

TURBULENCE AND SCRIPTURE

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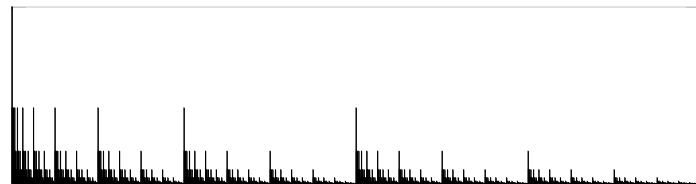
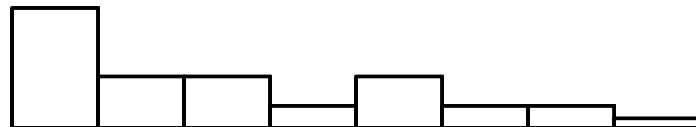
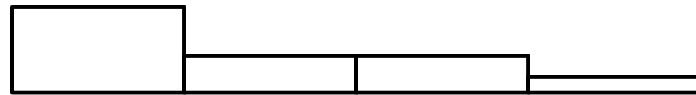
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Outline

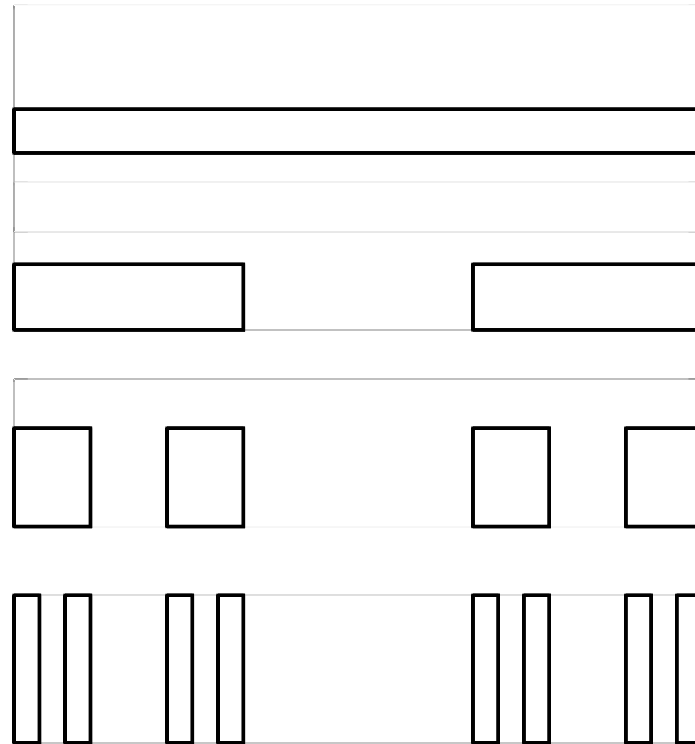
- *Shows that Scripture uses symbols of calmness and turbulence to illustrate our choices.*
- *Recalls that via such symbolism God's invites us to repentance and rectitude.*
- *Reminds us that, otherwise, we shall "bite the dust" with the devil and the wicked.*
- *Identifies the condition of equilibrium, without thorns and dust, with Jesus Christ.*
- *Recalls Jesus' repeated teachings about unity and love.*
- *Reminds us of actions we may take to experience true balance in our lives.*

Symbols from Natural Turbulence



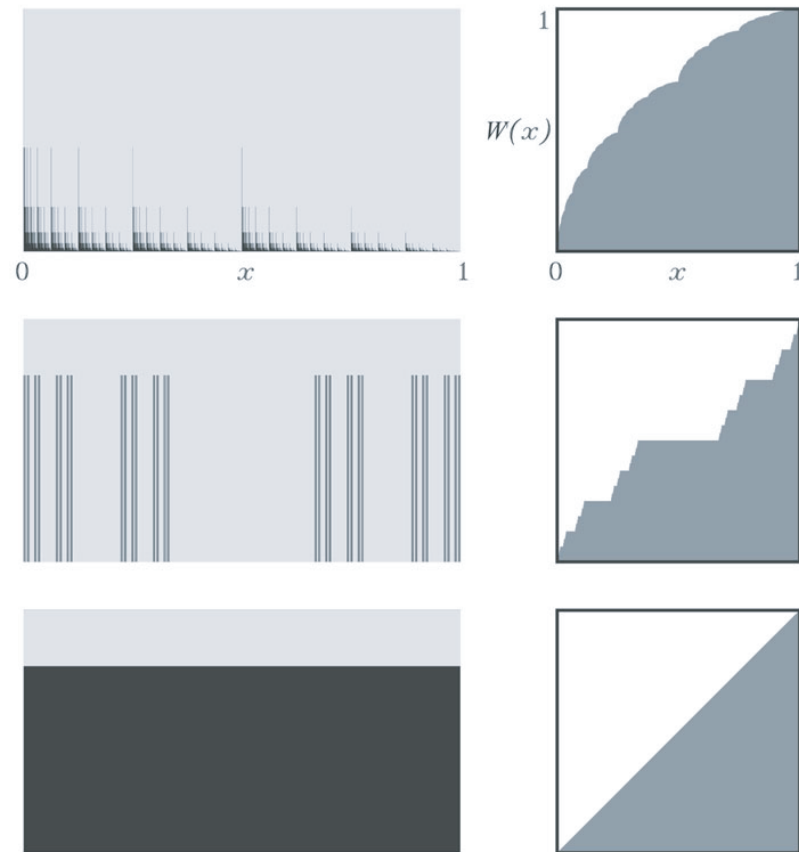
inequalities, thorns, dissipation

Another Diabolic Cascade



discrimination, thorns, dust

Equilibrium: The Straight Path



unity, hypotenuse, the root,
 else **devil's staircases**

The following citations pertain to **Repentance and Rectitude**:

- While the *uniform* condition of *balance* may be employed to symbolize the *rectitude* in God’s law, the divisive *cascades* may be used to visualize the accumulation of our *sins*.
- This may be seen in many exhortations to **conversion** present in Scripture, including the rather “*geometric*” pleas by John the Baptist: “I am the voice of one crying out in the desert, Make *straight* the way of the Lord” (Jn 1:23) “Every valley shall be filled and every mountain and hill shall be made low. The *winding* roads shall be made *straight*, and the *rough* ways made *smooth*” (Lk 3:5, Is 40:4), that clearly points us to *uniformity*. (!)
- Here, we may vividly observe how *repentance* makes whole what is “*fractal*” and how there is indeed only one *broad valley* in which the glory of the Lord is revealed to all mankind (Is 40:5, Lk 3:6). (!)
- This *rectifying* process corresponds to the *baptism with water* for the forgiveness of sins (Mt 3:6), pure water of repentance (Heb 10:22), that Jesus proclaimed echoing John the Baptist by saying “**Repent**, for the kingdom of heaven is at hand” (Mt 4:12).
- The cascades do denote our “*natural behavior*,” and as such, we ought to return to *equilibrium* constantly, for “everyone who drinks this water will be thirsty again” (Jn 4:13).

- This implies changing the *erratic* and *divisive turbulence* by the *unflappable* and *serene rectitude*. For as the Apostle Paul explains, “you too must think of yourselves as being *dead to sin* and *living for God* in Christ Jesus” (Rm 6:11).
- It is relevant to note that God’s help is found in uniformity. For “The Lord *raises* the needy from the *dust*” (1 Sm 2:8), takes us to *level ground* so that we do not stumble (Jer 31:9, Ps 23:2-3), and saves us from the *watery depths* and the *flood* (Ps 69:3). (!)
- This is seen also realizing that we are saved “by *waiting* and by *calm*” and that our strength “lies in *quiet* and in *trust*” (Is 30:15), without being “tossed by *waves* and swept along by every *wind* of teaching arising from human trickery” (Eph 4:14). That is, in the absence of *turbulence*, at low *Reynolds* numbers. (!)
- For as the prophet Hosea explains, “Let him who is wise understand these things; let him who is prudent know them. **Straight** are the paths of the Lord, in them the *just* walk, but *sinners* stumble in them” (Hos 14:10).
- Curiously, and in agreement with these observations, the *baptism* of the apostle Paul, after his encounter with Jesus, took place at *Straight* street (Acts 9:10-19). (!)

The following quotations pertain **the Devil and the Wicked**:

- The cascades and its *negative* eddies may be used to portray geometrically the works of the Devil, “the ancient serpent” (Rev 12:9) so shaped, the one always *divisive* and *selfish*, for he has sinned from the beginning (1 Jn 3:8) and “there is no truth in him at all” (Jn 8:44).
- This is consistent with his titles, “*the ruler of the power of the air*” (Eph 2:2), “*the evil spirits in the heavens*” (Eph 6:12), and “*the ruler of the world*” (Jn 12:31), that relate the Devil with *natural turbulence* (in our world and in the universe), and also with our ever-present economic Devil’s staircases. (!)
- The ever-symbolic *dust* generated by the cascades is found in the decree: “*the serpent’s food shall be dust*” (Is 65:25) and also clearly in the way she shall be ultimately defeated, for Jesus shall destroy her with the *breath of his mouth* (2 Thes 2:8). (!)
- The cascades not only may denote the Devil but also his followers, the *wicked*. For *sin* produces *death* (Rom 8:13), such as God announced it to Adam after the fall, “You are *dirt*, and to *dirt* you shall return” (Gn 3:19).
- This fact is found on several citations that relate the *sinner* with *turbulence*.

- For instance and quite graphically, “the hope of the *wicked* is like *thistledown* borne on the *wind*, and like *fine, tempest-driven foam*, like *smoke scattered* by the *wind*” (Wis 5:14), and “the *arrogant* shall be like *fine dust*” (Is 29:5). (!)
- For “all sinners will be destroyed” (Ps 37:38) and “they shall lick the *dust* like the serpent” (Mi 7:17). For “When they sow the *wind*, they shall reap the *whirlwind*” (Hos 8:7). (!)
- Turbulent and fractal traits in the wicked are also found in, “*Pride* adorns them as a necklace, *violence* clothes them as a robe. Out of their stupidity comes sin, evil thoughts *flood* their hearts” (Ps 73:6-7) and in “Ah, all of them are *nothing*, their works are *nought*, their idols are *empty wind!*” (Is 41:29).
- Turbulence is also a common punishment by God, for instance, “Then shall they know that I am the Lord, when I *disperse* them among the nations and *scatter* them over foreign lands” (Ez 12:15, Zec 7:11-14), as it happened to the people of Israel, when they disobeyed.
- This is also seen vividly in the edict, “A *third* of your people shall die of pestilence and perish of hunger within you; another *third* shall fall by the sword all around you; and a *third* I will *scatter* in every direction, and I will pursue them with the sword” (Ez 5:12), that evokes the original construction of Cantor dust. (!)

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- These observations are consistent throughout Scripture, for “The Lord *hates* those who love *violence*, and *rains* upon the wicked fiery coals” (Ps 11:5-6), for “The Lord repays his enemies their deserts” (Is 66:6).
- As cascades may be used to denote “*selfish division*,” one may appreciate in them the famous and symbolic 666 assigned to the *false antichrist* to come (Rv 13:18). For, as previously explained, the spiral 6, $r = e^{-\theta}$ correctly captures the motion that natural imbalances generate, *always* from **plus** to **minus**, as seen, for instance, on a hurricane. (!)
- This symbol, interpreted as three “*negatives*” and seen on the evil cascade as the fraction $2/3 = 0.666 \dots$ (with 0 denoting equilibrium), is also found, vividly, in the apostle Peter’s very symbolic denials: three before the cock crowed twice (Mk 14:66-72). (!)
- Curiously and consistently, the fraction $2/3$ is frequently found in experimental and theoretical results pertaining to turbulence, as in the “*two-thirds*” power-law of squared velocity fluctuations and in log-Poisson fittings of fully developed turbulence.
- In relation to *dust*, it is relevant to note that, consistently with these observations, Jesus washed with *water* the disciples’ feet (Jn 13:1-15) and instructed them to shake the *dust* from their feet whenever they were not received (Mt 10:14).

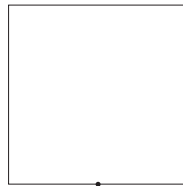
The following passages may be employed to stress the difference between **Short and Long**:

- In the *uniform* and *constant* condition that denotes God's law, one may observe **Jesus**, the *just* who did not sin (2 Cor 5:21).
- For as He explains, "Do not think that I have come to abolish the *law* or the *prophets*. I have come not to abolish but to fulfill" (Mt 5:17). (!)
- Clearly, Jesus is also seen in the **straight** and **shortest**. For, from such an *efficient* state He invites us: "Come to me, all you who labor and are burdened, and I will give you *rest*. Take my yoke upon you and learn from me, for I am meek and humble of heart; and you will find *rest* for yourselves. For my yoke is *easy*, and my burden *light*" (Mt 11:28-30).
- As the uniform condition may be understood as a sequence of actions that always maintain *equilibrium*, and as such behavior is improbable in us, we may understand that "If we say, 'We are without sin,' we deceive ourselves, and the truth is not in us" (1 Jn 1:8).
- This allows us to appreciate our daily struggles and our need to conversion, for as the Apostle Paul explains, "What I do, I do not understand. For I do not do what I want, but I do what I hate" (Rm 7:15).

- These observations permit us to comprehend that Jesus is in fact our **only** option, “*The way and the truth and the life*” (Jn 14:6). For only in our **Savior** we are no longer in custody under the law but under *faith* (Gal 3:23), as He leads us forth from darkness and gloom breaking our chains of sin (Ps 107:14).
- For in Jesus, the *uniform*, we may walk safely, contrary to what happens with the “*thorny*” cascades: “For the virtuous his paths are *level*, to the haughty they are *steep*” (Sir 39:24). For it is in the *plain* that God holds us with his love, when our feet slip (Ps 94:18).
- As “*fear* has to do with *punishment*” (1 Jn 4:18) and as there is no sin in uniformity, it is only in the **perfect love** of Jesus where our security resides (1 Jn 4:18, Mt 5:48). Here we may fully comprehend why “Happy the sinner whose fault is removed, whose sin is forgiven” (Ps 32:1).
- Jesus is also symbolized by the *root* and by the *hypotenuse*, and hence by the *simplest straight line* $X = Y$: the very geometry of the cross and Jesus crucified on it. (!)
- For such an equation defines him when He says, “Whoever is not with me is against me, and whoever does not *gather* with me *scatters*” (Mt 12:30), as the divisive *wind* does.



- The notorious difference between $\sqrt{2}$ and 2 may be used to further illustrate the goodness of *forgiveness*. For, “If you, Lord, mark our sins, Lord, who can stand?” (Ps 130:3), but “As far as the *east* is from the *west*, so far have our sins been removed from us” (Ps 103:12).
- Reconciliation with God is hence an exceedingly valuable **sacrament**, for “If we acknowledge our sins, He is faithful and just and will *forgive* our sins and *cleanse* us from every wrongdoing” (1 Jn 1:9), such as it is also expressed in “*The Lord’s Prayer*” (Mt 6:9-15).
- The difference between the shortest path and the others also permit us to appreciate the subtleties of sin. For the inefficiencies in cascades help us value the words of Jesus when he said: “Why do you notice the splinter in your brother’s eye, but do not perceive the wooden beam in your own eye?” (Mt 7:3). For we must leave out our *hypocrisy* first so that we may truly help our brother (Mt 7:4-5, Jas 2:10). (!)
- For *uniformity* is attained only by *obeying* God’s plan to a positive **cross** (Phil 2:8), surrendering ourselves to find **the point** in a rather trivial golf shot aided by our “gravity.”



The following citations may be used to express the desired condition of **Unity**:

- The *uniform* condition through its *constancy* allows us to value *unity*, within ourselves, in our interpersonal relations, in our societies, countries, and the world at large.
- In this context, the uniform denotes united societies, **aligned** with God's plan, while dusty cascades represent societies based on imperfect human systems, Devil's staircases that generate *emptiness* with their maximizing of personal profit or with their forced and false equities.
- For *true unity* is found in welcoming one another as Christ welcomed us (Rom 15:7) and in the solidarity that propel us to "Rejoice with those who rejoice, and weep with those who weep" (Rom 12:15).
- Clearly, *unity* is essential for Jesus Christ, for He says "I pray not only for them, but also for those who will believe in me through their word, so that they may all be **one**, as you, Father, are in me and I in you" (Jn 17:20-21).
- For, in fact, "How good it is, how pleasant, where the people dwell *as one!*" (Ps 133:1).

- This desired state of *unity* is also reflected in Jesus' famous words about marriage, when He explains, "they are no longer two, but *one*" (Mt 19:6), and in the explanations by the apostle Paul about the Church, "For as in *one* body we have many parts, and all the parts do not have the same function, so we, though many, are *one* body in Christ and individually parts of *one* another" (Rom 12:4-5, 2 Cor 8:8-15).
- This last citation suggests a *geometric* rather than an arithmetic relation for the **Church**, " $1 = 1 + 1 + \dots + 1$," that reflects Jesus' prophetic words about His triumph when He says, "There will be only *one* flock, *one* shepherd" (Jn 10:16). (!)
- In summary, only in the *uniform* and its *root* one may find the rectitude and the needed communication required to encounter *unity*. Only in the positive "*spiral of love*," $r = e^{+\theta}$, that flows towards the other, $1 = 0.999\dots$, even towards our enemies.
- For Jesus' disciples are recognized by their **love** for one another (Jn 13:35), an unnatural condition that always travels from **minus** to **plus**. (!)
- For, quite accurately, there is *darkness* between our selfish postures and our loving ones, as there was a prescribed eclipse of the sun between the **6**th and the **9**th hour when our Lord was crucified for us (Mk 15:33-37) and crowned by our many *thorns* (Mk 15:17). (!)

The following quotations tell us how to go **To the Uniform**:

- **Serving** one another (Mt 20:26, Mk 9:35):
 - Forgiving others, *seventy times seven times*, as symbolically seen in the second level of the turbulent cascade (Mt 18:22). (!)
 - Loving our enemies (Lk 6:27).
 - Blessing those who curse us (Lk 6:28, Rom 12:14).
 - Not judging others (Mt 7:1).
 - Giving more than receiving (Acts 20:35).
 - Applying the golden rule (Mt 7:12, Lk 6:31).
- Growing in **humility** (Phi 2:3, Rom 12:3), living at low *Reynolds* numbers: (!)
 - Praying without ceasing (Mk 14:38, 1 Thes 5:17).
 - Renewing our spirit and mind (Eph 4:23, Rom 12:2).
 - Receiving the peace of God (Phil 4:7, Jn 14:27, Col 3:15).
 - Not living according to our strength (Hab 1:11, Wis 2:11).
 - Refraining our tongue from lies (Ps 34:14).
 - Imitating God (Eph 5:1, Mt 5:48, Jas 1:4, Jn 7:18).
 - Thinking about what is true, pure, gracious (Phil 4:8).
 - Taking our thoughts captive to Christ (2 Cor 10:5).
- This journey may be expressed in the following song:

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Six, zero, **nine**, a dear song
 numbers unfolding daylong,
six, zero, **nine**, a clean gong
 symbols inviting us to love.

From **six** to **six**
 revolving inwards,
 from **six** to **six**
 I went downwards.

From **six** to **six**
 dividing selfishly,
 from **six** to **six**
 lying endlessly.

From **six** to **six**
 trying to be a rose,
 from **six** to **six**
 being only a nasty thorn.

Six, zero, **nine**, a dear song
 numbers unfolding daylong,
six, zero, **nine**, a clean gong
 symbols inviting us to love.

From **six** to zero
 I tapered my speed,
 from **six** to zero
 the tempest did not lead.

From **six** to zero
 I no longer postponed,
 from **six** to zero
 I finally atoned.

From **six** to zero
 I experienced peace,
 from **six** to zero
 my loneliness ceased.

Six, zero, **nine**, a dear song
 numbers unfolding daylong,
six, zero, **nine**, a clean gong
 symbols inviting us to love.

From zero to **nine**
 the spiral turned over,
 from zero to **nine**
 I dared to love others.

From zero to **nine**
 I attempted prayers,
 from zero to **nine**
 I became a repairer.

From zero to **nine**
 infinity flowed free,
 from zero to **nine**
 unity grew in me.

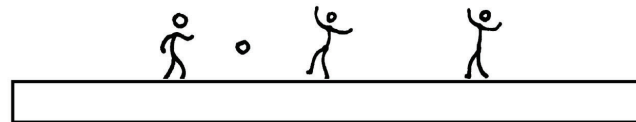
Six, zero, **nine**, a dear song
numbers unfolding daylong,
six, zero, **nine**, a clean gong
symbols inviting us to love.

From **nine** to **nine**
weaving my reality,
from **nine** to **nine**
dreaming its totality.

From **nine** to **nine**
conquering my greed,
from **nine** to **nine**
planting a new seed.

From **nine** to **nine**
despite a clear spite,
from **nine** to **nine**
knowing there is light.

Six, zero, **nine**, a dear song
numbers unfolding daylong,
six, zero, **nine**, a clean gong
symbols inviting us to love.



References:

1. *New American Bible, Saint Joseph Edition*, Catholic Book Publishing Co., 1992.
2. U. Frisch, *Turbulence*, Cambridge University Press, 1995.
3. C. E. Puente, *The Hypotenuse. An illustrated scientific parable for turbulent times*, 2005.
4. Z. S. She and E. Leveque, “Using scaling laws in fully developed turbulence,” *Phys. Rev. Lett.* 72:336, 1994.
5. Z. S. She and E. C. Waymire, “Quantized energy cascade and log-Poisson statistics in fully developed turbulence,” *Phys. Rev. Lett.* 74:262, 1995.