wondering, people (and comic strip characters) are still seeking an answer to the big question that subsumes the three derivative questions above: “Why do I exist?”

For the readers of this book, we would like to translate this essential question into a more precise query: “What exact combination of abstract chance and physical determinism caused the event of *your* particular consciousness?” Of course, the evolution of generic human consciousness is part of the solution; the trait of self-awareness appearing among the individuals of a species is obviously a *necessary* condition in order for one labeled “you” to occur. But what are the *sufficient* conditions for your particular subjectivity—the set of conditions that once satisfied, *force* “you” to emerge into existence?

Before you answer, remember that correlation is often confused with cause. Aristotle in his *Refutation of the Sophists* warned us of the folly of assuming a causal connection between two events merely because one event precedes the other; this is the well known “*post hoc ergo propter hoc*” fallacy. Just because “you” appeared in the same general time frame that a melding set of molecular

instructions defined the physical traits of yet another conscious entity does not necessarily mean that your subjectivity is the predictable outcome of the genetic specifics of that event. The eminent zoologist H. S. Jennings constructed a similar admonition when he wondered how one of a pair of twins could plausibly answer the question: "...How does it happen that my consciousness, my possibility of experience, is tied to this particular knot in the web [set of genes in the species], while there is another knot [set] with the same constitution, the same genes, that is not-I?..."<sup>1</sup>

Ending our triad of unanswered etiological sub-questions is "Why do 'you' exist now of all possible times?" Yours could have been the consciousness of a knight in medieval England helping King Arthur puzzle out exactly what was going on between Sir Lancelot and Queen Guinevere—or that of a handmaiden helping Queen Guinevere bemuse such analysis. You could have *been* King Arthur or Queen Guinevere. To write that the interlocking geographies of chance and determinism which address the above questions of existence are "ill-defined" in the literature of science and philosophy is to compose an understatement of epic proportion.

### **Chance and Necessity**

We all know and accept the role of determinism in our lives: physical event "A" causes physical event "B." Within naturalistic and scientific paradigms, determinism is the doctrine that all physical events and processes are caused (determined) by antecedent physical events and processes. If you are vigorously sneezed upon by a person with a cold, you get sick: determinism. If you leave your car lights on overnight, the engine will not start the next morning: determinism. If an O-ring is frozen, the pressure seal in the rocket motor will not function correctly: determinism. That in formal circles determinism is sometimes called "necessity" is better appreciated by modifying slightly the syntax of an earlier statement: If "A" occurs, "B" necessarily—that is, of "necessity"—follows. Therefore,

in the company of philosophers, we find the word “necessity” frequently employed for “determinism.”

We also accept chance as playing a role in our lives, but only at certain places in the script. Chance is allowed to provide the weather for the ballgame; it frequently arranges our first meeting with the person we eventually marry. It indiscriminately spares lives or takes them in airplane accidents and tornado touchdowns, and it lets *other* people win the lottery. Because chance ostensibly selects our genes, we also permit it to define the bounds of our intelligence, to determine our physical anatomy and athletic prowess, to set our height and the color of our skin, and capriciously to choose the physiological flaws and diseases we must bear. And at the end of life, for reasons genetic, poetic, fatalistic, or otherwise, we relegate to chance the responsibility for determining how and when we die. The scenes where randomness apparently speaks in the theatre of our lives are generally agreed upon and accepted with equanimity by all.

There is one additional point in the script where most of us, laymen and scholars alike, acknowledge an intrusion of randomness into our lives—a major intrusion. We just attributed our physical and mental traits to the genes that chance selects for us at conception. However, the (apparently) random encounter between the spermatozoon and the egg embraces an existential aspect. We are told that if things do not go in a certain (theoretically) specifiable manner during this event and the correct overall set of genes is not selected—especially those defining certain as-yet-unidentified regions of the inchoate brain, then the prospects for our personal existence are nil. The consciousness of the developing brain will not be our “I”, our point of view, but someone else’s. This widely accepted conclusion is unsettling to most people, and it is here that the watchmaker is welcomed with open arms as an ombudsman for our particular “I”. We require a supernatural entity to watch over the crucial specification of our genes during meiosis (chapter 3) and conception. Not only do we want this entity to observe, but also to actually intervene on a

microscopic scale, as required, to ensure that the desired set of thousands and thousands of genes link up correctly to affirm our mind's future existence and *not* the mental existence of someone else.

In spite of clearly defined footprints in the sand, in the final analysis people want to exist for warm, intentionally deterministic reasons, and not for cold, dispassionately random ones. As a potential architect of ones subjectivity, pure chance is deemed too impersonal, too abstract, and—above all—too tenuous. Individual existence, were pure randomness solely responsible for our genesis, would be incredibly frightening.

It would be nice, then, to boot abstract chance out the back door and dash back through the house to invite the watchmaker in the front. However, in this thesis we will keep both doors closed. Rather than adopting the typically contemptuous, dismissive view of chance and its role in our being, we will hold firmly and dispassionately to the empirical evidence. We will ungrudgingly accord this short-term unreliable—but admirably impartial over the long haul—entity the etiological merits it deserves and boldly investigate the existential consequences. The consequences are not completely dismal.

### **Two Types of Randomness**

The careful reader has noticed that we have squeezed in a few qualifiers for the word “chance,” lately employing such expressions as “pure chance” and “abstract chance.” Moreover, that reader will recall that the spermatozoon-egg union was termed an *apparently* random encounter rather than merely a *random* encounter. What of this? Are we hinting that chance comes in different flavors—that what chance is considered to be in some instances is not what it is thought to be in others? We are suggesting precisely that.

Philosophers argue that the events and processes we usually call random appear random only because we human beings lack complete knowledge of how to predict them deterministically. Your weatherperson may speak of

a “chance” of a thunderstorm in your neighborhood tomorrow. However, if that meteorologist had full knowledge of atmospheric and geographic conditions—temperature and wind velocity profiles, barometric pressures, humidities, ground reflectivity and water content—and additionally, full knowledge of how to use these parameters in an accurate weather model, *and* they had access to the computational power required to run such a model with the necessary internal precision, then the forecaster would no longer have to say there is a *chance* of rain tomorrow. They could say there *will definitely be* rain or there *will definitely not be* rain in your neighborhood tomorrow. The weather, were all parameters of its being perfectly known and accurately modeled, would no longer be a phenomenon ruled by what we normally call chance.

Toss a coin into the air. Given that we know the dimensions and density of the coin (giving us its ellipsoid of inertia), the starting position of the coin, the angular momentum imparted to it by the impacting thumb, the rotational viscosity of the coin in air at (say) twenty-three degrees centigrade, and the other mechanisms and parameters of relevancy, then “chance” no longer plays a role in the toss. With adequate time, precision, and capacity for mathematical simulation, we should know precisely how the coin will dispose itself upon landing. With massive computational effort, we can eliminate all elements of pure chance from the event. The same observation holds true for an ivory ball racing around the ball track of a spinning roulette wheel, cards being shuffled (fairly or unfairly), dice scrambling across a felt-topped table, indeed, all reputed processes of chance—including a spermatozoon desperately propelling its informational payload through a stygian sea to “randomly” torpedo an ovum. It is because we do not possess perfect knowledge of the initial conditions of our devices and processes of chance, and are unknowing of the involved extent and preciseness of relevant forces, directions of impact, coefficients of drag, viscosities, etc, that we cannot model these processes and must label them random. Therefore, when we say that “I”, as one of a pair

of monozygotic (identical) twins, am the one and not the other because of chance (dissimilar genes being ruled out in this case), it could be that we are asking randomness to substitute for deterministic causes of which we are ignorant. However, if we are positive that no physical antecedent causes obtain, then we are saying something else. But what?

In his treatise *Abusing Science*<sup>2</sup> philosopher Philip Kitcher explains that there are actually *two* types of random events. The weather, tossed coins, games of chance, and (we argue) biological conception are examples of “apparently random” events. Such events are not truly random, because they have knowable underlying physical causes, that is, “deterministic bases.” Though completely identifiable, the causes are not usually measurable in extent of influence. With complete knowledge of the physical antecedents to this type of “random” event and adequate analytical power and precision to model their underlying physical processes, all aspects of their apparent randomness would vanish. Many events attributed to objective (pure) chance—the other type of random causality—are actually caused by apparently random chance in disguise. These “pure chance” events are actually the intersection of two completely deterministic streams of events—RMS *Titanic* and the iceberg, for example. This “accident” occurred because of the intersection of two completely independent causal chains, one governing the speed and course of the 46,000 ton *Titanic*, the other controlling the path of the even more massive iceberg. The encounter, 95 miles south of the Grand Banks of Newfoundland, would have been devoid of all abstract chance and totally predictable had our breadth of knowledge on the night of April 14, 1912, been more complete. Unfortunately, for 1,513 of those aboard, it was not.

But there do exist in nature, Kitcher explains, processes that have absolutely *no* underlying deterministic cause. These processes are said to be governed by *irreducibly* random chance (sometimes called abstract chance, pure chance, or objective chance). This alter ego

of chance is a fundamental, objective metaphysical instrument. Philosopher Corliss Lamont notes that it endures "...outside of and regardless of the human mind..."—an *agent provocateur* recognized by such eminent philosophers as John Dewey, William James, Henri Bergson, and Aristotle.<sup>3</sup>

Pure chance is a real entity, but it is one we will never see or touch. Its existence is deduced only from the happenings that it mediates, events that totally fail to lend themselves to any deterministic explanation—even when *all* knowledge is brought to bear. Kitcher and others offer examples of this type of chance from quantum mechanics, for example, the decay of atomic nuclei. There is no "A" that precipitates "B" when "B" is atomic disintegration. One can drastically change anything and everything that could conceivably affect the nucleus of a radioactive atom: temperature, pressure, gravity, velocity, acceleration, whatever, and still, on a specific nuclear basis, one cannot predict when a given atom will disintegrate. We can say with small error that one hundred of a given one million radioactive atoms will decay in the next twenty-four hours, but we cannot label the doomed individual participants. (For an entertaining and thorough discussion of radioactivity as a nondeterministic process, see "The probabilistic revolution in physics" in *The Empire of Chance*.<sup>4</sup>)

The world of quantum events is replete with happenings governed by abstract chance. The search for a deterministic explanation for the randomness of these events is not likely to be successful. The usual approach is to hypothesize so-called hidden variables or unknown forces to explain the random effects of quantum mechanics. However, the eminent mathematician John von Neumann proved in 1932 that the use of hidden variables would not eliminate the probabilistic aspect of quantum mechanics. His conclusion was briefly challenged in the 1950s by physicist David Bohm, but subsequent theoretical and experimental work by the British physicist John Bell (Bell's inequalities) showed that Bohm's work invalidated special relativity. A deterministic explanation

of events in the quantum world that embraces these variables will not be forthcoming.<sup>5,6</sup>

We wish to add one more phenomenon to those that are generally accepted as irreducibly random. Indeed, our nomination may be the only *macroscopic* irreducibly random event in nature: Why are “you” in one brain rather than in another or, in fact, why are “you” in any brain at all? Just as no deterministic mechanism can cause a particular radioactive atom to decay at a given time, we will show that no deterministic mechanism can guarantee that “you” will originate or not originate in a given neural complex maturing at a specific time.

### **The Unvarnished Genesis of Mind**

Nobel laureate H. J. Muller, geneticist F. A. Fisher<sup>7</sup> and biologist G. C. Williams were the earliest individuals to divine the real truth behind why we exist as a conscious species. The unpopular observation surfaced in cocktail parties in the late 1960s as a pithy surmise with soul-shattering impact: “Man is a disposable container for DNA.” British zoologist Richard Dawkins subsequently (1976) explicated the unpleasant idea so persuasively in his book, *The Selfish Gene*, that currently his name is the one most frequently attached to the “container” notion. Although the dramatic phrasing of the sixties version is a bit brutal to provincial human sensibilities (Dawkins’ more extensive argument is almost as numbing), to all without more orthodox agendas it now appears incontestable that man’s body, including that pinnacle of all physical creation, his brain, is, in fact, primarily a survival machine for a board of directors he has very likely never even seen—his genes. The chicken, as the biologist says, is just an egg’s feathered methodology for making another egg. (Samuel Butler, a contemporary and ultimately a vehement critic of Charles Darwin, is credited with the original version of this observation.)

There it is then, the final insult of the Darwinian legacy: All of the body’s functional capabilities, including those that permit and enhance our enjoyment of life—

analytical thinking, physical adroitness, appreciation of music and art, color stereovision, a perceptive palate, the emotional adventures ambient to sexual reproduction—all of these anatomical and physiological embellishments have evolved toward one simple genetic end: enhanced survival of the molecular instructions that created us. We cannot put it more graphically than Dawkins, "...A monkey is a machine which preserves genes up trees, a fish is a machine which preserves genes in the water..."<sup>8</sup> Human genes thus make an investment in a strange, unanticipated effect called consciousness. It is an investment upon which a return will not be seen for over a dozen years—the mechanism of genetic feedback does not telegraph the swiftest of signals where the trait of self-awareness is concerned. Few financial investors have such patience.

What then are we to do with Dawkins' distressing notion that preservation of genetic material "...is the ultimate rationale for our existence..."? Most people already embrace a more comfortable, theistic paradigm for personal existence and are little motivated to judge whether Dawkins' conclusion is valid or not. (If you were handed a book and told with absolute certainty that it would turn your current view of existence upside down, would you read it?) We will begin this effort to understand the origin of our particular "I" by accepting the conclusion that Dawkins and his scholarly antecedents are realists who have reasoned uncompromisingly and well. We believe that an unbiased, pragmatic reader of contemporary literature in the biological sciences must ultimately concede that the unsavory proposition of Muller, Williams, Fisher, and Dawkins is true: As members of the species *Homo sapiens*, our bodies, our minds, and our consciousnesses are here accidentally; our primary purpose in life is to give our genes their rightful return on their investment.

### Opposing Views

We readily admit that there is fierce opposition to the “container” notion. Many people find impertinent the statement that humankind is but the genes’ way of creating replicas of themselves and that “we” and our behavior are, in effect, epiphenomena of the genes’ unthinking quest for immortality. Of the incensed folks with scientific credentials, Steven Rose, professor of biology at Open University in England, argues against sociobiologist E. O. Wilson’s use of Dawkins’ “selfish gene” hypothesis (in Wilson’s book, *On Human Nature*) in the following manner: “...The fallacy inherent in this neat formulation...is seen if the paradox is inverted; after all, it is equally plausible, paradoxical and fallacious to argue that the gene is merely human behavior’s way of creating another piece of human behavior...”<sup>9</sup>

But who was here *first*, almost four billion years ago, the gene or human behavior? The answer is the gene. And which survives fundamentally unchanged in form, adapting its container to more and more reproductively efficient versions but replicating itself in the same basic manner, form, and much of its content for four billion years: the gene or human behavior? Again, the gene. (We do not mean to imply that the genes have survived for billions of years unblemished; far from it. Random evolution within the chromosomes has resulted in a literal, organizational mess. Fully one-half of the chromosomes contain “junk,” atom after atom of useless, repetitive chemistry. Other sequences of useless code, while not repetitive in nature, lie *inside* legitimate sequences of genetic code for proteins and have to be “snipped out” before the gene can be used. Less than two percent of the chromosomes’ information carrying ability is taken up by valid code for proteins. Add to this the insult of more than ten thousand lesions a day due to oxidants from cellular metabolism and cosmic radiation. [The genes in a cell’s nucleus are like ducks in a shooting gallery to these particles.] The genes also undergo repeated transpositions and duplications over the eons, and, seemingly without

reason, get shifted from one chromosomal arm to another. However, glancing from a photograph of a bacterium to view our selves in a mirror, we see that these seemingly major structural “revisions” are nothing compared to the changes their “container” has endured.)

Other, more telling criticisms of Dawkins’ work exist; however, in the final analysis they, too, fail to lure one away from the admirable parsimony of Dawkins’ argument. (The reader who feels that he must attempt to salvage a portion of his ego in this regard is referred to these latter efforts with our best wishes. See, for example, Stephen Gould’s essay, “Caring Groups and Selfish Genes.”<sup>10</sup> But for balance, also examine a defense of Dawkins’ genic selectionism in Kim Sterelny and Philip Kitcher’s “The Return of the Gene.”<sup>11</sup> ) Within this treatise we will accept with practiced equanimity (that is, with no raised eyebrows) the fact that consciousness and human behavior are but foam on the continuing, genetically driven wave of primate life.

### **A Piece of Good News**

This treatise is primarily concerned with your particular consciousness and the complementary roles that abstract chance and physical determinism played in specifying your existence. As we survey the evolution of consciousness from the big bang to individual, self-aware life in the universe, everything seems to fall naturalistically into place just as one might expect—at least one reasonably well-grounded in the physical and biological sciences. However, in the final step of the exposition, the tenuous increment from generic consciousness in a species to an individual subjectivity that is “you” or not “you”, something very subtle steps in—something discreetly not mentioned in all the scientific literature. Here is that step that ostensibly must be governed by either divine grace (the watchmaker) or genes. However, if you are not religious and are conversant in just the barest fundamentals of genetics, you cannot accept that it is controlled by either.

In our effort we shall adopt the use of quotes, uninterrupted by punctuation, about the pronouns I, you, we, etc, to denote what psychologists call the mental construct of ourselves as a “metaphorical person,” that is, consciousness—including your particular subjective view. As we pursue our stated goal, systematic assessment of the role of randomness and necessity in our individual being, we shall uncover some unexpected facts that suggest a hypothesis which might read as follows:

*The probability that “you” will exist again in the future cannot be less than the probability was in the past that “you” would exist today.*

Phrasing this another way, we will unearth evidence that there is *no* event, *no* process, or *no* environment, nor set of events, processes, or environments, “A,” for which it may be said:

If “A” happens, then (and only then)  
“you” will *always* happen.

(In the terminology of logic, this would read, “A” is the necessary and sufficient condition for “you”.)

For a book that purports to walk the scientific straight and narrow, the above conjecture may seem to bounce off the handrails a bit. The statement appears to sanction the idea of traditional reincarnation, but that is an incorrect assessment. Ideas of supernaturally subsidized reincarnation with continuing personal histories are realistically untenable and logically repugnant. However, a real physical basis for what we might term “stochastic immortality” *of mere awareness of being and the concept of self* appears to exist in the nature of consciousness. This possibility resides specifically in the initialization of the “subjective direction” of consciousness, a phenomenon also known as one’s first-person view.

It would be unseemly to make much ado over a conjecture only claimed to be workable. The hypothesis

we will defend is totally compatible with physical reality, but it cannot be proven to operate in physical reality. It is nontestable and therefore cannot hold up its head in scientific circles. However, if it is physically possible, then just the chance that one's subjective point of view may exist again for *entirely* materialistic reasons is a frankly comforting thought. Perhaps secularists and atheists are entitled to their own Santa Claus, as long as Santa Claus is spelled p-r-o-b-a-b-i-l-i-t-y and he sits in a naturalistic sleigh pulled by eight pragmatic reindeer. The physical possibility of a probabilistically based immortality of "congruent" first-person views will receive a closely reined, but thorough investigation.

Our complete effort then comprises not one but two formidable themes: What deterministic and probabilistic processes put us here, and—in passing—is it possible they can do it again? Interestingly, pursuit of these questions vouchsafes our entrance into a small but elite company. Schopenhauer observes: "...The lower a man is in an intellectual respect, the less puzzling and mysterious existence itself is to him; on the contrary, everything, how it is and that it is, seems to him a matter of course..."<sup>12</sup> Or, as Tolstoy noted more tersely (and more humorously): Not everyone understands the problem.<sup>13</sup>

During our investigation of these questions, consciousness, the self-aware "I" of the physical brain, will be examined iteratively, each time with increasing prudence and not infrequently under a different paradigm. In the next chapter, we will take our first close look at consciousness and arrive at a working definition of what it is. We will examine its generic and its individual beginnings, and conclude with a look at the popular "origin view" of why "you" are "you". In chapter 3, we will begin with an overview of genes and then conclude precisely what genetic complements have to do, if anything, with forcing a particular point of view upon the "I" of the mind. Next, we will look at the relationship of the nonphysical "I" to the physical brain and the philosophical theories that attempt to explain that relationship. In chapter 5 we will look at personal identity through a

series of classical and not-so-classical thought experiments. In the same chapter, we will look at how a first-person view initializes in a new brain during the first two years of life and how this subjective view subsequently wakes up each morning in a mature brain. In chapter 6 we will investigate the constraints necessary to remain an “I” once we discover we are one. Chapters 7 and 8 contain the nucleus of our probabilistic argument. There is some effort to be put forth, but we promise some amusing adventures along the way—and a warm feeling at the end of it all.

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