

## A CHRISTIAN THEORY OF INFORMATION

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### Introduction

There are countless areas of human knowledge that have not been consciously reclaimed under the Lordship of Christ via a Reformed worldview. The subject of information, or “information theory,” is one of those areas.

In this essay, I hope to provide the broad strokes of a Christian theory of information in a similar fashion to how Van Til provided the broad strokes of a Christian theory of knowledge in his work by that title.<sup>1</sup> Although, due to the nature of this article, what follows will obviously be much smaller and less detailed.

“Information” is notoriously difficult to define. The word is common in our age, and yet, there is no consensus on what exactly “information” is. Cambridge scholar Steven Meyer concurs in his popular book, *The Signature in the Cell*:

The elusive character of information – whether biological or otherwise – has made it difficult to define by reference to standard scientific categories.<sup>2</sup>

Indeed, human beings use the word “information” to describe multiple concepts that, depending on the context, strongly differ from one another. One commonly speaks of “transferring” information, “storing” information, “erasing” information, etc. Yet, most people seem to recognize that information is existentially dependent upon the physical characteristics of various objects (i.e. the information “in” a phone book disappears when the phonebook is burned).<sup>3</sup> Our society also seems to subconsciously distinguish

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<sup>1</sup> Cornelius Van Til. *A Christian Theory of Knowledge* (Phillipsburg: Presbyterian and Reformed, 1969).

<sup>2</sup> Steven Meyer. *The Signature in the Cell* (New York: HarperOne, 2009), 15.

<sup>3</sup> Phillip E. Johnson put it this way during one of his Summit Ministries lectures, “Darwinism: 140 years later”: “When we use a computer to write, we are very cognizant of the fact that the information in the document that we’re writing is totally different from the medium in which it is recorded... the information that carries the meaning is something very different than from the medium in which it is inscribed.”

metaphysical information from its physical carrier; we download information on to our computers knowing full-well that our computer doesn't get heavier as more and more information is added.

All of these puzzling realities leave one asking, *what is information, and what is its relationship to God and creation?* It is my contention that, while there are two general uses of the term "information" in our society, the third sense of the term – which recognizes the absolute Creator of the universe – is the only satisfactory option. Information may be properly referred to as nonmaterial meaning or purpose either (a) projected into material creation by the mind of the immaterial Creator (i.e. DNA), or (b) manifested in material creation by an immaterial creaturely mind as a creaturely reconstruction of God's original blueprint (i.e. music, books, etc.).

### **Information as Statistical Data ("Physical" Code)**

Information theory has largely been dominated by the American engineer and mathematician Claude Shannon (1916-2001). He sought to find the limits of signal processing operations like data compression and data storage and communication. Shannon's work immediately spawned a variety of applications (i.e. cryptography, language processing, etc.), and it wasn't long before "Shannon's theory" crassly became synonymous with "information theory." This equivocation is unfortunate since (a) Shannon's goal was never to develop a comprehensive theory of information, (b) Shannon's theory hardly scratched the surface of information theory (as it will become evident below), and (b) there are countless thinkers after Shannon that have made substantial contributions to the subject of information.

Nevertheless, Shannon did open a door to a vast and perplexing subject, and on the journey, he established some of the simplest principles of information – at least in terms of how it can be used and communicated. Indeed, information in his study was used in a very technical, scientific, and quantifiable way – a "bit." Thus, 01 is a "bit of information." Simply put, information in this sense is nothing more than extant binary code.<sup>4</sup>

The first thing to note about the Shannonian/statistical perspective of information is that *coherence and meaning are completely irrelevant*. 0101100010000 is information just as much as 010 or 10101 is information. Information to be information simply has to fill digital "space" (e.g. binary); it doesn't have to communicate anything and no subject has to understand it. Indeed, according to this theory, intelligibility is not a requirement for the presence of information. As Edgar Andrews recently summarized in his chapter entitled "Information, stupid!":

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<sup>4</sup> Claude Shannon was the first to coin the term "bit." His research provided two major breakthroughs. First, in 1948, he demonstrated the connection between entropy (and with it, probability and thermodynamics) with information, which he defined as "the resolution of uncertainty." Second, he demonstrated that electrical application of Boolean algebra could resolve any logical or numerical relationship.

Basic (statistical) information theory treats every input signal as equivalent and calls it 'information' – simply because it's new to you. Regardless of whether it is random radio noise from a distant galaxy or a frantic plea from Houston to wake up, it counts as information and can be analyzed statistically by the theory. Clearly, information theory at this level isn't going to tell us very much...statistical theory...allows us to quantify the amount of information that must be transmitted to convey a message, and thus identify the most efficient way of sending it.<sup>5</sup>

As such, many have tried to assert that information is a property of matter, or simply, that "information is physical." For example, Max Boisot, Ian C. MacMillan, and Kyeong Seok Han explain in *Explorations in Information Space*:

Information is physical (Landauer 1999). It is a constituent element of all physical processes and hence cannot be treated as something epiphenomenal to the economic process. It must be engaged with its own terms.<sup>6</sup>

The IBM physicist Rolf Landauer is cited in this quote as one who asserts that "information is physical." Perhaps this is an inappropriate reference for such a sweeping claim, for Landauer's understanding of information was not so cut and dried. At the very least, he differentiated between information and its physical carrier:

Information is not a disembodied abstract entity; it is always tied to a physical representation. It is represented by an engraving on a stone tablet, a spin, a charge, a hole in a punched card, a mark on a paper, or some other equivalent. This ties the handling of information to all the possibilities and restrictions of our real physical world, its laws of physics and its storehouse of available parts.<sup>7</sup>

Of course, it must be admitted that Landauer's position is no less puzzling than that of Boisot, MacMillan, and Han. The statement "information is not a disembodied abstract entity; it is always tied to a physical carrier" is somewhat troubling.<sup>8</sup> If "information is physical," then it would seem that no physical representation is needed. A physical representation is needed, one would assume, for an entity that is *not* physical. To put it in layman's terms, it is one thing for an ambassador to represent a king (both of whom are physical), and another for a crown to represent the *authority* of the king (the crown being a physical embodiment of something nonmaterial).

Perhaps the authors of *Exploration in Information Space* thought that "Landauer's

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<sup>5</sup> Edgar Andrews. *Who Made God?* (Carlisle: EP Books USA, 2009), 175.

<sup>6</sup> Max Boisot, Ian C. MacMillan, and Kyeong Seok Han. *Explorations in Information Space: Knowledge, Agents, and Organization* (Oxford University Press, 2008), 39.

<sup>7</sup> Quoted in Leff and Rex, eds., *Maxwell's Demon 2*, 335.

<sup>8</sup> The first half of this sentence is also very easy to quote out of context to support the statement "information is physical."

principle” supports the idea that “information is physical.”

Landauer’s principle states that there is a minimum amount of energy that has to be dissipated, on average, when erasing a bit of information in a computing device working at absolute temperature  $T$ . This minimum energy is equal to  $kT \ln 2$ , where  $k$  is Boltzmann’s constant. Landauer’s principle has profound implications as it allows for novel, physically motivated derivations of several important results in classical and quantum information theory. Moreover, it proved to be a powerful heuristic tool for establishing new links between, or obtaining new derivations of, fundamental aspects of thermodynamics and other areas of physics.<sup>9</sup>

Brian Hayes comments in *American Scientist*:

In the early 1960s Rolf Landauer...discovered that only a certain subclass of computational events have an unavoidable three-zeptojoule cost. Ironically, these expensive operations are not those that produce information but rather those that destroy it, such as erasing a bit from a memory cell.<sup>10</sup>

In other words, Landauer’s principle shows that, under certain radical, physical conditions, the entropy of the elimination of a bit on a computer chip can be mathematically calculated. If the conditions change (e.g. temperature of the computer chip, or the information is being encoded instead of erased) the principle no longer applies.

What is more important is that Landauer’s principle fails to demonstrate that information is physical; it simply assumes physicality. Indeed, the classic Shannonian theory of information *presupposes* attributes of information for the sake of statistical purposes.<sup>11</sup> To ask about the real nature of information is to ask a question that this theory is not prepared to answer. Landauer’s research as a mathematician and engineer limited the comprehensibility of his theory. That is, he wanted to *use* information, not define it. Thus, information was given meaning on the basis of pragmatism. If not used to measure and calculate, information is simply a unit that assumes digital space.

Presupposing (instead of demonstrating) that information is physical is not unusual in the general discussion of information theory. Charles Seife’s popular book *Decoding the*

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<sup>9</sup> Claudia Zander , Angel Ricardo Plastino Angelo Plastino, Montserrat Casas and Sergio Curilef. “Landauer’s Principle and Divergenceless Dynamical Systems.” *Entropy* 11 (2009): 586-597.

<sup>10</sup> Brian Hayes. “Reverse Engineering,” *American Scientist*, March-April 2006, 95, 107.

<sup>11</sup> An example of defining information on the basis of how it is used can be found in the following: “It might be useful to say, here, that stimuli are physical, while information is non-physical. Information is defined (*for the special purposes of communication engineering*), in terms of...” Stuart C. Brown. *Philosophy of Psychology* (Macmillan, 1974), 198. Emphasis mine.

*Universe* is one notable example.

Seife says, “[information] is a physical entity, a property of object akin to energy or work or mass.”<sup>12</sup> Clearly, this goes beyond the conclusions of Landauer’s principle and, unfortunately, Seife provides no argument in his book to substantiate this claim. More unfortunately, Seife makes the same mistake as Landauer. He says, “information cannot travel from place to place instantly, because information has a physical presence.”<sup>13</sup> Seife cannot have it both ways. Either “information has a physical presence” or “[information] is a physical entity. *Having* a physical “presence” is not the same as *being* a physical “entity.” The property of an object is not the same as the object itself.

Despite these crucial distinctions, Seife continues this “information is physical” mantra all the way to the end of his book:

Information is physical. It is not an abstraction that miraculously sits on an atom or an electron; the information must be stored on that object and the information must manifest itself in some physical manner.<sup>14</sup>

There is much confusion packed into this small paragraph. First, Seife is giving an unusual application to the word “abstraction.” Abstractions, to be abstractions, don’t (miraculously or unmiraculously) “sit” anywhere as if they were a physical entity, for they are *abstractions*. Physical entities, however, have no problem sitting “on an atom or an electron” precisely because they are *physical* entities. Saying “Information is physical. It is not an abstraction that miraculously sits on an atom or an electron,” is like saying “Bankers are rich people. They are not poor beggars who live in mansions and drive sports cars.” “Poor beggars” don’t “drive sports cars” any more than “an abstraction...sits on atoms or electrons.” Perhaps Seife’s presuppositions aren’t letting him make the obvious distinction between something “physical” and something non-physical like an “abstraction.”

Second, how can Seife assert that “information is physical” while at the same time saying “information must manifest itself in some physical manner”? The two assertions are not the same, and this (again) seems to be a failure to distinguish between the property of something and the thing itself. A manifestation of something, to be a manifestation, does not require the exact same properties as the thing that is being manifested – for how would one distinguish the manifestation from the thing being manifested? Seife appears to be too concerned about securing the physical reality of information to even construct a valid argument, let alone a true statement. Indeed, three times Seife asserts that information is “physical” in his book, but not once does he actually substantiate this claim. It appears Werner Gitt was right: “The philosophy of materialism is fundamentally predisposed to relegate information to the material

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<sup>12</sup> Charles Seife, *Decoding the Universe* (Penguin Group, 2006), 56-57.

<sup>13</sup> Seife, *Decoding the Universe*, 142.

<sup>14</sup> Seife, *Decoding the Universe*, 246.

domain.”<sup>15</sup>

One would expect an argument and not merely an assertion for the physicality of information in a book dedicated to the subject of information. After all, it is not as if human experience suggests that information is purely physical. In fact, the contrary seems more likely. Any computer user downloads “tons” of information to their disk drives, and yet, the disk drive doesn’t get any heavier. More challenging, is if a sculptor carved out the words “President Nixon took the US dollar off the gold standard in 1971” on a 1x1x1’ block of wood, the sculptor added information and lost matter within the same given space. *Less* matter, in this case, actually results in *more* information (one wonders how materialist empiricism could ever account for such a phenomenon). Furthermore, if the sculptor carved the same sentence multiple times on the same block, no new information was added. None of these things should be possible if “information is physical.”

It is important to note that this is not a minor issue regarding information theory. It is central to the debate. And it is unfortunate that Seife (among countless others) provides nothing but dogmatic affirmation of information’s physicality.<sup>16</sup> Other thinkers who are thoroughly competent in their field have come to the opposite conclusion:

Information is not physical, although it can have physical representation.<sup>17</sup>  
– Stuart J.D. Schwartzstein, Center for Strategic and International Studies

Information is not physical (material) or energy (power, work) but is essential to all useful activity. – George H. Amber, Paul S. Amber, *Anatomy of Automation*

It is also important to understand that information is causally effective, even though information is not physical but an abstract entity.<sup>18</sup> – George Ellis, *Faith, Hope and Doubt in Times of Uncertainty*

It might be useful to say, here, that stimuli are physical, while information is non-physical.<sup>19</sup> – Stuart Brown, Royal Institute of Philosophy

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<sup>15</sup> Werner Gitt. *In the Beginning Was Information: A Scientist Explains the Incredible Design in Nature* (Green Forest: Master Books, 2005), 51.

<sup>16</sup> Seife also arrives at some rather extreme conclusions. He personifies “Nature” (capital N) as a God-like entity that “attempts to dissipate stored information just as it attempts to increase entropy” (80), “gathers information about the atom and disseminates it into the surrounding environment,” (200) and “is always making measurements with these particles. It’s impossible to prevent it from doing so,” (205).

<sup>17</sup> Stuart J.D. Schwartzstein. *The Information Revolution and National Security* (Washington DC: Center for Strategic and International Studies, 1992), 196.

<sup>18</sup> George Ellis. *Faith, Hope and Doubt in Times of Uncertainty* (Interactive Publications, 2008), 11.

<sup>19</sup> Stuart C. Brown. *Philosophy of Psychology* (Macmillan, 1974), 198.

Information is like 'news,' it informs. Information is not directly related to physical quantities. Information is not material and is not a form of energy, but it can be stored and communicated using material or energy means. It cannot be measured with instruments but can be defined in terms of probability distribution.<sup>20</sup> – David Raymond Anderson, *Model Based Inference in the Life Sciences*

We have not yet learnt enough about ourselves, and our brains and our language, to overcome entirely the difficulties presented by the dual concept of body and mind...Nevertheless we can begin to understand that the 'immaterial principle' that operates within us is the manifestation of the information coded within our physical brains. Information is not material...(but) it can be carried and manifested only by material systems, whether active or passive...We can usefully think of the 'immaterial principle' that seems to pervade life as the encoded information that directs those ordered activities so that life continues.<sup>21</sup> – John Zachary Young

And information is not 'material', but digital facts, digitalized images and text that can be inexhaustibly and infinitely changed.<sup>22</sup> – Ine Gevers and Jeanne van Heeswijk

The rise of computers has had a lot to do with the popularity of ideas like these. The constant process of transferring information from one physical medium to another and then being able to recover that same information in the original medium brings home the supposed separability of information and matter. In biology, when you're talking about things like genes and genotypes and gene pools, you're talking about information, not physical objective reality. They're patterns. Even if computation is tied to a physical substrate, there's a difference between computation and information...<sup>23</sup> – Robert Aunger, *The Electric Meme*

Even the biology based on a materialistic philosophy, which discarded all vitalistic and metaphysical components, did not readily accept the reduction of biology to physics...Information is neither a physical nor a chemical principle like energy and matter, even though the latter are required as carriers.<sup>24</sup> – J. Peil

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<sup>20</sup> David Raymond Anderson. *Model Based Inference in the Life Sciences* (Springer, 2008), 52. Note: that this is a chapter on "information theory and entropy."

<sup>21</sup> John Young quoted in Denys Wilkinson, Denys Haigh Wilkinson, *Our Universes* (Columbia University Press, 1991), 35.

<sup>22</sup> Ine Gevers and Jeanne van Heeswijk. *Beyond Ethics and Aesthetics* (SUN, 1997), 262.

<sup>23</sup> Robert Aunger. *The Electric Meme* (Free Press, 2002), 139.

<sup>24</sup> J. Peil quoted in *In the Beginning Was Information*, 51.

In short, a variety of scientists and thinkers recognize that information itself is something nonmaterial, but it always has a physical “carrier” – despite the die-hard philosophical naturalists who refuse to let go of the false statement “information is physical.”

Where the debate gets complicated is in discussing (a) the nature (or possibility) of non-“carried” information and (b) the origin of *any* information. This is usually when a person’s presuppositions come to the table and, often enough, their irrationality is exposed. For example, if the material world is all that there is, then the idea of non-“carried information” must be dismissed *a priori*. There is no information if it is not physical in some way. This creates a number of interesting issues in and of itself (especially regarding the origin of information), but there is little space to discuss them here. But, bigger problems are introduced even if it is granted that information always has a physical carrier because that assumes a fundamental distinction between the physical *representation* of information and information itself. It is this distinction that no theory of information can seem to get around, and it is this distinction that is most threatening to materialist worldviews. What is the nature of the thing that is being represented by the physical carrier? Virtually no secular scientist (let alone Christian scientist) has even begun to scratch the surface in answering this question. As a result, even those who are pre-committed to materialist philosophies concede on this fundamental distinction simply because there is no better explanation. The paradox remains: information must be physical (due to naturalist, materialist presuppositions) and information cannot be physical (due to experience and observation). The end result is a lack of stability in scientific discussions regarding information theory.

In any case, for all of its statistical and communicative uses, the theory that information is nothing more than binary and statistical quantity does not do justice to human experience. It has many problems, namely, its limited application. If a person wants to stay close to Shannon’s theory in combination with Landauer’s principle, then one is limited to defining information as quantifiable, communicable code, which raises the question: how does this view of information apply to non-binary entities such as DNA, language, and music? Granted, DNA, language, and music can be translated into strictly binary information for a different physical carrier (i.e. transferred onto a computer that writes and reads binary code). But is it really accurate to suggest that dictionaries, the human genome, and music charts don’t contain “information” until they’ve been converted to binary? Would it really be more appropriate to say that DNA, books, and score sheets contain *potential*, but not *actual* information? To put it differently, can information exist where Landauer’s principle does not apply (e.g. outside a computer chip, and not at absolute temperature)?

Surely it does. Upon what basis can one absolutize his or her definition of information (computer binary) over another (i.e. books, DNA, etc.)?<sup>25</sup> Of course, the Christian answer to that question is simple: God and His revelation is our ultimate starting point for any endeavor of human knowledge. Only with an all-wise Creator and ultimate Origin of information (regardless of what it is) can *any* information be defined, have meaning,

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<sup>25</sup> Andrews argues this point a bit differently, demonstrating how the same information exists regardless of the language used. See *Who Made God?*, 202.

and exist at all. The creature's attempts to define reality apart from the Creator will always end in futility. This is apparent in the second definition of information.

### Information as a Conventional Synonym for Meaning

If information can exist in other conditions besides those outlined by Shannon and Landauer, then perhaps there are more definitions than the materialist telecommunication and mathematical community can provide. The rest of society – even those specializing in the telecommunication world – have easily solved that quandary, at least on a semantic level. This introduces the second major use of the term information: it is a conventional synonym for *meaning*.<sup>26</sup>

[Information is] meaning that a human being assigns to data by means of the conventions applied to that data.<sup>27</sup> – William Stallings

Information is *meaning*. Organization is irrelevant unless it induces meaning. Computers have no sense of meaning, so computers always process data, not information. The nature of data structure or data organization is not addressed.<sup>28</sup>  
– Lee Ratzan

Information is not a commodity; it is a skilled human accomplishment. Information is meaning resulting from a person's engagement with data.<sup>29</sup> – Willem J. Muhren and Bartel Van de Walle

Information is meaning and context, arising from processing, interpreting or translating data to extract and underlying message or pattern.<sup>30</sup> – Taverekere Srikantaiah, Michael E. D. Koenig, American Society for Information Science and Technology

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<sup>26</sup> This definition is directly disputed by F.I. Drekste, who said, "Although information, as ordinarily understood, may be a semantic concept, this does not mean that we must assimilate it to the concept of meaning. For on the face of it, there is no reason to think that every meaningful sign must carry information or, if it does, that the information it carries must be identical to its meaning." F.I. Drekste. *Knowledge & the Flow of Information* (Oxford: Basil Blackwell Publisher, 1981), 42. See his other works, including *Perception, Knowledge, and Belief: Selected Essays* (Cambridge: Cambridge University Press, 2000).

<sup>27</sup> William Stallings. *Communication Networks* (Atlanta: Association for Media, 1985), 1.

<sup>28</sup> Lee Ratzan. *Understanding Information Systems: What They Do and Why We Need Them* (Chicago: American Library Association, 2004), 5.

<sup>29</sup> Willem J. Muhren and Bartel Van de Walle, "A Call for Sensemaking Support Systems in Crisis Management" in *Interactive Collaborative Information Systems*, Robert Babuška, Frans C. A. Groen eds (Heidelberg: Springer, 2010), 432.

<sup>30</sup> Taverekere Srikantaiah, Michael E. D. Koenig. *Knowledge Management in Practice: Connections and Context* (Medford: Information Today, Inc., 2008), 178.

A brief illustration is in order. A five year-old girl is looking at the magnet letters on a fridge. Her father asks her, “what does it say?” When she stares patiently at the scattered letters, and finally replies, “nothing,” she is in essence saying *there is no information here, Dad*. It says nothing. It asserts nothing intelligible. It cannot be discerned.

However, if her father rearranges the letters to say, “Cookies are in this fridge!” she’ll smile, understand, and quickly open the door. There is information on the fridge because it *means* something (at least, to her), despite the fact that nothing has physically changed with the magnet letters (the physical “carrier” of information) except, of course, for their spatial location.

Two features are apparent from this broader use of the word “information.” The first is that information is essentially the opposite of “random data.” If the magnet letters on the fridge spelled “I like cookies!” there would be information. But if they read, “esk!icoeiklol,” there would *not* be information. Why? Because the former means something (to someone), while the latter does not. The former has *coherence*, while the latter is random data – even if there was no change in the given physical space, or even if the same letters are used. Indeed, it appears that simply changing “esk!icoeiklol” to “I like cookies!” is to make the change from “random data” to “information.”

But, this begs the question: who or what determines what is “random data” (or “redundancy”)<sup>31</sup> and what is “information”?

It is the interpreter, the subject, the *creature* who determines what is coherent and what is not. That is the second feature of information in this perspective: it is conventional, subjective, relative to the interpreter. A Nestle-Aland 27<sup>th</sup> Edition Greek New Testament is random data for most people because they have not learned Koine Greek, but it is a wealth of information to the Greek scholar. Unlike the statistical definition of information, when “information” is the same as “meaning,” the same set of signs, symbols, or electrons can be random data at one moment and information the next without changing anything but the interpreter.

Put in other terms, information at this level is anything that *communicates*.<sup>32</sup> If a given set of letters, numbers, or signals does not communicate to anyone, then it is not information. If it does communicate, then it is information. This is how the SETI project determines if there is “intelligence” in outer space.<sup>33</sup> If there is a pattern to signals, then that suggests information, which, as various works have recently argued<sup>34</sup>, suggests

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<sup>31</sup> See Seife, *Decoding the Universe*, 13-14.

<sup>32</sup> This is essentially the same as “theorem 9” in Gitt’s work *In The Beginning Was information* (p. 68): “Theorem 9: If the information is to be understood, the particular code must be known to both the sender and the recipient.” Gitt’s proposals are far more extensive than those presented in this essay, and it is unfortunate that so many have overlooked his well-argued work in the discussion of information theory.

<sup>33</sup> See <http://www.seti-inst.edu/>.

<sup>34</sup> See Stephen Meyer’s *The Signature in the Cell*, William Dembski and Jonathan

*intelligence*. For that reason, it is an oxymoron to say “meaningless information.” Information would not be information if it did not have meaning. Information *is* meaning.

But, who or what determines what “meaning” or a “pattern” is? If 0101 is a pattern to Person A, then surely 0010000100 is a pattern to Person B or C. And if that is a pattern – *to some human being* – then why not 00010100101100011001? How could the subject possibly determine with absolute certainty what code, data, and signals have information and what code, data, and signals do not? One would literally need omniscience to determine with certainty what is a genuine “pattern” and what is merely “redundant” and “random.”

Clearly, in this conventional model of information, *human* understanding and *human* intelligence is the bottleneck for (a) at least defining information, if not also (b) discovering all other intelligence. Information depends on the intelligence, the knowledge, and the mental capacities of the subject who is acting as the (final) interpreter. If a given set of code or data can be interpreted by man, it is information. If man cannot solve it, then it is not information.

Consequently, yesterday’s “random data” might soon become today’s “information.” One example of this phenomenon was featured in the November 2009 edition of *Popular Science*:

RNA has always been considered DNA’s helper; its best-known job is turning genes into proteins. Some of it was even thought to have no function at all, the equivalent of cellular junk. But in 2003, as a graduate student at Yale, Rinn discovered thousands of new types of RNA, called large intervening non-coding RNAs, or LINC’s, and later proved that they play more than just supporting role in regulating genes – they appear to direct the entire show. At the time, the notion was considered contentious, even ridiculous. “It was the same thing again – ‘what you’re passionate about is stupid,’ Rinn says, ‘Classic science was not ready for this. Almost nobody was ready for this.’” He silenced his critics in 2007, when he showed that one of the LINC’s serves a vital function in human cells. He dubbed it HOTAIR, a wry nod to the fact that so many scientists thought his field of research was full of it.<sup>35</sup>

Because some data didn’t have any “function” or meaning, scientists didn’t consider it information. It was “junk RNA.” However, once the meaning of it was discovered, the *same* code became known as powerful and (quite literally) life-changing “information.”<sup>36</sup> What was different? Nothing but the knowledge of the human interpreter.

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Wells’ *The Design of Life*, etc.

<sup>35</sup> Melinda Wenner. “The Rule Shredder,” *Popular Science*, November, 2009, 54.

<sup>36</sup> The same or similar example of genetic code turning from “junk” to useful can be found in Frank Slack’s essay (quoted on page 236-237 of *Who Made God?*) entitled “Regulatory RNAs and the demise of ‘junk’ DNA” in *Genome Biology*.

But, as with all creature-centered theories of reality, the implications of this common use of the word “information” have considerable difficulties. It seems indisputable that, even if no one in the world knew Greek, the Greek New Testament would still contain information. Or, are we to believe that if everyone in the world only spoke English, all books written in other languages like French and German would cease to contain information since they no longer mean anything to anyone? Or, consider the example above regarding DNA in biology. Scientists only recently understood what certain chemicals and sequences mean in DNA. Does that mean that before the scientists learned the language of DNA, there was no information in DNA?

If a person holds to a purely conventional, subjective and creaturely definition of information, then the answer must be yes. There is no information where there is no human interpreter of it. DNA did not contain information until biologists learned its language.

However, this is absurd – at least to the Christian. Why should a Bible or a strand of DNA cease to contain “information” just because no creature is there to understand it?<sup>37</sup> Why should the lack of wisdom on behalf of the creaturely knower determine the content (and, perhaps, nature) of the object of knowledge? It is almost like saying that a tree that falls in a forest only makes a noise if someone is there to hear it.

To put it bluntly, the Christian must ask the basic question that is continually unanswered in the field of information theory: why should the *creature* determine what does and does not have meaning in *God’s* creation?

### **Information as a Conventional Synonym for Meaning in the Context of Unbelief**

When pushed to this critical point in the discussion, those unbelievers who faithfully hold to this creaturely sense of information have no other option but to either (a) dogmatically re-affirm that information is subjective meaning despite its problems, or (b) resign to a sort of agnostic relativism where no one knows for sure, but scientists know enough to talk about it “usefully.”

It is important to note the irony of this second option: it embraces that which it is trying to ignore. Asserting that “information” can be known only to the extent that it is used by human subjects is precisely the essence of this second perspective, regardless of any agnostic or relativistic preface that tries to escape the second perspective’s problems. Unless one is willing to say that “information” in all senses is *completely meaningless*, then, logically, one must adopt the view that information is meaning – or at least *meaningful* – in some creaturely context. Circularity is both the solution and the

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<sup>37</sup> This whole concept resonates with the metaphysics of George Berkeley (1685-1753), who asserted that something truly exists only if someone is there to perceive it or if someone is being perceived. As he put it in *The Principles of Human Knowledge*, I. iii., “The table I write on, I say, exists, that is, I see and feel it; and if I were out of my study I should say it existed, meaning thereby that if I was in my study I might perceive it.”

problem.

Put in more Van Tillian language, the view of (b), which is nothing more than the second view of information that has been discussed this section (III.), asserts that a concept or word has meaning simply because the creature says it has meaning, not because an omniscient, purposeful Creator exists, works in creation, and reveals Himself, reveals His will, and reveals knowledge. Thus, anything beyond man's opinion is off-limits because man, just by virtue of being human, cannot know with certainty; objective, universal truth-claims and objective definitions are impossible. So, man must define whatever there is to be defined and whatever can be defined – that is, all definitions must be circular (“x is true because I say so,” etc.).

Of course, from a Christian perspective, God has the right to be circular – for He is self-defining, self-sufficient, and self-contained. Furthermore, He is the only true God and so these attributes and His glory remains uncontested. Therefore, for the believer, knowledge of concepts is possible because the Creator and source of all knowledge reveals to creatures whose faculties He can sovereignly control.<sup>38</sup> For the unbeliever, however, the only sure and final conclusion is that opinion is absolute.

It is clear that this option is self-defeating for the same reason that most forms of relativist moral arguments are self-defeating: one must deny that opinion is absolute in order to establish that opinion is absolute. That is, in principle, one needs some kind of absolutism to be a consistent relativist. Popular treatments of this poor philosophy (e.g. Koukl or Copan) competently reveal the absurdity of these conclusions.<sup>39</sup>

Nevertheless, it is not difficult to find this phenomenon – being forced into contradiction by attempting to avoid any sense of objectivity – in discussion of information theory. One notable example comes from Diedrich, Fodor, and Zucker in their 2008 publication *Stimulating the Mind: A Technical Neuropsychanalytical Approach*.

The word ‘information’ as used (after Shannon) in so-called ‘information theory’ does not refer to what is normally meant by ‘information,’ since Shannon’s information is a purely syntactic property of something like a bit-string, or other structure that might be transmitted from a sender to a receiver using a mechanism with a fixed repertoire of possible messages. Having that sort of information does not, for example, allow something to be true or false, or to contradict something else. However, the more

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<sup>38</sup> As John Frame put it, “[God] can control, not only the initial revelatory events but also our reception of that revelation, so that we can receive it with confidence. He has not chosen to make our subjective reception of that revelation infallible. But he has given us sufficient justification to affirm the infallibility of the revelation itself.” John Frame in *Revelation and Reason: New Essays in Reformed Apologetics*, ed. K. Scott Oliphint and Lane Tipton (Phillipsburg: Presbyterian and Reformed, 2007), 128.

<sup>39</sup> See Greg Koukl and Francis Beckwith, *Relativism: Feet Firmly Planted in Mid-Air* (Grand Rapids: Baker, 1998) and Paul Copan, *True for You But Not For Me* (Bloomington: Bethany House, 2009).

general concept of information, like ‘mass’, ‘energy’ and other deep concepts used in scientific theories, is not explicitly definable. That is to say, there is no informative way of writing down an explicit definition of the form ‘X is Y’ if X is such a concept. All you’ll end up with is something circular, or potentially circular, when you expand it, e.g. ‘information is meaning’, ‘information is semantic content’, ‘information is aboutness’, ‘information is what is expressed by something that refers’, ‘information is a difference that makes a difference’ (Bateson), and so on.

But that does not mean either that the word is meaningless or that we cannot say anything useful about it. The same is true of ‘energy’. It is sometimes defined in terms of ‘work’, but that eventually leads in circles.<sup>40</sup>

There is some truth in these words. First of all, it is true that information is difficult to define, and that defining it may have to do with the context in which it is used. Second of all, it is true that there are concepts that cannot be entirely reduced to mathematical or analytic formulas. However, the denial that “information is meaning” in this quote needs further comment.

First, the authors accurately summarize Shannon and information theory. Then (going beyond Shannon) they assert the impossibility of defining a concept like information in any certain or objective sense. This forces them to face the option of subjectivism, which they then deny since the usefulness of absolute subjective definitions are inherently circular. Finally, since there is no other option in their generally Creatorless worldview they resolve by going back and affirming that which they previously denied, namely, that there is still some use and meaning for “information” – not because the Creator of the universe has anything to say, but merely because people use it, just like “energy” and “mass,” etc.

When seen through the broader Christian worldview, it almost appears as if Van Til and Bahnsen’s detailed work on the nature of unbelief and self-deception is vindicated. Unbelieving thought begins with the presupposition of unbelief, knows the truth, but suppresses the truth in unrighteousness even if that suppression results in absurd conclusions. Or, to put the pattern of unbelief in a summary form:

1. A denial of the knowable absolute. (Due to presupposition – unbelief)
2. A denial of the circular subjective. (Due to *sensus divinitatis* – knowledge of the truth)
3. An affirmation of the circular subjective. (Due to suppression of the truth in unrighteousness – hardened heart)

Granted, most unbelievers in the world would probably accept instead of reject (2), at

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<sup>40</sup> Dietmar Dietrich, Georg Fodor, Gerhard Zucker. *Stimulating the Mind: A Technical Neuropsychanalytical Approach* (Springer, 2008), 133.

least until it can be demonstrated that their self-centered autonomy is circular and unreliable. In other words, some people are more aware of the problems that subjectivism creates (e.g. the impossibility of objective morality, etc.) than others. Christian apologetics largely assists in uncovering these problems, opening the door for an objective solution. Of course, even then, unbelief may continue as creatures to “suppress the truth in unrighteousness” (Romans 1). So, there is no power to embrace the truth even after admitting the irrationality of circular, subjective, (alleged) autonomous opinion; people choose to live with contradictions in their thought even after they have been shown them.

But for those in more scholarly fields whose task is to publicly uncover the truth, circularity and subjectivity is generally unacceptable, if not unbearable. It is not enough to say “x is true because I say so.” There needs to be some kind of verifiable foundation from which to make truth claims. Yet, because an objective and knowable norm does not exist as an integral part of his worldview, the unbelieving thinker is forced to affirm that which he knows is irrational.<sup>41</sup>

To connect this to the main subject, the unbeliever’s theory of information, where information is a conventional synonym for meaning, is directly representative of unbelief itself: it is self-deceptive and internally contradictory. Everyone knows that DNA contained “information” before scientists learned its language, and that a Greek New Testament contained information even if no one could read Greek. Yet, no one can consistently affirm this reality – at least outside orthodox Christianity.

### **Information as Projections of the Creator’s Genius in Creation**

It seems that Cornelius Van Til anticipated this very problem in his epistemology. He insisted that God, not man, is the final “interpreter” of all things. As William Edgar summarized:

On the Christian (“theist”) view, the rules of logic are defined by God’s nature and plan. God determines what is possible and impossible, what is contradictory or not. On the non-Christian (“anti-theist”) view, the ultimate background is wide open possibility, defined by the human being. Thus, he may judge what qualifies as revelation, and he will often reject it because, it does not pass the test of the possible, the impossible or the contradictory as he defines them.<sup>42</sup>

If knowledge can be defined as “justified true belief,” then information might be defined as the nuts and bolts of “belief.”<sup>43</sup> Therefore, it would not be improper to change this

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<sup>41</sup> For an excellent discussion of self-deception in the epistemology of unbelief, see chapter 3 of Greg Bahnsen, *Presuppositional Apologetics: State and Defended* (Nacogdoches: Covenant Media Press, 2008).

<sup>42</sup> William Edgar in *Introduction to Systematic Theology*, 81.

<sup>43</sup> The relationship between knowledge and information is certainly an area that needs

quote (changes of “knowledge” to “information” are in **bold**) to reflect a Christian theory of information:

On the Christian (“theist”) view, **information is** defined by God’s nature and plan. God determines what is possible and impossible, what is contradictory or not, **what is truly “random data” and what is truly “information.”** On the non-Christian (“anti-theist”) view, the ultimate background is wide open possibility, defined by the human being. Thus, he may judge what qualifies as **information**, and he will often reject it because, it does not pass the test of the possible, the impossible or the contradictory as he defines them.

Thus, in a Christian theory of information, information *is* meaning, but not according to man, but rather according to God. *Information exists regardless of the knowledge or even the very existence of the knower.* If everyone in the world died and no person could read English, Webster’s dictionary would still contain information. And even if no biologist or human being ever existed, there would still be information within the DNA of a cell. Information would still exist in the blood of a mouse even if the mouse was entirely incapable of ever learning the information or learning *about* the information in the DNA of its own blood. Why? Because God created all of these things, and He has already exhaustively and accurately interpreted and known all things. Thus, information, in an ultimate and Christian sense, must transcend time, transcend location and cultural context, and transcend subjective, conventional and therefore creaturely meaning. It is from God’s mind, and not from man’s mind. As such, information – the meaning and wisdom and knowledge that is inherent to the mind of God – existed long before creation, as Lady Wisdom declared:

Ages ago I was set up, at the first, before the beginning of the earth. When there were no depths I was brought forth, when there were no springs abounding with water. Before the mountains had been shaped, before the hills, I was brought forth, before he had made the earth with its fields, or the first of the dust of the world. When he established the heavens, I was there; when he drew a circle on the face of the deep, when he made firm the skies above, when he established the fountains of the deep, when he assigned to the sea its limit, so that the waters might not transgress his command, when he marked out the foundations of the earth, then I was beside him, like a master workman, and I was daily his delight, rejoicing before him always. (Proverbs 8:23-30)

All of the information required for the creation and its most fundamental features – whether in chemistry, biology, geology, astronomy – was always present for the Creator. He is the original Source and original Interpreter of all information, wisdom, knowledge, etc. Everything that a creature knows is merely a reconstruction, a reinterpretation, a *reprocessing* of God’s original blueprint. Van Til constantly spoke of this:

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further exploration in information theory.

The self-existent God is the original of which man is the derivative. Our very knowledge of ourselves, says Calvin, involves our knowledge of God as our original, whatever is found in man, as God's image bearer, with the exception of that which results from sin, has its original in God.<sup>44</sup>

Christians must also believe on the two levels of knowledge, the level of God's knowledge, which is absolutely comprehensive and self-contained, and the level of man's knowledge, which is not comprehensive but is derivative and reinterpreted. Hence, we say that as Christians we believe that man's knowledge is analogical of God's knowledge.<sup>45</sup>

Univocal reasoning starts with the assumption that man and the universe are entities from which, as ultimate starting point, we can reason to God. We believe, however, that not even Adam in Paradise could do this. He could only do what Calvin speaks of in the first paragraph of the *Institutes*, namely (a) think of God and himself simultaneously, and (b) think of God as ultimate and of himself as derivative.<sup>46</sup>

In Paradise, man made his self-consciousness *the immediate but wholly derivative* starting point while he made the self-consciousness of God the *remote but wholly ultimate starting point* of all his knowledge.<sup>47</sup>

Greg Bahnsen made Van Til's point even clearer:

The Christian God is totally self-sufficient, and in Him there is an equal ultimacy of unity and diversity (being Triune). Everything outside of Him derives its existence, character, meaning, and purpose in light of Him and His sovereign counsel. There is a categorical distinction drawn between this sovereign, self-sufficient, triune God and the created realm; the Creator is absolute, original, and unconditioned, while the creation is finite, dependent, and derivative. The Creator plans, governs, and controls every event of history. Thus the standard of meaning and truth is always in the mind of God.<sup>48</sup>

We might legitimately insert into Bahnsen's last sentence, "Thus the standard of meaning, truth, *and therefore, information*, is always in the mind of God."

If information is any kind of "meaning" at all, it is *God's* information. God is the one who forges meaning from what appears to be random code just by revealing to us *His* knowledge (Rom. 1, Ps. 19, etc.). The creature is like the 5 year old puzzled over the letters on the refrigerator door, while her Dad is like God the Father who reveals

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<sup>44</sup> Van Til, *Introduction to Systematic Theology*, 72.

<sup>45</sup> Van Til, *Introduction to Systematic Theology*, 33.

<sup>46</sup> Van Til, *Introduction to Systematic Theology*, 178.

<sup>47</sup> Van Til, *Introduction to Systematic Theology*, 129.

<sup>48</sup> Greg Bahnsen. *Presuppositional Apologetics: Stated and Defended* (Powder Springs: American Vision Press, 2008), 16.

wisdom, truth, and meaning in Scripture and creation. Indeed, God is the one who brings ultimate meaning out of what typically appear (to human subjects) to be meaningless events. Because information is not dependent upon a human interpreter and rather a divine Interpreter who knows all things (nothing is “random data” to Him), meaning exists wherever God knows how to interpret information.

The following quote of Van Til can also be modified (changing “knowledge” to “information”) to further clarify a Christian theory of information:

If one does not make human **information** wholly dependent upon the original...consequent revelation of God to man, then man will have to seek **information** within himself as the final reference point.<sup>49</sup>

This, of course, is precisely what has happened since the work of Shannon in the last half of the 20<sup>th</sup> century. Whether in his statistical theory of information or the conventional use of the word in society, information will, ironically, be *meaningless* without God as the final reference point. As the Scriptures say, “the fear of the Lord is the beginning of knowledge” (Proverbs 1:7), and “the fear of the Lord is the beginning of wisdom” (Proverbs 9:10).

## Conclusion

In summary, in a Christian theory of information, information (nonmaterial) is not created according to the creature’s subjective knowing capacities, constantly changing according to the man’s epistemological failures and successes. Information, at its most basic level, is meaning and purpose projected into creation (having a physical carrier) by the omniscient Creator of the universe who has decided to reveal purpose, order, and direction in His creation. The information of God, indeed, is wisdom and knowledge with a physical means of transportation, reproduction, and reduplication.

But all information, whether original or reproduced, is ruled by Christ the Lord. Only by God’s will is any set of data – whether in binary or DNA – intelligible to human beings, just as we depend upon Him for our very existence: “for in Him we live and move and have our being,” (Acts 17:28). Only in His light “do we see light” (Ps. 36:9). May we join Kuyper in a modern revision of his famous quote, “In the total expanse of human life there is not a single *bit* of which Christ, who alone is sovereign, does not declare, ‘Mine!’”

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<sup>49</sup> Cornelius Van Til. *A Christian Theory of Knowledge* (Nutley: Presbyterian and Reformed, 1968), 17.

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