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The Half-Bound World

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In his invaluable *Reader's Manifesto*, literary critic B.R. Myers, skewering current literary fads, offers a spoof list of rules for serious writers. Rule II is:

> *Sprawl.* Brevity may be the soul of wit, but contemporary reviewers regard a short book as "a slender achievement." So when in doubt, leave it in.

I naturally had Myers's mock precept in mind when approaching Neal Stephenson's *Baroque Cycle*—three damned, thick, square books weighing in at a total of over 2,600 pages. My better self then reflected that some fine novels, including some indisputably great ones, are of comparable size; that the Victorian "three-deckers" and serialized novels, some of which likewise attained immortality, did not stint on wordage; and there are some stories that can *only* be told at length. Allowing these charitable thoughts to prevail, I turned to the first page of the *Cycle* with an open mind, ready to be entertained and instructed. I was not disappointed. This is a fine story-telling achievement.

Neal Stephenson's
Baroque Cycle

Quicksilver
2003 ~ 928 pp.

The Confusion
2004 ~ 816 pp.

The System of the World
2004 ~ 892 pp.

All available in cloth (William Morrow; $27.95) and paper (Harper Perennial; $15.95)

Cryptonomicon
Avon ~ 1999 ~ 1,152 pp.
$8.99 (paper)

The *Baroque Cycle* cannot be discussed without some preliminary remarks about structure. It is most easily available as three bound books with the titles *Quicksilver*, *The Confusion*, and *The System of the World*. That is just a bookseller's convenience, though. The *Baroque Cycle* is not a trilogy, but an octology: eight connected narratives—the author calls them "books"—featuring the same principal characters. *Quicksilver* contains Books 1, 2, and 3; *The Confusion*, Books 4 and 5; *The System of the World*, Books 6, 7, and 8. In a further complication, Books 4 and 5 are broken into pieces—nine and eight pieces, respectively—with the pieces alternating through *The Confusion*. In an introductory note to that second volume, Stephenson says: "It is hoped that being thus *con-fused* shall render them the less *confusing* to the

Reader." This is actually a pun on the contents of the narrative, of which more in just a moment.

To keep this essentially eightfold structure in my own reader's mind—to stress that the fact of Stephenson's story appearing in three volumes is merely a consequence of production and marketing requirements—I am going to refer to the whole thing as "the *Baroque Cycle*," rather than by the names of the three individual volumes. When I want to be more precise, I shall refer to one of the eight books, keyed to the three volumes as above. In fact, though the three-volume set is the one found in most stores, the eight books can now be bought separately.

While dealing with these matters of presentation, I should add that all three volumes are supplied with excellent maps, and the first has also a good selection of genealogical charts, and a list of *dramatis personae*. (Though that list is at the end of the book—vexing for those of us who were taught that it is immoral to look at a novel's last pages until all the others have been read.)

So much for presentation. Now, what's it all about?

As the word "baroque" suggests, this is historical fiction, a genre that can be loosely divided into "hard" and "soft" styles. On the one hand, the writer of historical fiction may try to capture the inner life and motivations of some real and well-documented historical figure. Robert Graves's Claudius novels offer outstanding examples of this "hard" sub-genre. The author might, on the other hand, center his story on some invented person, who is then let loose amidst historical scenery: think of *Gone With the Wind* or Patrick O'Brian's sea stories.

The *Baroque Cycle* is "soft" historical fiction, the principal characters all invented. They move among real historical circumstances, of course, and encounter many real persons. These real historical figures are mostly drawn from the outside, however, with very little of their inner lives presented. We see them through the eyes of invented characters, hardly ever the reverse—all in accord with the conventions of this kind of fiction.

Most of the action takes place in England, France, Germany, and Holland between the years 1655 and 1714. The longest continuous stretches of action—the entirety of Books 6, 7, and 8—cover 1714, the year when Britain's Stuart dynasty, in the person of Queen Anne, expired, and the first Hanoverian king was installed, by no means without opposition from Stuart diehards and schemers like Viscount Bolingbroke. The earlier crisis of the Stuart dynasty—the "Glorious Revolution"—in the late 1680s and early 1690s forms another major backdrop; the years 1665-6 of the Great Plague, the Fire of London, and

Isaac Newton's *anni mirabiles*, another; and 1670–73, a time of war and strategic-dynastic-religious maneuvering among England, France, and Holland, yet another.

The books primarily follow three main characters, all fictional. Daniel Waterhouse, born in 1646, is thoughtful, scientifically inclined, open-minded, and bears little sign of deep religious conviction (though his father was a fierce Puritan). Daniel is at the heart of the book, and likely the character, more than any other, into which Stephenson put his own thoughts and feelings.

Eliza, born in 1666 or 1667, is given no surname, though she acquires several titles of nobility as the story proceeds. She is a feisty, courageous, and worldly-capable woman, with a special talent for dealing in the rudimentary financial markets of the time. In Book 5 she gives a roomful of French aristocrats an inspired lesson in international banking—a passage that could be used today in a college course on the subject. Eliza is a native of Qwghlm, a fictional archipelago somewhere out in the Atlantic off the coast of Scotland, part of Britain but with its own peculiar pre-Celtic language and folkways. Taken as a slave by Barbary pirates and shipped off to the harem of the Ottoman Sultan, Eliza is rescued at the Siege of Vienna by the *Cycle*'s third key figure: Jack Shaftoe.

Born in 1660, Shaftoe is a fearless but amoral picaroon, raised in the London slums, tormented by an Imp of the Perverse and by love for Eliza. Alas, after less than two years' acquaintance, he alienates Eliza by proposing a slave-trading business venture to Africa. Eliza has, understandably, a hatred of slavery. Jack's love is thereafter hopeless, but inextinguishable. In a nice recursive twist, Jack is famous as a picaroon in the world of the *Cycle* itself: there is a picaresque novel about him current in 1680s France, we are told.

Of the real people in the book, three are by far the most prominent: Isaac Newton, the great mathematical and scientific genius; Gottfried Wilhelm Leibniz, the philosopher and mathematician; and Caroline of Ansbach, a pretty ("high-colored blonde Nordic beauty," according to one of her husband's biographers) and clever woman who in 1705 married the son of Hanover's ruler. Ansbach consequently became Princess of Wales in 1714 when that ruler ascended the English throne as King George I. In due course (1727) her husband became King George II and she, Queen of England. Caroline is best remembered by English people for her dying words to her heartbroken husband. From her deathbed she urged him to remarry after she was gone. "No," sobbed George, "I will have mistresses." Caroline: "Ah, God! I don't mind that."

The very first incident in Book 1 is a flash-forward to October 1713, when a messenger arrives in Boston,

Massachusetts, with a letter from Caroline to Daniel Waterhouse, urging him to return to Europe to patch up the Newton-Leibniz quarrel. Waterhouse had taken himself off to the Colonies in 1696 to build a primitive computing machine away from the distractions of London. Newton and Leibniz had famously, and actually, quarreled about which of them was the true inventor of the calculus.

There is of course a host of lesser characters, both real and fictional. Among the real persons are numerous monarchs: Louis XIV of France, William III of England, and Peter the Great of Russia make several appearances each. We also have glimpses of, among many others, John Churchill (later Duke of Marlborough), Samuel Pepys, the composer Handel, John Locke, a young Ben Franklin, Bolingbroke, the pirate Blackbeard, William Penn, Christopher Wren, and the formidable Electress Sophie of Hanover, granddaughter of one English King (James I) and mother of another (George I).

The deep theme of the *Cycle* is the birth of modern ways of thinking in science, religion, politics, and business. In all these zones, contrasts between the old and the new are clearly drawn. Nor are we allowed to forget that those contrasts often appeared in the same person, as in the case of Isaac Newton. No one did more to establish modern styles of thought about the physical world; yet Newton was obsessed by alchemy and by hidden messages in the Bible.

The contrasts in those other zones are at least as interesting. In religion, for example, we are given vivid pictures of the full range of period types: stoic Calvinists, militant Puritans, earnest seekers after reconciliation (Leibniz), and everything else on the spectrum. That is only to speak of Christians: we also encounter Jews, Muslims, Hindus, Jains, and Japanese Buddhists. The birth of the modern world, though, was midwifed by the great turning of thought in Christianity that began with the Reformation. That is the religious topic explored at length in the *Cycle*. The longer-range issue of whether, once the baby has been safely delivered, we still have any need of the midwife, is mainly left alone, though it is plain that Stephenson has it in mind.

Least sympathetic of the religious characters—practically a mustache-twirling villain, in fact—is the odious Jesuit fanatic Édouard de Gex. In a blood-curdling rant in Book 7, de Gex exposes the deep connection between modern religion and modern economics. Addressing Eliza, who is helpless at his feet, he says:

> Money, and all that comes with it, disgusts me.... To nobles, clerics, and peasants—the only people needed or wanted in a decent Christian Realm—coins were as alien, eldritch, inexplicable as

> communion wafers to a Hindoo. They are, I believe, an artifact of the pagan necromancers of the Romans.... The money-cult has spread faster across what used to be Christendom than the faith of Mahomet did across Araby. I did not grasp the enormity of it till *you* came to Versailles... and shortly were ennobled... and why? Because you had noble qualities? No. Only because you were Good With Money—a high sorceress of the coin-cult.... Burning you, Eliza, was to be the climax, the catharsis of a great Work of purification. England was to fall to the armies of the Most Christian King.... It was to have been the end of heresy—the heresy of the so-called Protestants, of the Jews, and, most of all, of the money-cult.

Coins, communion wafers... hmm. One of the sub-themes of the *Cycle*, in fact, is the way in which financial innovation was driven by religious out-groups: Jews, Armenians, Huguenots (who were Calvinist), and Qwghlmians (whose Christianity, we are told, predates the Roman Catholic Church—a boast actually made by Armenians).

These are the peoples that historian Yuri Slezkine has called "service nomads" and "Mercurians." Their way of doing business via signed pieces of paper seemed strange and unsafe in the Baroque period, even to one as enlightened as Daniel Waterhouse: "I say only that ink, once dried on the page, is a brittle commodity, and an œconomy made of ink is likewise brittle, and may for all we know be *craz'd* and in a state to crumble at a touch." Daniel's fears were not altogether misplaced. Until everyone got used to the new ways, the paper economy *was* unstable, as the South Sea Bubble of 1720 demonstrated.

As science, religion, and economics slowly turned towards the modern, so did government. The terms "Whig" and "Tory" came into British politics around 1680, with the efforts to exclude Charles II's younger brother from the line of succession on account of his Catholicism. Stephenson limits his descriptions of English politics to sketches of key players, but we learn enough to make plain the gulf opening up between, on the one hand, the tussles and compromises of the English power system, and on the other, the stifling torpor of France's absolutism and the brutish savagery of Russia's.

And then, of course, there is science. The Royal Society was founded in 1660, and we see John Wilkins, its first secretary, on his deathbed. In 1687 Newton published his *Principia*, the greatest single book of science ever written. Through the eyes of Daniel Waterhouse, we are given a preview of the *Principia* in Book 3, complete with supporting diagrams. Daniel has a kidney stone

surgically removed by the great polymath Robert Hooke, who among other things surveyed London for its rebuilding after the Fire. Robert Boyle's work on gases under pressure led to the first steam engines—we watch one in operation at the very end of the book, pumping water out of a Cornish tin mine.

And if mines can be pumped out, then metals can be more easily extracted, so here we are back with the coinage, the fusing and *con-fusing* of metals and of modes of thought, the flow of trade. We see Newton as Master of the Royal Mint (as he was, from 1699), and the bankers of Europe scribbling out their bills and letters of credit. It all hangs together.

That is Neal Stephenson's real achievement—to show us the whole thing, this new System of the World, stirring into motion. It does not, and never can, operate flawlessly, like those beautiful mechanisms in glass cases at the Science Museum in South Kensington when I was a boy, which could be wakened to action by inserting a penny. A System of the World is not like that. There are drive shafts the wrong length, cog wheels that do not mesh, and pieces left over from the old system that can't be made to fit anywhere. Somehow, though, it moves, and works, and a new world comes into being. As Daniel's friend Roger Comstock observes:

> We are at a fork in the road just now. One way takes us to a wholly new way of managing human affairs. It is a system I have helped, in my small way, to develop: the Royal Society, the Bank of England, Recoinage, the Whigs, and the Hanoverian Succession are all elements of it. The other way leads us to Versailles, and the rather different scheme that the King of France has got going there.

There is an expression in Chinese literary criticism that is apt here: "half-bound." During China's imperial ages, women's feet were bound up tightly in childhood to prevent the bones from growing, tiny feet being thought an indispensable component of female beauty. It was very cruel, and left the adult woman well-nigh lame. Advanced Chinese thinkers in the nineteenth century deplored the practice, and when the imperial system was overthrown in 1911, foot-binding ceased almost everywhere.

Little girls whose feet had been bound for only a year or two were left with some irreparable deformation of the bone structure, though—a condition known as "half-bound." In the early twentieth century, the ponderous literary mannerism of the imperial age was yielding to a more fluent vernacular style, which tried to bring prose closer to everyday speech. Older writers, trained in the imperial style of writing, could not always make the transition completely. Their literary productions strained for the vernacular, but kept slipping

back into old forms, allusions, and usages. Their style was called "half-bound" by obvious analogy.

Stephenson is showing us a "half-bound" Europe. Adult human beings cannot, for the most part, change their thinking much. Great revolutions owe less to people changing their minds than to the dying off of older generations of thinkers and their replacement with new ones. You can unwrap the bindings from the feet of those girls, but they will be "half-bound" all their lives, to the very end. It is therefore not surprising to see Sir Isaac Newton applying the most advanced mathematics to the principle of action at a distance, then scratching around in the Bible for clues as to what "action at a distance" actually means.

As if to anchor these old-new contrasts in the very texture of his fiction, Stephenson lets in some slight alchemical mysteries. These are mere hints, by no means rising to the level of full-blown magical realism, but nevertheless departures from the strictly realistic.

I like to think—though I am only guessing—that what Stephenson has in mind with these is a fiction-writer's equivalent of the "strange loops" described by Doug Hofstadter in his 1979 book *Gödel, Escher, Bach.* These odd, inexplicable patterns and paradoxes show up in any sufficiently complex system, just as a sphere covered with hair cannot be "combed down" without leaving a whorl point somewhere. The scientist and mathematician Stephen Wolfram has made much, perhaps too much, of this in his researches on cellular automata—even claiming, in a fascinating 2002 book titled *A New Kind of Science*, to have established just that.

The epitomes of all strange loops are the theorems that Kurt Gödel, in a sensational 1931 paper, found lurking just beyond the reach of *Principia Mathematica*, the massive work in which Alfred North Whitehead and Bertrand Russell attempted to construct all of arithmetic from simple logical rules and axioms. It can't be done, Gödel proved; there will always be a whorl point, a theorem you can't prove, an anomaly you can't explain.

The main whorl point in the *Baroque Cycle* is Enoch Root, the very first character named in Book 1. He shows up at key points throughout the narrative. In Book 3, for instance, while Eliza is staying at the house of Christiaan Huygens, he is on hand to prompt her to turn Huygens's telescope to a certain point of the horizon, where she spots a French ship coming to carry out a plot against William of Orange. (Enoch even gives her the name of the ship, slightly coded.) In Book 4 he shows up in India, as an emissary of Sophie, to guide Jack to some key ore deposits, and so on.

We learn nothing about Enoch's background or life. He is strange-

ly ageless and given to monkish garb, complete with hood. A wizard? Possibly. Not only is he the first named character in the *Cycle*, he is very nearly the last one referenced. At the very end of Book 8 Daniel is in Cornwall, watching that first steam engine at work, and reminiscing: "This journey began with a wizard walking into his door."

Enoch is in fact more ageless than Daniel knows. He also appears in Stephenson's 1999 book *Cryptonomicon*, a yarn about the twentieth century, whose narrative alternates between World War II and the late-1990s dot-com craze. Enoch is there in both time zones, apparently not aged. "And all the days of Enoch were three hundred and sixty five years," we are told in the Book of Genesis. That would take you from the 1630s to the 1990s, the entire span of time referenced by the *Baroque Cycle* and *Cryptonomicon*, taken together as a (gulp!) decalogy.

I don't much care for wizards in otherwise naturalistic stories, but I'm willing to forgive Stephenson this discreet nod to the fantasy genre. Stephenson cut his literary teeth writing science fiction, and the precise boundary between sci-fi and fantasy has never been established to universal satisfaction. One of the greatest sci-fi vehicles of the 1950s squared the circle by naming itself *The Magazine of Fantasy & Science Fiction*. And there are surely science fiction precursors to Enoch Root, like the Lazarus character in Walter Miller's 1959 blockbuster *A Canticle for Leibowitz*.

Cryptonomicon and the *Cycle* are bound together in other ways, incidentally, to the degree that the second is often spoken of as a prequel to the first. Numerous characters in the *Cycle* bear the same names as characters in *Cryptonomicon*, and so are presumably their ancestors. Stephenson, who had already conceived of the *Cycle* as he was finishing *Cryptonomicon*, left some clues to the prequel-to-come in *Cryptonomicon*, and planted in the *Cycle* some sly references to the earlier-published book. On his way to a country-house conference of Whigs in Book 5 of the *Cycle*, for instance, Daniel Waterhouse stops to ask for directions in a small town named Bletchley, otherwise unmentioned in the *Cycle*. "This bland countryside seemed oddly well suited for the hiding of secrets in plain sight," remarks the narrator, before passing on. Indeed: Bletchley Park was the center of British cryptography in World War II. The great mathematician-logician Alan Turing labored there. The German Enigma code was broken at Bletchley Park, and some of the earliest electronic computers were put to work there. All this is part of the story told in *Cryptonomicon*.

As its title suggests, *Cryptonomicon* is centrally concerned with cryptography—the making and breaking

of codes, one of the purposes for which electronic computers were first used. And cryptography is likewise a major theme running through the *Baroque Cycle*. Eliza falls in with the French court cryptographer (a real person) and has an affair with him—an affair of great consequence to the twentieth-century plot of *Cryptonomicon*! In no time at all she is writing letters to Leibniz in a code keyed to hexagrams from the Chinese *Book of Changes*, an ancient work of divination based on a binary scheme of line segments broken or whole. Eliza, who is a very ingenious lady indeed, also figures out a way to keep a coded journal in embroidered cross-stitch.

The main inspiration here is Leibniz. One of the under-appreciated themes of that age was the rapid development of mathematical symbolism. A mature literal symbolism for algebra—the *a*'s and *b*'s, *x*'s and *y*'s familiar to us from school algebra—had been provided by Viète and Descartes, the first of whom was just beyond, and the second well within, living memory in the later seventeenth century. This, once it had been internalized by a new generation, brought about a great and revolutionary advance in human intellectual capability.

It is fair to say that no one appreciated this fact better than Leibniz, a first-class inventor of symbols, whose notation for the calculus won out decisively over Newton's, and is the one still used today. A well-designed symbolism could, Leibniz said, "relieve the imagination," making it easy to do complex calculations with little thought. It is but a short step from there to the question: Why not perhaps with *no* thought? Blaise Pascal had already (around 1643) built a mechanism that could add and subtract numbers. Leibniz, in 1673, exhibited to the Royal Society a machine that could multiply and divide, too.

By this point, though, Leibniz's imagination had raced far ahead of merely arithmetic computation as a goal. At university in Leipzig he had studied, and written a thesis on, Aristotle's categorization of human thought. If, reasoned Leibniz, every concept could be categorized and tagged with a unique symbol, and if some way could be devised to combine the symbols, so that new concepts could be generated—from the symbol for "central" and the symbol for "Africa," a unique symbol for "Central Africa"—then the whole of thought might be mechanized, with a great Logic Mill deciding the truth or falsehood of any conceivable proposition. The most basic concepts might, for instance, be represented by prime numbers, and their composition by multiplication, so that all reasoning would become arithmetic, which Leibniz knew could already be mechanized. The factorization of a whole number into primes is unique, so that a complex concept could always be uniquely reduced to basics.

This system, explained by Leibniz to the (real) mathematician Nicolas Fatio in Book 5 of the *Cycle*, has echoes all over modern logic, computing, and cryptology, as of course Stephenson knows perfectly well. The details of that purchase you just made on the Internet were likely encrypted using the RSA scheme, which depends, like Leibniz's categorization of concepts, on the multiplication of prime numbers. The method used by Gödel for his revolutionary 1931 proof likewise depended on the use of prime numbers to encode symbols, strings of symbols then being coded by the products of those primes. That got everyone—notably Alan Turing and John von Neumann—thinking about how both instructions and data might be represented numerically, leading to the stored-program computers of the present day.

Thus we are back with Gödel's anomalies, with codes and ciphers, with computing machines and binary digits (first envisioned by Leibniz). Nor have we lost track of the currency/metallurgy/technology threads. As a servant of the House of Hanover, Leibniz struggled to solve the problem of flooding in the silver mines of the Harz mountains. He actually collaborated with the French Huguenot engineer Denis Papin on the construction of a steam engine in 1705, though this was long after he had given up on the Harz mines and their problems.

Machines, silver, computation, coinage, the House of Hanover, the science, the logic, the technology, and the politics are all intertwined in the figure of Leibniz. The picaresque, too, for the *Cycle* is always—well, nearly always—a novel, not a textbook. Jack Shaftoe the picaroon actually has a distressing adventure in the Harz mountains, from which he is rescued by—who else?—Enoch the alchemist.

Stephenson's writing style is blessedly free of most of the kinds of affectation and "trendy stylistic gimmicks" B.R. Myers describes. One passage is laid out as a play script, a stunt pioneered by James Joyce and all too often imitated since (even by George Orwell). Jack Shaftoe, slightly demented by venereal disease, has a lurid vision, which we share. For the most part, though, this is straight realistic narrative, agreeably interspersed with letters written by the principals to one another when far apart.

Any writer of a historical novel faces the problem of *diction*. How should the characters speak? If they are speaking foreign languages, of course the author will translate their words into English; but what English? The English of their time, or of ours? Once you go back beyond 1800, the spoken vernacular quickly gets more and more difficult for a present-day reader to follow, and there is mounting doubt as to how people actually did speak. The labor

involved in producing and checking archaic speech forms is also more than the revenues from an average novel will justify.

Stephenson has taken a relaxed attitude to the problem, seasoning his characters' speech with enough archaisms to give some period flavor, but ignoring niceties of seventeenth-century grammar, vocabulary, and usage. This blithe approach will sometimes jar the more fastidious reader, but fiction reading is all about suspending disbelief, and the extra suspension involved here is not too great a stretch. I only wish the author had been a bit more consistent. "Phanatiques" and "fantastickal," both on the same page, and with the latter spelled "phantastickal" elsewhere?

The book does, however, suffer from numerous anachronisms. English people of the 1680s did not have the noun "subtext," the adjective "multilayered," or the verb "lynch" (the latter being an eponym for a man born some decades after the events in the *Cycle*). They did not talk about "high net worth individuals" or "having sex." They might just conceivably have said "let's have lunch," but I am sure it would not have occurred to them that "correlation is not causation." Stephenson knows all this very well, and is just exercising the punk literary style he is famous for, concerning which style the only thing to be said is that you either mind it, or not. When our author has a party of sight-seeing Jews in London tell us that "We…never expected the Spanish Inquisition," the reader—at least if he is a Monty Python fan—knows that he is just being teased.

Against all this, in any case, is a fine power of description. The *Baroque Cycle* is full of memorable images. A ship loaded with oriental silks and spices has burned in mid-ocean, with almost all hands lost. Rowers from a following ship go out among the wreckage:

> Curls of cinnamon-bark dotted the surface of the water, each one looking like a small burnt ship itself. Around the hulk spread a morass of Chinese silk, ruined by fire and sea-water but still more gaily colored than anything their eyes had seen since their final whorehouse-visits in Manila four months earlier. The silk caught on the longboat's oars and came out of the water with each stroke, giving them gorgeous glimpses of tropical birds and flowers before sliding off and sinking into the gray Pacific.

Stephenson's text is full of treasures like this. A duke in his uniform as Grand Admiral of France is "like a galleon on legs." At a duel in London's Opera House (while Handel is conducting rehearsals), we see the loser struggling for his footing at the edge of the stage, "his blood…dripping onto the kettledrums, with faint sounds like reports of distant can-

nons." In London during the plague year we catch sight of Cheapside, "where men on ladders were clambering into upper-story windows of a boarded-up house to remove limp, exhausted children who'd somehow outlived their families."

Stephenson has a fine eye for how things move, too. When a driver reins in his team: "Their gait collapsed and they pocked gradually to a stop, taking the momentum of the carriage in the breeching straps slung round their backsides." Nor can you fault the author on due diligence: just look at the chain of command at the Tower of London in Book 6, the procedure for making phosphorus in Book 4, or the many detailed references to arcane points of sailing, cryptology, and metaphysics. Whether he is correct on all these items I cannot say; but he is correct on all those I checked. There is some high comedy, too: I especially enjoyed Newton and Leibniz bickering over the proper computation of distances on a map, which "devolved into a lengthy progress of disputes about applied Euclidean geometry and the nature of absolute space: arguments that Newton and Leibniz were perhaps a bit too eager to engage in, so that Daniel had to intervene from time to time and ban Metaphysics."

My only serious stylistic quibble is with "Qwghlm." I think it ought to be a firm principle of fiction writing, if not a constitutional amendment, that authors not give us names we can't pronounce. Qwghlmian is rife with such names: "Sgrh," "Mnyhrrgh," "Skrrgh," "cCmndhd"—oh, and meet Mr. Bhnh the boatman (Book 3). This kind of thing is just annoying, and will remind any parent of the more tiresome kind of children's bedtime book. Stephenson has brought Qwghlm forward—actually backward, timewise—from *Cryptonomicon*, where a fuller description of the wretched place is given (and from which book I took three of those Qwghlmianisms). Qwghlm is one of only a few imaginary places in the *Cycle*; I wish Stephenson could have spared a few vowels for it.

A novel stands or falls by the pleasure it gives to the thoughtful and attentive reader. By that standard, and setting aside the minor blemishes noted above, the *Baroque Cycle* is a very fine work of popular fiction. The more you know about math, logic, and computing, the more you will find in it; but any reader who, at a bare minimum, does not mind mathematical and technological topics will find something. If you have been wondering whether you should tackle Neal Stephenson's three big volumes, I urge you to do so.

I came away from the *Baroque Cycle* at last both entertained and instructed—instructed, most especially, in how the world we inhabit emerged from the religious and dynastic bloodlettings of the middle

seventeenth century, in how the commonplace ideas of today were the revolutionary notions of three hundred years ago, and in how a System of the World—never complete, as Daniel remarks on the very last page of the *Cycle*, always a-mending, endlessly argued over—comes to be. Is there a quite new System being born today, as I am writing, as you are reading? If so, the clues are here, in Neal Stephenson's masterpiece.

***John Derbyshire**'s 2003 book* Prime Obsession *won the 2007 Euler Prize for mathematical exposition, awarded by the Mathematical Association of America. His most recent book is* Unknown Quantity, *a history of algebra (Joseph Henry Press, 2006).*