CHAPTER 3

THE ABSOLUTE

The Tetragrammaton • The name of the name of the name • The irreducible nonmetaphor • Spinoza's theory of the emotions • Fiat money • How to live in the realm of the passions

Theories aim to describe essences and must therefore deal with absolutes, the traditional province of religion, philosophy, and mathematics. The best and most accepted absolutes are the theories of inanimate matter—Newtonian mechanics, electromagnetic theory, relativity, and quantum mechanics—that require mathematics for their exposition. Indeed the development of much of mathematics has been triggered by the needs of physicists elaborating their theories. But although mathematics is the most value-free way to formulate it, a theory doesn't have to be mathematical, and it doesn't have to confine itself to the inanimate. A theory, as long as it makes no analogies, can deal with anything.

This chapter therefore deals with the idea of God, who represents the ultimate ground beneath all metaphors, the literally incomparable. In particular I present Spinoza's profound analysis of the structure of human emotions, the agonies they cause us, and their link to the nature of Being and God. Spinoza's description is absolute, not relative; it stands on its own two feet, and is a perfect and accessible emodiment of what I call a theory.

THE TETRAGRAMMATON

מוֹדֶה אֲנִי לְפָנֶיךָ, מֶלֶךְ חַי וְקַיָּם,
שֶׁהֶחֱזַרְתָּ בִּי נִשְׁמָתִי בְּחֶמְלָה, רַבָּה אֱמוּנָתֶךָ.

Modeh ani lefanecha melech chai vekayam
shehechezarta bee nishmati bechemlah—
rabah emunatechah.

At an early age I was taught to pray in Hebrew, though no one took the trouble to tell me what the prayers meant. In kindergarten we mindlessly learned to chant the *Modeh*, a children's prayer to be recited on waking that, I now understand, thanks God for restoring your soul after its disappearance during the night:

Translated it reads:

I give thanks before you, living and eternal king, that you have returned within me my soul with compassion; how abundant is your faithfulness.

Schopenhauer regarded the void as positive and life as its interim negation. Not so, according to the *Modeh*, which views each person's soul or spirit, *nishmati* in the transliteration above, as the positive substance that God returns to your zombie body each morning. *Neshamah*, the Hebrew word for "soul," is also the word for "breath."

For Schopenhauer, life ends when God asks for His money back, perhaps to recapitalize someone else. As long as He doesn't come knocking at the door to repossess it, life continues. For the *Modeh*, in contrast, sleep is soulless and life doesn't continue unless God acts to reinstill it each morning.

Who is this Jewish God of action, and what are His qualities? Note that nowhere in the short *Modeh* does the Hebrew word for God actually appear. The prayer refers to Him only metaphorically, as the living and eternal king.

But God does have a name, and His name has a name too. The

Tetragrammaton[1] is the formidable and fancy *name of the name* of God. Glorious with gravitas, the Tetragrammaton is the majestic way of referring indirectly to God's name as it appears in the Bible, as a sequence of four Hebrew consonants, יהוה, read from the right to the left.[2] Sequentially transliterated, the four consonants correspond approximately to the English letters YHVH, as follows: יהוה HVHY. The first letter, *Y* in English, corresponds to the Hebrew letter yod, י. Written left to right, as they would be in English, the letters form the word YHVH, pronounced *Yahweh*. A single name, with no patronymic, as in Prince and Madonna, is grand. A single name with its own name is even grander. YHVH is a bit like HRM, a Triagrammaton for the king or queen of England.

If you are familiar with Hebrew you will recognize the sense of awe that accompanies a glimpse of the Hebrew word יהוה. It is the letters alone that produce the awe, not their pronunciation, as I will shortly explain. To approximate their aura, I write the English letters of God's name in white on black: YHVH.

Throughout the 12 years in school in which I learned to read and speak Hebrew and to recite prayers by heart, I saw the word יהוה printed innumerable times in Bibles and prayer books. Yet I never once heard the word pronounced *Yahweh*. Everyone *I* knew pronounced YHVH as though it were the entirely different Hebrew word אדני /ADNY, pronounced *Adonai*, as though the letters YHVH were in reality the letters ADNY. The words ADNY and YHVH barely resemble each other. It was as though I was taught to say "HRM" whenever I saw the word "Elizabeth."

I have written the letters ADNY in a workmanlike sans serif typeface to contrast their mundanity with the extraordinariness of YHVH. There is nothing fancy or glorious about the word ADNY. It's simply the possessive plural of *Adon*, the Hebrew word for "lord," or "master," and is therefore roughly equivalent to the respectful "Milord." In the British-style high school I attended we addressed

our English teacher as "Sir" and our Hebrew teacher as "Adon," equivalent terms that acknowledge authority but lack awe.

ADNY is one of God's many aliases in the book of Genesis. The Bible sometimes also refers to God as ADNY ADNM, pronounced *Adonai Adonim*, a vocative "My Lords of Lords," more wondrous than *Adonai* alone by virtue of its recursion. Surprisingly, God's aliases in the Bible precede the appearance of His real name. God as *Yahweh* is absent throughout the first chapter of Genesis, whose first line reads "In the beginning *Elohim* created the skies and the earth." *Elohim* is the plural of *El*, a generic god, and means simply gods in the sense of a royal pluralized divinity.

The Tetragrammaton YHVH makes its first appearance in Genesis 2:4, only after God has perfected the Creation and can finally rest:[3] "These are the generations of the heavens and of the earth when they were created, in the day that YHVH *Elohim* made earth and the skies." Even here He carries a double moniker.

To this day when I see the letters YHVH I hear in my head the word ADNY. So deep and thorough is this conflation that not until I was far into adulthood did I realize that the letters YHVH did not literally spell ADNY. I looked at the Hebrew letters for YHVH and my mouth and mind said ADNY. My classmates too, I discovered, suffered from the same confusion, even to this day. We saw one word and uttered the other. No one ever mentioned that the actual pronunciation of YHVH was *not* ADNY.[4]

No observant Jew ever utters the name *Yahweh*. By custom rather than commandment, God's name is not pronounced aloud or even under one's breath. Being brought up customarily, my friends and I were never told not to say His name. We didn't know He had one.

THE NAME OF THE NAME OF THE NAME

A few of my more observant school friends went a step further: not only did they avoid uttering the name YHVH, but they also avoided uttering the alias ADNY. Instead they pronounced *Adonai* as *AdoShem*. The reason was as follows. The י/yod, the last (leftmost) Hebrew letter of אדני, is also the first (rightmost) letter of the word יהוה. Thus the alias ADNY incorporates one letter of God's true name, too close for comfort. Therefore some Jews replace the י/yod in ADNY with the entire Hebrew word *Shem* (meaning "name"), pronouncing ADNY as *ADoShem*. It's as though the normal honorific HRM used to refer to the queen becomes uncomfortably familiar when it refers to Queen Mary, because of the shared letter *M*, so that, just for Queen Mary, the alias HRM is replaced by HRName.

Orthodox Jews carry this to extremes and avoid pronouncing anything reminiscent of the Tetragrammaton. Thus even the word *Elohim* is pronounced *Elokim*, so that the shared *H* of YHVH and *EloHim* is replaced by the cognate but symbolically insignificant *K*.

Many go numerologically further. In ancient Hebrew one uses the letters of the alphabet to represent numbers. The tenth letter of the alphabet is י/*Y* and the fifth letter is ה/*H*, so that the number 15 is represented in base 10 by the letters *YH*. But *Y* and *H* are the first two letters of God's name, and so no one writes *YH* for 15. Instead 15 is written as *TV*, because the numbers corresponding to the ninth letter, *T*, and the sixth letter, *V*, also add to 15 but don't seem to reference God. (It seems to me that replacing *YH* with *TV* makes the combination TV even more reminiscent of God, the unignorable avoidance indicating a presence. One could go one step further and replace 9 + 6 with 8 + 7, but that would cause the same problem.) Similarly the number 16, 10 + 6, which should be written in base 10 as the Hebrew letters *YV*, shares two letters with YHVH and is there-

fore written *TZ*, 9 + 7. Some don't know where to stop, and write G-d rather than God, as though "God" were God's name. It isn't.

THE IRREDUCIBLE NONMETAPHOR

Moses, tending the flock of his father-in-law, Jethro, near the mountain of Horeb, saw a burning bush whose flame could not consume it. God, from within the bush, declared Himself to Moses and commanded him to deliver the Israelites from Pharaoh.

"Who shall I tell them sent me?" asks Moses.

"Tell them: I am that which I am," answers YHVH.

Yahweh is the antimetaphor, the ultimate ground, for whom no analogies are possible and no similes adequate. He is what He is. *Yahweh* is the name of something that isn't a model of reality, but reality itself.

The excommunicated Jewish philosopher Baruch Spinoza, who was interested in the nature of reality, defined wonder as "the conception of anything, wherein the mind comes to a stand, because the particular concept in question has no connection with other concepts." *Yahweh* has no connection with other concepts; He has no qualities; He is *beyond* intelligence and beauty; He is *beyond* good and evil; He cannot be categorized. He is precisely what He is, and He tells us so.

When He says, "I am that which I am," sometimes translated as "I will be that which I will be," God is riffing on His true name: the Hebrew for "I will be" is אהיה/*EHYH*. Its root is *HVH*, the last three letters of God's name. *HVH* means "being" and is also the name of the present tense in Hebrew grammar. Presence and Being necessarily precede everything. YHVH is the irreducible substance out of which everything else is constructed. "*Yah Weh*" is the sound identical with the object, an inhalation *Yah* followed by an exhalation *Weh*, the sound

of panting while running, the vocalization of a woman in bed. You can't ask "Why?" about YHVH; you can only attest to His existence.

Like God, the electron is precisely what it is and equally wondrous. About it too you can ask only "What?" not "Why?" For the electron, the wonder is the Dirac wave function Ψ, the so-called four-component relativistic spinor that satisfies the Dirac equation. The spinor ψ is the alter ego of the physical electron, the idea that corresponds to its material states. Two of its four components describe the state of its internal magnetization (north or south), and the remaining two describe the positron—the electron's antiparticle—and its two magnetizations.

A THEORY OF THE EMOTIONS

I first began to read Schopenhauer in 1979. I had been willfully ambitious with regard to physics and was just beginning to realize that my passion for it was depriving me of air. Still ambitious, but aware now of the repercussions, I found solace in Schopenhauer's description of the miseries the Will inflicts on all of us. That led me to Spinoza's *Ethics*, published posthumously in 1677, and his analysis of human behavior.

In part 3 of *Ethics*, entitled "Of the Affects," Spinoza tried to do for human emotions what Euclid did for geometry. In the rest of this chapter I want to cast light on Spinoza's theory in order, ultimately, to contrast theories with models. Because all of us experience feelings, exploring a theory of them seems like a good place to start.

Euclid used primitives, ingredients everyone is familiar with, as his raw material. Geometric primitives include points and lines, which Euclid defined as follows:

> A point is that which has no part.
> A line is a breadthless length.

The extremities of lines are points.

A straight line lies equally with respect to the points on itself.

The definitions are ingenious but obscure. If you didn't know what points and lines were by having had them shown to you, these definitions wouldn't help you envision them. We are embodied and begin with our senses.

To his primitives Euclid added axioms, the apparently self-evident logical principles that no one would argue with, stating, for example, "If equals are added to equals, then the wholes are equal." Since 3 = 3 and 2 = 2, then 3 + 2 = 3 + 2. This is indisputable, but not all axioms are as unquestionable as they appear.

Finally, he proceeded to theorems, the interesting and often unexpected deductions he could prove by applying the axioms to the primitives to construct a chain of reasoning. The most famous is Pythagoras's theorem that relates triangles to squares: the sum of the squares of the two perpendicular sides of a right-angled triangle is equal to the square of its hypotenuse. This method, beginning with primitives and proving propositions by deduction, is called *axiomatization* and has become the classic method of mathematics.

In geometry there are no causes, only inviolable relationships. Spinoza believed that the same was true of human beings. He approached what he called "the affects"—essentially all human emotions—the way Euclid approached triangles and squares, aiming to understand their interrelations by means of principles, logic, and deduction. His larger aim, culminating in part 5 of *Ethics*, entitled "Of the Power of the Intellect, or On Human Freedom," was to find a method to escape the violent sway of emotions on human beings caught in their grip.

Ethics is more a worldview than a tightly reasoned argument. Nevertheless I call what Spinoza created a theory. He makes no analogies; his primitives live in their own space; he doesn't attempt to explain how humans behave by comparing them to some other sys-

tem. He employs observation, experience, introspection, and intuition to those human experiences familiar to everyone.

The Primitive Sensations

Spinoza's primitives are *pain, pleasure,* and *desire.* Every adult with a human body knows by direct experience what these sensations are, though Spinoza, following Euclid, attempts to define them. He begins with desire, which he terms man's essence, all of "man's strivings, impulses, appetites and volitions . . . which are not infrequently so opposed to one another that the man is pulled in different directions and knows not where to turn." "Desire," he summarizes, "is appetite conscious of itself." The consequences of desire are pleasure and pain:

> Pleasure is the transition of a man from a less to a greater perfection.
> Pain is the transition of a man from a greater to a less perfection.

Note that perfection is *not* pleasure and imperfection is *not* pain. Pleasure and pain are associated with transitions *between* states, not the states themselves. These seventeenth-century insights are in agreement with recent studies in psychology that find that people who obtain something they always wanted quickly become accustomed to their new possession or status and are soon no longer satisfied with it.

For now, assume that we know what we mean by *pleasure, pain,* and *desire.* They lie beneath all the other emotions and can conveniently be thought of as closer to organic conditions than psychic ones. That pain is fundamental is borne out by the fact that doctors test comatose patients for signs of life by looking for a response to pain. It is, of course, much more difficult to cause pleasure than to cause pain. Nevertheless, for Spinoza, pain and pleasure bear equal

weight and can exist independently of each other; the absence of one doesn't indicate the presence of the other.

Spinoza distinguishes precisely between local and global sensations. "Pleasure and pain," he writes, "are ascribed to a man when one part of him is affected more than the rest, whereas *cheerfulness* and *melancholy* are ascribed to him when all are equally affected." *Suffering*, therefore, is localized pain, while *melancholy* is globalized pain.

His definitions of *good* and *bad* are pragmatic: "By good I here mean every kind of pleasure . . . especially that which satisfies our longings, whatsoever they may be. By evil, I mean every kind of pain, especially that which frustrates our longings." Good brings pleasure, and bad brings pain. Moral good is identical to sensual good; it's good to feel good and it's bad to feel bad.

The Derivative Emotions

Just as the value of a stock option depends on the underlying stock price, so the more complex human emotions depend, via one or more degrees of separation, on the three underlying primitive sensations. Spinoza's entire theory resembles the structure of contingent claims in modern finance, whose Efficient Market Model I describe in chapter 5. The following are paraphrases of some of Spinoza's definitions.

Love is pleasure associated with an external object. It is an emotion one step removed from simple pleasure.

Hate is pain associated with an external object.

Hope is the expectation of future pleasure when the outcome is uncertain and doubtful.

Joy is the pleasure we experience when that doubtful expectation is fulfilled.

Disappointment is the pain opposed to joy.

Pity is pain arising from another's hurt. Expanding on this, he writes,

> "Pity is pain accompanied by the idea of evil, which has befallen someone else whom we conceive to be like ourselves."

Pity involves two evils: the pain we experience as well as someone else's pain. Correspondingly there should be an emotion involving two goods: our own pleasure and someone else's. "What term we can use for pleasure arising from another's gain, I know not," Spinoza writes, adding that there are many derivative emotions that don't yet have names.[5]

Like convertible bonds, modern-day corporate securities that have both debt and equity characteristics, there are emotions that depend on two underlying primitives. Thus *envy* is pain at another's pleasure. Conversely, though the concept appeared long after Spinoza's death, *Schadenfreude* is pleasure at another's pain.

Cruelty links all three primitives: Spinoza defines it as the desire to inflict pain on someone we love or pity.[6] Financially speaking, cruelty is analogous to a convertible bond whose debt and equity depend on three economic underliers: the stock price, the level of interest rates, and the credit worthiness of the company's debt.[7]

I call Spinoza's analysis a theory because it is an attempt to describe the nature of emotions rather than compare emotions to something else. You can get a feel for the scope and thoughtfulness of his categorization by looking at a few more of his many subtle decipherings:

> We will call the love towards him who confers a benefit on another, Approval; and the hatred towards him who injures another, we will call Indignation.

> Honour is pleasure accompanied by the idea of some action of our own, which we believe to be praised by others.

> Regret is the desire or appetite to possess something, kept alive by the remembrance of the said thing, and at the same time constrained by the remembrance of other things which exclude the existence of it.
>
> I shall call him intrepid who disdains an evil I usually fear.
>
> Repentance is sadness accompanied by the idea of oneself as cause, and self-esteem is joy accompanied by the idea of oneself as cause. Because men believe themselves free, these affects are very violent.

Three Meta-affects

To span the complexity of human emotions, Spinoza adds to his theory three additional primitives that are closer to meta-affects than affects themselves. The first is *vacillation*, a state of oscillation between two emotions. Thus *jealousy*, he explains, is the vacillation between hate and envy toward an object of love in the presence of a rival. Jealousy depends on envy, and envy, as we have seen, depends on pleasure and pain. If we follow the links far enough, every affect terminates at pain, pleasure, or desire.

The second meta-affect is *wonder*. Wonder is what we experience when confronted by something that fills the mind to the exclusion of all else, something unrelated to anything else we know. Wonder is what Moses experienced at the burning bush, in the presence of Yahweh, who is what He is. Spinoza expands on wonder:

> But if it be excited by an object of fear, it is called Consternation, because wonder at an evil keeps a man so engrossed in the simple contemplation thereof, that he has no power to think of anything else whereby he might avoid the evil. . . .
>
> Otherwise, if a man's anger, envy, &c., be what we wonder at, the emotion is called Horror. . . .

> If it be the prudence, industry . . . of a man we love, that we wonder at, our love will on this account be the greater, and when joined to wonder or veneration is called Devotion.

I will illustrate wonder in chapter 4, when I recount the miraculous development of quantum electrodynamics, a theory that exemplifies better than anything else the triumph of the mental over the physical.

Spinoza's final meta-affect is *contempt,* the feeling we have when we contemplate something that most forcibly reminds us of the qualities it lacks, their absence a palpable presence. He links contempt to *derision* and *scorn*:

> As devotion springs from wonder at a thing which we love, so does Derision spring from contempt of a thing which we hate or fear, and Scorn from contempt of folly, as veneration from wonder at prudence. Lastly, we can conceive the emotions of love, hope, honour, &c., in association with contempt, and can thence deduce other emotions, which are not distinguished one from another by any recognized name.

Wonder, vacillation, and contempt lie not so much beneath all affects as to the side of them.

I have created a map of Spinoza's verbal definitions in Figure 3.1. At the center of the diagram is the primitive *pain.* The solid black arrows emanating from *pain* lead to its derivative affects. To the lower right is *pleasure,* whose dashed arrows lead to pleasure-related emotions. Thus *pride* is the pleasure derived from thinking too highly of oneself. In the upper right is *desire,* the driver of all action, whose heavy black arrows of cupidity point to its dependents. Thus *emulation* is "the desire of something engendered in us by our conception that others have the same desire," a type of inauthenticity in that the cause of our desire is someone else's desire. Mass-market advertising depends on it.

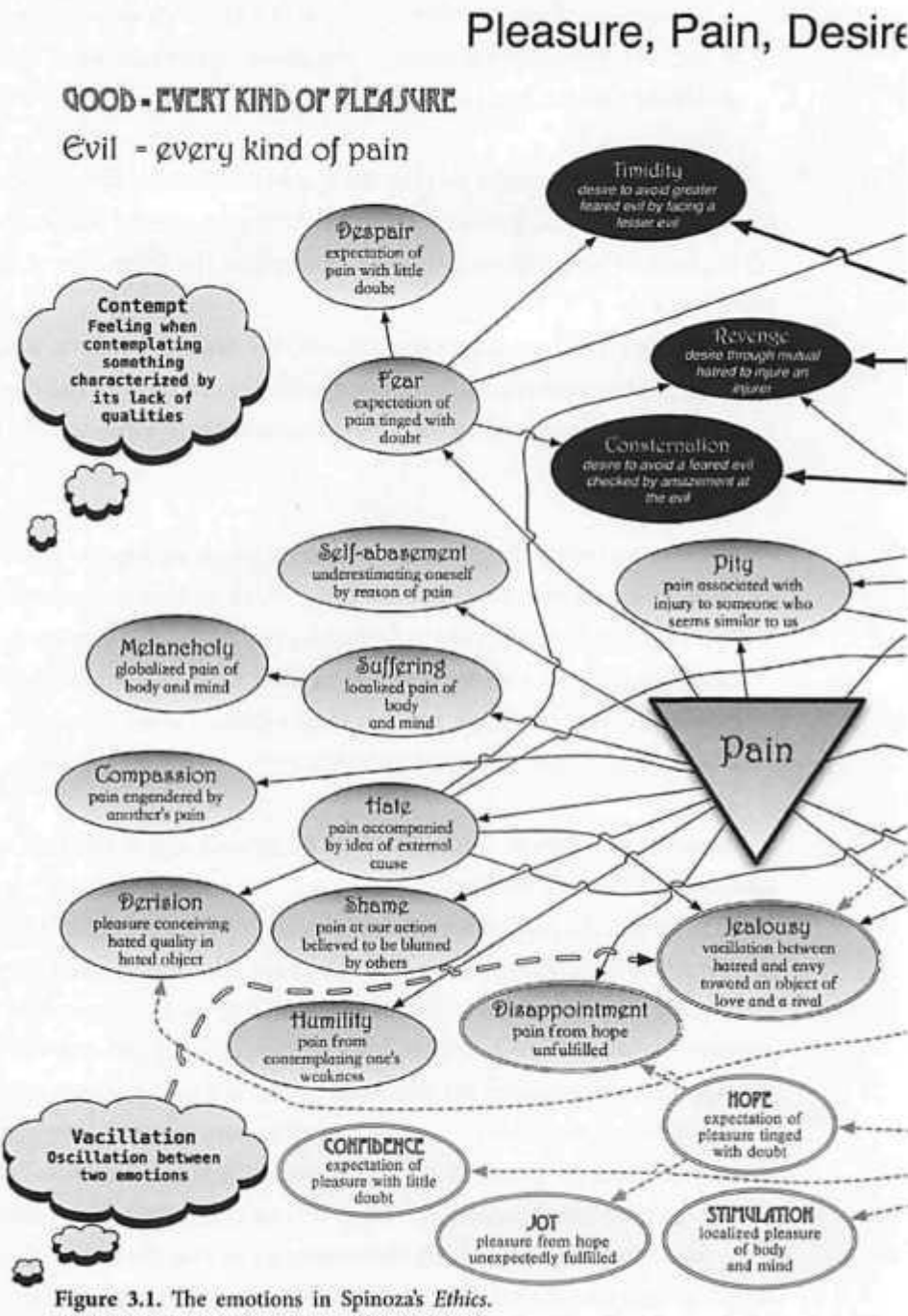

Figure 3.1. The emotions in Spinoza's *Ethics*. The diagram links familiar emotions to *Pain*, *Pleasure*, and *Desire*.


A Map of the Emotions
Wonder
Feeling when contemplating something unconnected to everything else
Courtesy
desire to act so as to please people and refrain from displeasing them
Regret
desire to possess something tinged by awareness of other things which prevented the possession
Cruelty
desire to injure someone we pity or love
Desire
Emulation
desire engendered by another's desire
Injurer
one who brings pain
Gratitude
love for and desire to benefit a loving benefactor
Indignation
hatred towards an injurer
Benevolence
desire to benefit one whom we pity
Envy
pain at another's pleasure
LOVE
pleasure accompanied by idea of external cause
APPROVAL
love toward a benefactor
Schadenfreude
pleasure at another's pain
BENEFACTOR
one who brings pleasure
DEVOTION
love toward one we admire
SYMPATHY
pleasure/pain from another's pleasure/pain
PLEASURE
SELF-APPROVAL
pleasure from contemplating one's strength
MERRIMENT
globalized pleasure of body and mind
HONOR
pleasure at our action believed to be praised by others
PRIDE
pleasure from thinking too highly of oneself
DISDAIN
pleasure from thinking too little of someone

In the map you can examine the link between the hybrid emotions and the primitives. *Courtesy* is the desire to please people and to refrain from displeasing them, linked to both *pleasure* and *desire*. *Revenge* is the *desire* through mutual hatred to bring *pain* on someone who has brought us *pain*. *Regret*, the saddest of emotions, is the desire to possess something, tinged with the recollection of a past that made it impossible. Who hasn't known it?

FIAT MONEY

I have used Spinoza's framework to look at the idea of money, a topic fraught with a variety of emotions.

Once upon a time money was gold coinage; later it was paper representing a claim on gold deposits; nowadays it's fiat money, a medium of exchange and value that is purely conventional, freely created, and anchored by nothing except authority. "Money," wrote Schopenhauer, looking a little deeper, "is human happiness in the abstract; he then who is no longer capable of enjoying human happiness in the concrete devotes himself utterly to money."

But genuine money is more than crystallized pleasure. It doesn't come easy, except to those who print it. "By the sweat of your brow will you eat bread," said God to Adam and Eve after the Fall. Genuine money is crystallized work, and work is pain in the service of the desire to survive. Genuine money is also security, the expectation of future pleasure and freedom from pain. It combines in one object all three of Spinoza's primitives, as illustrated in Figure 3.2.

Fiat money, unlike genuine money, incorporates only pleasure and desire. Without work, it lacks the connection to pain that gives it value and respect. By virtue of this lack, it induces contempt.[8]

Figure 3.2. Genuine money in Spinoza's theory

LOVE AND DESPERATION

It seems to me that love can be more complex than Spinoza's simple pleasure associated with an external object. Sometimes love can be the desperate pleasure of giving in to desire and abandoning control. Madame Bovary, Humbert Humbert, Charles Swann, Anna Karenina—for all of them love was mingled pain and pleasure. This kind of love is as much the longing for the cessation of the pain of longing as it is the longing for the commencement of pleasure. It vacillates between desire, hope, and despair. It is fibrillation, and the love of it is a death wish.

But people seem to need the desperate side of love. The citizens of Aldous Huxley's *Brave New World* had easy access to unemotional

physiological lovemaking. As a result every few years they had to undergo a VPS (Violent Passion Surrogate). The synthetic passions of a periodic biochemical love affair were necessary to keep their bodies functioning smoothly.

HOW TO LIVE IN THE REALM OF THE PASSIONS

Spinoza spent most of his life working on his *Ethics*. His theorizing was aimed at practice; he intended it to provide a cure for the passions and a practical blueprint for living. The word *passion* originates from the Latin word for suffering, as in the Passion of Christ. Passion sweeps across us from the outside, destroying our capacity to reason. Spinoza's cure for the bondage of the passions is to understand ourselves both from within and from without.[9] The result will be action based on understanding rather than passion driven by emotions. Understanding leads to autonomous action, the capacity to be an underlier rather than a derivative.

Parts of *Ethics* are so cryptic as to seem impenetrable. But, as Gilles Deleuze writes:

> There is a double reading of Spinoza; on the one hand, a systematic reading in pursuit of the general idea and the unity of the parts, but on the other hand and at the same time, the affective reading, without an idea of the whole, where one is carried along or set down, put in motion or at rest, shaken or calmed according to the velocity of this or that part.[10]

What follows is *my* affective reading, riven with complications, discrepancies, and contradictions, which I hope will seem reconciled by chapter's end.

THE FOUR QUESTIONS

1. Why Do We Treat Ourselves Differently from Others?

I tend to treat other people as though they are responsible for their deeds and misdeeds. When they do something that hurts me, I regard them as free agents who could have done otherwise. But what about the harmful things I do? In my case I often feel as though I'm in the grip of tidal pulls that make me do things I wish I hadn't done. I tend to excuse myself with the understanding that I can't help it.

Observing others from outside, I hold them responsible. Observing myself from inside, I can always think of good excuses for my behavior. In their case it's Will; in my case I call it circumstance. Why one explanation for their behavior, another for mine?

2. How Can We Control Ourselves?

We are filled with desires whose origins we don't understand. When we act on them, we imagine we are behaving freely. But as Spinoza wrote:

> Men are conscious of their own desire, but ignorant of the causes whereby that desire has been determined.
>
> But experience teaches all too plainly that men have nothing less in their power than their tongue, and can do nothing less than moderate their appetites. . . . So the madman, the chatterbox, the child, and a great many people of this kind believe they speak from a free decision of the mind, when really they cannot contain their impulse to speak.

Our apparent freedom is only the freedom to do what we want. Our volition drives us. What drives our volition? "You can do what you want, but you cannot want what you want," wrote Schopenhauer on the same topic.

Madame Bovary, Anna Karenina, Humbert Humbert—couldn't they have stopped themselves?

3. What Is the World Made Of?

Since Descartes or even before, we have regarded some parts of the world as matter and other parts as mind. Why are there two apparently distinct substances? What, if any, is the connection between them?

4. Why Does the Material World Have Laws While the Human World Has Explanations?

Matter satisfies Newton's laws, Maxwell's equations, the Dirac theory of the electron. Matter has no freedom of action. You can't ask the falling ball "Why?" The human world, on the other hand, has explanations for its behavior:

> Why did you hang up on me?
> *Because you insulted me. Why can't you at least be civil?*
> Because you enjoy provoking me. Why do you take everything to extremes?
> *Because . . .*

Such explanations can be endlessly recursive, searching hopelessly for a first cause.

SPINOZA'S ANSWERS

Spinoza divided knowledge of the world into three categories: adequate knowledge, inadequate knowledge, and intuition.

ADEQUATE KNOWLEDGE

When my son was a little less than two years old, I used to play a game he liked, bouncing him up and down on my knee while chanting a nursery rhyme:

Half a pound of tuppeny rice
Half a pound of treacle
Mix them up and make them nice
Pop goes the weasel!

On "Pop goes the weasel!" I would sharply drop my knee all the way down and let him bump to the floor. He always chortled. He liked the game so much that one day he asked me to repeat it over and over again, laughing at each bump except the final one, when he turned to me in surprise and asked, "Why it's not funny anymore?" From outside himself, he understood something within himself. He had discovered that something repeated over and over again becomes progressively less funny until it's not funny at all. This is an example of *adequate knowledge*.

Adequate knowledge is an apprehension that is self-contained, that leans on nothing else. The Dirac equation, the theory of evolution, Freud: these are adequate explanations. There is no need to ask "Why?" when something is adequately explained. The explanation is sufficient; the theory is the fact. Dirac discovered that electrons sat-

isfy the Dirac equation. My son discovered that funniness fades with repetition. That's how God's world works.

Adequate knowledge is global: it transcends a single individual or a singular occurrence. It is always-true knowledge rather than ad hoc knowledge. Adequate knowledge is a comprehension of relationships rather than causes. In Spinoza's words:

> I call that cause adequate whose effect can be clearly and distinctly perceived through it. But I call it partial, or inadequate, if its effect cannot be understood through it alone.

Theories are adequate knowledge. Models are inadequate.

INADEQUATE KNOWLEDGE

When we truly understand an occurrence, we have *adequate* knowledge of it; when we don't, when we are unable to explain an occurrence in generality, we have *inadequate* knowledge. For example:

> The financial crisis of 2007–2008 was caused by the global savings glut.
> *What caused that?*
> The Asian currency crisis of 1997–1998: Asian countries came out of that wanting to run net surpluses rather than net deficits.
> *But what caused that?*
> . . .

Each explanation, reasonable though it sounds, provokes a request for another. Each explanation is inadequate and local because it displaces the ultimate cause one degree further from the final effect.

Extending the Scope of Adequate Knowledge

As time passes we understand more things adequately. To take an example given by Stuart Hampshire in his book on Spinoza, humans may once have thought that lightning indicated that the gods must be angry; now we know that lightning is caused by a difference in electric potential, as described by Maxwell's equations. In similar fashion, while people used to cite "evil" as the mysterious source of criminal behavior, we now often blame it on "parental neglect."[11] In this way we progress from inadequate understanding in terms of the arbitrary volition of the gods to understanding via more general laws.

Similarly, claims Spinoza, human volition is an inadequate explanation for human actions, and it must be replaced by a deeper understanding via laws of human behavior: "To conceive a thing as free can be nothing else than to conceive it simply, while we are in ignorance of the cause whereby it has been determined to action." Saying we have acted freely is tantamount to saying we don't understand why we acted. When we follow our passions "freely" we are in fact behaving deterministically, according to the well-known laws of physics and the poorly known laws of mind. We understand the laws of matter well, and know that it is futile to complain about the behavior of electrons. Man's behavior is also subject to laws. The better we understand them, the more tolerant we will be. The Dirac equation is a more profound explanation of reality than "I did this because you did that."

Hegel wrote that "the history of the world is none other than the progress of the consciousness of freedom." Spinoza's claim is that the history of the world is none other than the progress of the consciousness of our lack of freedom.

If there are laws of the universe governing human behavior, how can we learn them?

From the Particular to the General, from Reason to Intuition

According to Spinoza, there are a variety of ways to attain understanding of the world:

- Via particulars
- Via generalities
- Via intuition

Particulars are diverse and confusing, but they provide the basis for understanding everything else: "The more we understand particular things, the more do we understand God,"[12] that is, Nature, in its entirety. Applying reason to particulars, we obtain adequate ideas about the regularities common to all things. A step beyond that, according to Spinoza, is the deepest kind of knowledge:

> The highest endeavor of the mind, and the highest virtue is to understand things by the intuitive kind of knowledge.

INTUITION

It takes intuition to discover theories. Intuition may sound casual, but it emerges only from intimate knowledge acquired after careful observation and painstaking effort. Before you can move one level higher in the pyramid of understanding, before you can attain intuition in some domain, you have to struggle with the particulars of that domain until knowledge of its details is second nature to you.

A cyclist develops physical intuition about the correct angle to tilt body and bicycle to a curved track so as to maximize stability; the builder of a velodrome can calculate the correct banking angle to ensure the cyclist remains in equilibrium; together biker and builder

combine visceral and theoretical knowledge. Intuition is learning to ride a bicycle without thinking. You have to incorporate the laws of the world into your body.

Feynman's insight into the parallel evolution of quantum mechanical paths, Dirac's grasp of the essence of electrons, Newton's understanding of mass and its motion—all are instances of the external world joining with the internal. Intuition is a merging of the understander with the understood. In the words of the Upanishads, *Tat tvam asi,* Thou art that.

Perfection via Intuition

"Pleasure is the transition of a man from a less to a greater perfection," wrote Spinoza. No one achieved greater advances in our levels of perfection than Isaac Newton, born in 1642, only ten years later than Spinoza. John Maynard Keynes wrote a speech about Newton for the tercentenary of his birth, celebrated belatedly by the Royal Society in 1946, after World War II. By then Keynes had died, and his brother Geoffrey delivered the speech. It was based on Keynes's reading of a box of Newton's notes, many of them cryptic and mystical, concerning his attempts to understand not just the physical but the entire world.

> Newton came to be thought of as the first and greatest of the modern age of scientists, a rationalist, one who taught us to think on the lines of cold and untinctured reason. I do not see him in this light. Newton was not the first of the age of reason. He was the last of the magicians, the last of the Babylonians and Sumerians, the last great mind which looked out on the visible and intellectual world with the same eyes as those who began to build our intellectual inheritance rather less than 10,000 years ago. . . .
>
> I believe that the clue to his mind is to be found in his unusual pow-

ers of continuous concentrated introspection. . . . His peculiar gift was the power of holding continuously in his mind a purely mental problem until he had seen straight through it. I fancy his pre-eminence is due to his muscles of intuition being the strongest and most enduring with which a man has ever been gifted. Anyone who has ever attempted pure scientific or philosophical thought knows how one can hold a problem momentarily in one's mind and apply all one's powers of concentration to piercing through it, and how it will dissolve and escape and you find that what you are surveying is a blank. I believe that Newton could hold a problem in his mind for hours and days and weeks until it surrendered to him its secret. Then being a supreme mathematical technician he could dress it up, how you will, for purposes of exposition, but it was his intuition which was pre-eminently extraordinary—"so happy in his conjectures," said De Morgan, "as to seem to know more than he could possibly have any means of proving."

There is the story of how he informed Halley of one of his most fundamental discoveries of planetary motion. "Yes," replied Halley, "but how do you know that? Have you proved it?" Newton was taken aback—"Why, I've known it for years," he replied. "If you'll give me a few days, I'll certainly find you a proof of it"—as in due course he did. . . .

Certainly there can be no doubt that the peculiar geometrical form in which the exposition of the *Principia* is dressed up bears no resemblance at all to the mental processes by which Newton actually arrived at his conclusions.

His experiments were always, I suspect, a means, not of discovery, but always of verifying what he knew already.

Why do I call him a magician? Because he looked on the whole universe and all that is in it as a riddle, as a secret which could be read by applying pure thought to certain evidence, certain mystic clues which God had laid about the world to allow a sort of philosopher's treasure hunt to the esoteric brotherhood. He believed that these clues were to be found partly in the evidence of the heavens and in the con-

stitution of elements (and that is what gives the false suggestion of his being an experimental natural philosopher), but also partly in certain papers and traditions handed down by the brethren in an unbroken chain back to the original cryptic revelation in Babylonia. He regarded the universe as a cryptogram set by the Almighty—just as he himself wrapt the discovery of the calculus in a cryptogram when he communicated with Leibniz. By pure thought, by concentration of mind, the riddle, he believed, would be revealed to the initiate.

He did read the riddle of the heavens. And he believed that by the same powers of his introspective imagination he would read the riddle of the Godhead, the riddle of past and future events divinely foreordained, the riddle of the elements and their constitution from an original undifferentiated first matter, the riddle of health and of immortality. All would be revealed to him if only he could persevere to the end, uninterrupted, by himself, no one coming into the room, reading, copying, testing—all by himself, no interruption for God's sake, no disclosure, no discordant breakings in or criticism, with fear and shrinking as he assailed these half-ordained, half-forbidden things, creeping back into the bosom of the Godhead as into his mother's womb. "Voyaging through strange seas of thought alone," not as Charles Lamb "a fellow who believed nothing unless it was as clear as the three sides of a triangle."

Keynes saw Newton's explanations as merely a means of verifying what he had already discerned more directly. This was also James Clerk Maxwell's impression of André-Marie Ampère, who in 1820 discovered the connection between electricity and magnetism. Referring to him as the "Newton of electricity," Maxwell wrote:

> We can scarcely believe that Ampère really discovered the law of action by means of the experiments which he describes. We are led to suspect, what, indeed, he tells us himself, that he discovered the law

by some process which he has not shown us, and that when he had afterwards built up a perfect demonstration, he removed all traces of the scaffolding by which he had built it.

For Spinoza, God's understanding of the world is like that of the cyclist banking on a curve, perfectly stable without his having to think, in unison with the road. God's is the ultimate intuition, so encompassing that there is no boundary between the creator and the created.

PERFECTION

Pleasure is the transition to a greater perfection, but what is perfection itself? Early in *Ethics*, Spinoza defines it: "Reality and perfection I use as synonymous terms."

How can reality be perfection? Our world is not a Panglossian best of all possible worlds. Nevertheless, I observe that our language reveals a sense in which the real and the perfect are synonymous:

Perfect means completed: The perfect tense in grammar refers to actions that have been completed.

Completed means successfully realized: Only that which has been completed is actual and realized. (A quarterback "completes a pass.")

Therefore perfect means real: Only that which has been completed as its author intended, whose realization matches the mental model that preceded it, is perfect.

A True Theory Is Perfection

An idea, as we will shortly see, is always inseparably associated with matter; each is a side of one larger thing. Thus truth, according to Spinoza, is a harmony between an object and its idea.

An idea that corresponds with its object is a very good definition of a correct theory.

Levels of Perfection

Spinoza understood that our fundamental desire is to remain integral, to survive: "No virtue can be conceived prior to the virtue of striving to preserve oneself." Pleasure and goodness are conducive to survival, while pain and evil promote disintegration, a change of state. As Spinoza writes:

> The emotion of pain is an . . . activity of transition from a greater to a less perfection. In other words, it is an activity whereby a man's power of action is lessened or constrained.

Spinoza is not naïve about pleasure; he knows that it is not an unmitigated good, and that it is best when it is balanced. He distinguishes pleasure from stimulation (Latin *titillatio*), a pleasure that is focused more on some parts of the body than others. Localized pleasure, he writes, can exert an obsessive power "that can overcome other actions of the body, and may remain obstinately fixed therein, thus rendering it incapable of being affected in a variety of other ways: therefore it may be bad." Who could disagree?

Because stimulation accompanied by the idea of an external cause is, by his definition, a kind of love, love may be excessive too. Generalized pleasure, though, is always good:

> Mirth is pleasure, which . . . consists in all parts of the body being affected equally: that is, the body's power of activity is increased or aided in such a manner, that the several parts maintain their former proportion, therefore Mirth is always good, and cannot be excessive.

SUBSTANCE, MIND, AND MATTER

Everything we are aware of manifests itself as either matter or mind. In Spinoza's view, these manifestations are the features of only one Substance. Substance has many attributes, but we humans can perceive only two of them: a mind-quality (Thought) and a matter-quality (Extension). The word *substance* originates in the Latin *substare*, "to stand beneath." In the language of finance, substance is the ultimate underlier, and everything else is its derivative.

Mind and matter are simultaneous attributes of Substance. Mind is not an epiphenomenon of matter, nor is matter an epiphenomenon of mind. Neurophysiology doesn't explain psychology, and psychology doesn't replace neurophysiology. Both are different views of the same underlier.

Things made out of Substance obey the deterministic laws of the universe, but it's not easy to deduce those general laws when you observe only particulars. Lest you think it naïve to assume that there are laws behind everything, recall how many centuries of observing the lights in the night sky it took to discover that Newton's three laws of motion and his law of gravity could explain the motions of the planets, the stars, and objects on earth. Tycho Brahe had to map the planetary motions and Johannes Kepler had to intuit that they described mathematical ellipses, each planet sweeping out equal areas in equal times; only then could Newton step into the picture with dynamics.

With time, what more may we still discover?

Mysterious Materialism

Spinoza is a materialist, but not a naïve materialist. Since Newton we think of matter as dull, inanimate stuff that must obey laws. But Spi-

noza points out that the matter we inhabit is full of mysterious possibilities:

> However, no one has hitherto laid down the limits to the powers of the body, that is, no one has as yet been taught by experience what the body can accomplish solely by the laws of nature. . . . Nor need I call attention to the fact that many actions are observed in the lower animals, which far transcend human sagacity, and that somnambulists do many things in their sleep, which they would not venture to do when awake: these instances are enough to show, that the body can by the sole laws of its nature do many things which the mind wonders at.

The brain, after all, is part of the body too. One of the lessons of twentieth-century physics—of relativity, quantum mechanics, and cosmology—is that the more we learn about matter, the more enigmatic it seems.

There is a "mind" way of looking at things and there is also a "matter" way. In his book *I Am a Strange Loop,* Douglas Hofstadter imagines a digital computer built out of chains of dominoes constructed to divide the prime number 641 by all the numbers less than it. You begin the program by knocking over the first domino. The logic of the chains is such that if no number can divide 641 without a remainder, then the final domino in the chain will fall. The domino computer begins its computation, and the final domino falls a few seconds later. *Why did the domino fall?* Answer 1: Because the domino preceding it in the chain pushed it over. *And why did that domino fall?* Because the domino preceding it fell and pushed it over. Et cetera. But there is also Answer 2: Because 641 is a prime number. Both of these answers are simultaneously true, the first in the realm of matter, the second in the realm of mind. The dominoes don't know about primes, and primes don't know about dominoes.

Each explanation is separately valid. But the logical chains that drive each explanation—falling dominoes in the matter realm, division by primes in the mind realm—cannot be independent of each other. It makes no sense, says Spinoza, to have two different causes for the same single sequence of events. Instead, according to Spinoza, there is one unique sequence of events, and there is one unique causal chain that accounts for both explanations.

Stuart Hampshire sharpens this argument and thereby makes it even harder to accept. Suppose you become embarrassed and turn red. You might say, "I blushed because I became embarrassed." A strict Spinozist would not claim that embarrassment was the cause of blushing, because embarrassment is the *mental description* of the *physical* blush, a crisscrossing of causal chains. We should not jump from one style of explanation to another. We must explain physical things by physics and psychological things by psychology. It is of course very difficult to give up the notion of psychic causes for physical states. But, as Spinoza says, no one knows by what means the mind moves the body.

Ethics argues that every manifestation of Substance must appear as both Thought and Extension. (In Hebrew, the word for *word* is the same as the word for *thing*.) Mind and the emotions, like matter, are not extraordinary; they lie within, not outside, Nature and its laws. From this point of view, the body and the mind are reciprocal: "The body is the object of the mind. The object of the idea constituting the human mind is the body."

It is tempting to assume that there is an idea corresponding to everything, and hence, recursively, an idea of an idea too. To which Spinoza preemptively answers, "This idea of the mind is united to the mind in the same way as the mind is united to the body." That is, the idea of the mind is the mind itself. The circle closes.

Emotions Are the Link

Why does Spinoza place so much importance on the emotions? Because mind and body proceed in parallel disconnected paths, and emotions are the only perceptible link between them. The passions are the wormhole between the two sides of our little piece of dream-stuff:

> The human mind has no knowledge of the body, and does not know it to exist, save through the ideas of the modifications whereby the body is affected.
>
> The mind does not know itself, except in so far as it perceives the ideas of the modifications of the body.

By the "modifications of the body" Spinoza means the affects or emotions. The only way the mind can know the body is through the emotions, which tie the two spheres together. The *idea* side of our physical responses to external interactions are the emotions, hence their critical importance.

Though the dominoes don't know about primes, and the primes don't know about dominoes, the body and the mind know each other through the affects.

Our Understanding of Our Body Is Unclear

Like most people, I function pretty well without understanding anything about my physiology. It may even be a distraction to know too much about one's internal structure. From Spinoza's viewpoint, this ignorance is to be expected: it is only through the passions that we can know our body, and since the passions are caused by interactions with other bodies, we cannot form a clear idea of our own body in isolation.

THE CURE: UNDERSTANDING THE ADEQUATE CAUSES

Our passions, properly understood, are *re*actions to something outside us. If we had a clear idea of the laws that constrain us, we would adequately understand the causes of our passions. They are passions only as long as we don't understand them. Once we do, proceeding *with* understanding becomes an *action*, and we become an independent underlier rather than a dependent derivative.

We can, Spinoza claims, convert our passions into actions by understanding their true causes: "If we can be the adequate causes of any of these affections, I understand by the affect an action; otherwise a passion." Spinoza's cure is in keeping with contemporary notions: we need to lay bare the subconscious drivers of our feelings. When you understand yourself from inside and out, you know yourself. Freedom is the unification of understanding and volition, of reason and desire. Will and Understanding are one and the same. Understanding is merely Will perceived from the inside.

With this understanding, you become close to Spinoza's God, who does not *think* about what to do. He operates with intuition. He does not consider the possibilities and then do the right thing. There is no *need* for Him to act. He is complete and perfect. He does what He does and He is what He is. He's the Understander and the Understood. He's not a metaphor.[13]