



INFORMATION

The Key to Life

Dr. Werner Gitt

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Terms Used for Large Numbers

The names of many large numbers differ between American and British/German usage. This book uses the naming conventions of American English.

Large number terms	American English	British English
Thousand	10^3	10^3
Million	10^6	10^6
Billion	10^9	10^{12}
Trillion	10^{12}	10^{18}
Quadrillion	10^{15}	10^{24}
Quintillion	10^{18}	10^{30}
Sextillion	10^{21}	10^{36}
Septillion	10^{24}	10^{42}
Octillion	10^{27}	10^{48}

FOREWORD

by William A. Dembski

In the first chapter of Romans, the Apostle Paul makes clear that the attributes of the physical world give sufficient evidence of God to render atheism not just intellectually untenable but also morally repugnant. Ignorance of God's power and glory is never innocent but always willful. Thus, Bertrand Russell's famous quip that if asked at the pearly gates why he disbelieved in God, he would respond "not enough evidence," has never seemed, at least within Christian theology, as particularly exculpatory. The physical creation has always been enough to convince humanity of God's power and glory, and to assert the opposite has always been a mark of foolishness (cf. Ps. 14:1).

Professor Werner Gitt was one of the first Christian thinkers to see the profound connection between the mathematical theory of information and evidence of God's activity in the world via a spoken word (cf. Gen. 1 and John 1). Thus, this book is the sequel to an earlier book titled *In the Beginning Was Information* [G15]. But what exactly about the physical world gives evidence of God? If the universe were a giant homogeneous pudding, it might be difficult to discern God's power and wisdom in creation. But the world is not a pudding. It is a space-time continuum, the mass-energy of which is hierarchically distributed with

precise structures at each level of organization. In particular, cosmology and biology both give evidence of God. The focus of this book is on biological design. It argues that the vast complexity and precise organization of DNA — its information! — provides conclusive evidence for the activity within the world of a non-material entity. Information, as this book demonstrates, is inherently non-material — it lies beyond the reach of any reductive materialism.

Werner Gitt, by contrast, argues that information of the sort that we see in living systems could not have come about by material processes devoid of intelligent guidance. In this regard, Werner Gitt's thinking parallels that of many design theorists this side of the Atlantic. The intelligent design movement, from the start, has seen the crucial role of information as a marker of intelligence and the inability of purely material factors to capture the notion of information. Our emphasis has been a bit different from Werner Gitt's, focusing on statistical and complexity-theoretic properties of patterns associated with the activity of intelligent agents. Werner Gitt is aware of this work and draws connections with it at the end of this book. Yet his approach to information is broader than that of most American design theorists, focusing also on the semantics, pragmatics, and end-directedness (what he calls "apobetics") of information.

My strong endorsement of this work should not be interpreted as a blanket acceptance of every one of its claims. Thus, I would encourage readers to keep in mind that the intelligent design movement, broadly conceived, contains some diversity of views. There is agreement on core issues: intelligent design proponents agree that information is a primary and irreducible feature of the created order, that purely material forces are unable to account for information, and that natural selection cannot create the sort of information that we encounter in biology (in particular, materialistic theories of evolution are bankrupt). Nonetheless, individuals within the intelligent design community hold a diversity of views on the precise details and timing of key events in the formation of the cosmos and of life.

As a mathematician with experience in reading technical literature, I found the organization and notation of this book quite accessible. Readers without this background or experience, however, may experience something of a "culture shock." I would encourage such readers to exercise patience and plow through what for many will be new terminology and notation. Some of this terminology may seem idiosyncratic. In part this

is an unavoidable consequence of this book being a translation from the German language. But it is also the result of hammering out a new vocabulary to define novel concepts. Sitting on my shelf is a massive encyclopedia of physics dated 1992. In it the word “information” appears neither as an entry nor in the extensive index. Information, as applied to the natural sciences, remains in its theoretical infancy. This book helps to advance the discussion and move it to maturity.

Although I speak and read the German language fluently, having lived in Germany for five years, I was delighted when in 1998 I was able to purchase the then recently completed English translation of *In the Beginning Was Information...* I’m delighted that this expanded and refined sequel to that work is likewise available in English. I appreciate its scientific insights. But even more I appreciate its commitment to our God and Savior, Jesus Christ, who is the Word — the INFORMATION — made flesh.

William A. Dembski, Research Professor in Philosophy at Southwestern Seminary in Ft. Worth, Texas, and Senior Fellow with Discovery Institute’s Center for Science and Culture. With doctorates in both mathematics and the philosophy of science, he is a prolific author who published the first academic monograph on intelligent design (*The Design Inference*, Cambridge University Press) and founded the first intelligent design research center at a major university (Baylor University’s Michael Polanyi Center).

PREFACE

We live in the Information Age. Computers (processors of information) play a central role in our society. Indeed, no branch of science, technology, government, or private industry could do without this revolutionary and timesaving tool. Indeed, the term “information” has become a key word for our understanding, not only of technological processes, but also of biological systems.

But what is information? Claude Shannon was among the first to tackle this question and to develop a mathematical theory for studying it. Unfortunately, Shannon’s definition of information falls short of being all-encompassing. It does not consider certain essential attributes of information such as meaning and purpose. In fact, it is suitable for handling just one relatively superficial aspect, the statistical attribute.

As an information scientist I took up the challenge and have spent more than 30 years researching the concept of information. The realization that information was by no means an attribute of matter but rather a distinct non-material entity was a breakthrough for me. This position stands in stark contrast to all those publications that are influenced by the widely accepted materialistic worldview.

After working out a definition of information, I succeeded in formulating scientific laws for this non-material entity, information, from which it is possible to draw sound arguments. Some of these scientific results were published in the German book *Am Anfang war die Information* [G25] (translated into English as *In the Beginning was Information*) and in two English-language articles [G26].

Thereafter, the book was substantially altered and extended, appearing in 2016 in German under the new title *Information: Der Schlüssel zum Leben* (*Information — the Key to Life*). Since then, the German version has gone through multiple editions and refinements, all of which to date are incorporated in this English version under the same title.

This version of the book also reflects the cumulative efforts of a number of others over the years, in translating, editing, and correcting. To all of them I would like to express my very heartfelt thanks for all the effort, time, and patience invested.

This book has been structured into two parts. Chapters 1 through 8 address exclusively scientific matters and the resulting conclusions. We begin by first establishing a precise definition of Universal Information (UI), and then formulating empirical statements derived from observations of human (natural and machine) languages.

Next, we take an extensive look at the fundamental aspects of scientific laws of nature. From the empirical statements derived, we then propose six scientific laws and nine corollaries of Universal Information. Finally, through careful study, we have determined that all living organisms contain UI in their DNA and belong within the UI definition domain. Thus, the scientific laws of UI apply to all of life, and by using them as premises we are able to draw sound arguments. This is discussed extensively in chapter 8.

In chapter 9 we go beyond the boundary of science and demonstrate that the Bible is a divine source of UI, extending beyond human intellect. By means of mathematical-probability reasoning, we determine that the Bible is an absolutely trustworthy source of truth. Additionally, we demonstrate by comparison that our previously drawn scientific conclusions agree with biblical revelation.

In this age of materialism-based science, people believe what they regard as science and reject the Bible. Why is this? Modern science rests on two unjustifiable pillars. One is materialism, claiming that all phenomena in this world are caused exclusively by mass and energy. The

other pillar of modern science (a corollary of the first) is that mass and energy possess the ability to self-organize over time. These are principles whereby God is completely excluded from all scientific thought processes. Both of these pillars are toppled by the scientific laws of Universal Information.

This book refutes materialism, atheism, and the theory of evolution, and confirms the existence of an almighty and all-knowing God. What was stated almost two thousand years ago in the New Testament (Rom. 1:19–21) is here supported with scientific arguments,

since what may be known about God is plain to them, because God has made it plain to them. For since the creation of the world God's invisible qualities — his eternal power and divine nature — have been clearly seen, being understood from what has been made, so that people are without excuse. For although they knew God, they neither glorified him as God nor gave thanks to him, but their thinking became futile and their foolish hearts were darkened.

My hope and prayer is that this book will “light a fire” and also encourage many to dig ever deeper for the truth. If this is done with unhindered sincerity, then in the end a person will turn toward the living God of the Bible — the scientific evidence demands it!

Wesley Pitt



INTRODUCTION

There is an ancient war between creationists and secular evolutionists. This war has intensified over the past few centuries, most notably after the publication of Darwin's *On the Origin of Species* (1859). Science is one of the primary fronts in this war; however, philosophy, theology, law, economics, the arts, education, and essentially every area of human activity are also involved.

Many people are convinced that this war is based upon the concept of “religion vs. science,” “blind faith vs. confirmed facts,” or “emotion vs. rationality.” This is a misconception which results only in arguments that are tangential to the central issue. If the main issue is not framed properly and addressed directly, it will never be dealt with in a rational manner. However, there is a two-pronged approach that may lead to a solution.

First, it is vital to understand that this is not a “science vs. religion” matter. Both sides are unquestionably ideological and, as such, can be defined as religious. If this is not understood, people will continue talking past each other and addressing matters that never deal with the primary issue.

Evidence of this problem lies in the common evolutionary argument that their position is not religious and not metaphysically based. They

seem convinced that the creation position relies entirely on religious beliefs while the evolution position is based entirely on solid scientific facts. The physicist-philosopher David Bohm in “Sketches, Further Remarks on Order,” from the 1969 book *Towards a Theoretical Biology*, has a cogent remark here:

It seems clear that everybody has got some kind of metaphysics, even if he thinks he hasn't got any. Indeed, the practical “hard-headed” individual who “only goes by what he sees” has a very dangerous kind of metaphysics, i.e., the kind of which he is unaware. ... Such metaphysics is dangerous because, in it, assumptions and inferences are being mistaken for directly observed facts, with the result that they are effectively riveted in an almost unchangeable way into the structure of thought. What is called for is therefore that each one of us be aware of his metaphysical assumptions, to the extent that this is possible.¹

In their attempt to silence creation opposition, evolutionists have tried to use modern science to undermine points being made by the opposition, in particular any statements which appear to have a biblical basis. Evolutionary arguments are disseminated through every possible medium: education, entertainment, government, and daily news programs. Essentially, this has amounted to a form of propaganda which is often devoid of scientific facts. The sad truth is that this propaganda to which the public has been constantly exposed has caused many Christians to doubt their own faith. Our goal then, from a Christian perspective, is to help build up the faith of our brothers and sisters in the Lord while presenting the facts and logic regarding a number of evolutionary arguments.

There are some major weaknesses in modern science which need to be exposed. One, for instance, is an argument over what “reality” means. Both Kant (18th century) and Kuhn (20th century) argued that our perception of reality is distorted as it passes through our sensory receptors and is then subjected to complex electrochemical processing in our brain. Kuhn explained that concepts and assumptions already programmed within our brains can also alter our perceptions of reality. Within the last twenty years, the term “worldview” has been adopted to represent those neural programs that alter our perceptions.

1. David Bohm, “Further Remarks on Order” in C.H. Waddington (ed.), *Towards a Theoretical Biology: 2 Sketches* (Edinburgh University Press, 1969), p.41f.

Very simply put, a worldview is what you believe to be true and thus is the basis for the way you interpret what your senses tell you, as well as determining your actions and reactions in everyday life. What you believe to be true will be based on what you have learned, what you have been taught, your assumptions, and your own experience. The two worldviews that will be addressed in this book are those of the *biblicists* (those who believe the Bible is true) and the *materialists* (those who believe only what their senses can determine is true).

Biblicists and materialists are in continuous conflict. A person who believes that the Bible is true also believes that it was inspired by God Himself and thus takes precedence over what our senses might tell us, or how we interpret what our senses might tell us. A materialist believes that he is free of any metaphysical or religious trappings and is depending entirely upon what his senses inform him is true, as well as on his own ability to interpret and understand those sensory inputs. As such, neither position is neutral, for as much as the former depends on the accuracy of God's Word, the latter depends on faith in the ability of his own brain and senses and is in axiomatic denial of any other ultimate source of knowledge. Thus, both are, in essence, religious views.

So, while Christians have a bias *for* God and the Bible, materialists have a bias *against* God and the Bible. Evolutionists, as materialists, also have a strong bias that restricts science to material processes only. These biases are parts of their respective worldviews, based upon their respective frameworks of ideas, assumptions, axioms, etc. No one is exempt from having their worldview affect or bias how they perceive things and how they think about things. Thus, the argument that Christians should be disqualified from science because of their bias is fallacious. In fact, it is historically verified that most of the individuals who initiated formal studies in various fields were Bible-believing Christians: Kepler, Newton, Faraday, Maxwell, Boyle, Mendel, Pasteur, and many others.

The foundation for all of this is naturalism, which claims that all phenomena are the results of natural causes and can be explained entirely by natural laws. "Nature" is thus defined as "the entire material universe and its phenomena." Materialism is defined as "the doctrine that everything in the universe was and is caused and explainable solely by mass and energy and the laws that govern these." This either leads to the conclusion that a circular argument is involved or that materialism and

naturalism are synonymous. Unlike naturalism, however, materialism is unambiguously defined:

The cause of all phenomena is matter, and determinism is the foundation of all scientific progress and criticism.²

What are living things made of? Are there special substances that are found in living things but not in nonliving material? Is there a special “spirit” or “essence” that living things possess? Does life have a physical and chemical basis that we can hope to understand and describe in the same way we do something that is not alive, like an automobile engine or a calculator? To answer these questions, we must first examine the world around us ... a world made up of matter and energy.³

The fundamental assumption of the modern scientific establishment is that reality consists solely and entirely of time, space, mass, and energy — mass and energy defining “matter.” As a result of this assumption, it requires that scientists explain all observed phenomena in terms of space, time, and matter alone, and also that matter must be able to self-organize over time. This is the worldview of secular science today.

This worldview, which excludes from the outset even the possibility of a creator or god, is by definition a metaphysical stance. It is not a matter of science, but a presupposition based upon ... what? Perhaps only on a desire for God not to exist?

Such a position logically leads to the conclusion that evolution must be true, as nothing other than natural forces and laws is permitted in the range of explanations. Complexity, intelligence, organization — all must be the result of physical processes. This, however, is also what they are trying to prove, and therein lies the logical fallacy of *petitio principii* (assuming the conclusion in the premises). Interestingly, they generally appear to be unaware of their involvement in this fallacy and fail to see how their own worldview is affecting the objectivity of which they boast. Once again, we see Bohm’s quote ringing loud and true.

The inescapable fact is that, one way or another, we are all biased. Classical science, however, had instituted a system of checks and balances

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2. Claude Bernard (1800s), cited in Arthur Custance, *The Mysterious Matter of Mind* (Grand Rapids, MI: Zondervan, 1980).
 3. Kenneth R. Miller and Joseph S. Levine, *Biology* (Upper Saddle River, NJ: Prentice Hall, 2000), p. 45.

as a way to eliminate as much bias as possible. This was done by welcoming the participation of scientists who had varied, and sometimes opposing, worldviews/religions. Controversy was tempered by mutual respect. This system is no longer in operation; only one worldview is permitted in standard science journals. Sadly, this is usually true for both the creation and evolution journals. This strict adherence to the orthodoxy (of either side) is the subject of a quote by Sir Karl Popper in his 1984 book *The Myth of the Framework: In Defense of Science and Rationality*:

I hold that orthodoxy is the death of knowledge, since the growth of knowledge depends entirely on the existence of disagreement ... discussion between people who share many views is unlikely to be fruitful, even though it may be pleasant; while a discussion between vastly different frameworks can be extremely fruitful even though it may sometimes be extremely difficult, and perhaps not quite so pleasant (though we may learn to enjoy it).⁴

The first point is the necessity of showing that both sides of the creation/evolution debate are not only subject to bias but are dependent upon a metaphysical foundation. The second point is that it is necessary to debate the issue in terms of a decisive topic or subject, and not some ambiguous issue. Is there such a decisive subject? In this book we have treated the subject of “information” as that decisive subject. We believe this subject can get to the heart of the matter and help us decide which position is correct.

The word “information,” as it is used in everyday language, is somewhat vague and subject to confusion. It is generally used to denote some meaningful knowledge that is to be learned or communicated. However, when information is being considered in terms of engineering — e.g., for storage and transmission purposes — no meaning is required nor is it relevant. Because the word “information” carries different meanings, we have unambiguously defined it by identifying its four distinguishing attributes. In order to avoid ambiguity or misunderstanding or conflation with other uses of the word “information,” we have labeled this definition “Universal Information,” often abbreviated as UI.

4. Karl Popper, *The Myth of the Framework: In Defense of Science and Rationality* (Oxfordshire, UK: Routledge, 1995).

Proceeding carefully, certain laws about Universal Information can be formulated. The very existence of Universal Information challenges the worldview of materialism. The possibility of an intelligent source is examined, as well as whether or not this intelligent source is non-material.

We then examine the particular coding system found in DNA, and discover that the information conveyed within genes is indeed UI. Using this DNA evidence and scientific laws governing UI as premises, we are able to develop sound, logical deductions. This leads us to the following conclusion: the God of the Bible exists, and He is responsible for originating and embedding Universal Information into biological life.

The truth is a powerful thing: it does not allow a person to remain undisturbed. Some embrace and follow the truth. Some reject it outright. Others prefer to ignore it, employing what might be termed “intentional ignorance.” How a person reacts to the truth is a willful decision that produces unavoidable consequences in that person’s life.

If materialism is embraced, then we invent our own standards of right and wrong and are accountable to no one for our decisions. If, however, the Bible is right, then there is an absolute standard of right and wrong and we are to be held accountable for not only our decisions, but our attitudes and actions as well. In Paul’s letter to the Romans, he states:

For since the creation of the world God’s invisible qualities — his eternal power and divine nature — have been clearly seen, being understood from what has been made, so that people are without excuse (Rom. 1:20).


Let us take a look.



PART ONE

Information

Chapter 1



VARIOUS MANIFESTATIONS OF INFORMATION

Following are some examples of complex systems, about which the question must be asked: What is the reason this system can function in such a remarkable way?

1.1 The spider's web

Figure 1 shows a section of the web of a *Cyrtophora* spider. The mesh size is approximately 0.8 mm x 1.2 mm. The circle in the lower picture indicates the part that has been highly magnified by an electron microscope to provide the upper picture. The design and structure of this web is exquisite, and the spider uses the available material quite economically. The required rigidity and strength — stronger, weight-for-weight, than steel or indeed any other man-made fiber including Kevlar — are obtained with a minimal amount of material. Spiral threads do not merely cross the radials and the two sets are not attached at the points of intersection only. Instead, they run parallel over a short distance and then they are tied or “soldered” together with very fine threads.

This spider's web gives the appearance of skilled architectural planning and proficient weaving. The spider's body chemically synthesizes the silk it uses for spinning the web using a computer-like controlled

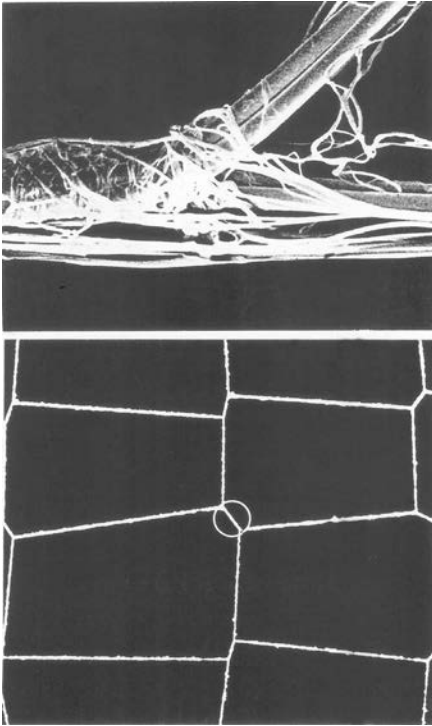


Figure 1: The web of a *Cyrtophora* spider.

where threads can be seen emerging from two of them. Silk having the required tensile strength is produced in the “factories” located directly below the spinnerets. These complex processes have a computer-like control and, in addition, all the required equipment is highly miniaturized. How is it possible that such a complex and minutely detailed manufacturing process can be carried out without mishap? It is because the system contains a controlling program that has all the required processing **information** (see chapter 5.9.2, Operational Universal Information).

manufacturing process. Where did this apparent architectural, engineering, and chemical ability come from? How were these instincts instilled into the spider? Where did the information come from? Most spiders are also active in recycling: they eat their own web in the morning and chemically process the material for re-use in manufacturing a new web.

If we want to answer these questions, we have to be willing to look at the way in which *information* plays an essential role.

1.2 The spinnerets of *Uroctea*

The spinning spigots of *Uroctea* spiders are shown in Figure 2 under high magnification. The female has 1,500 spinnerets, only a few of which appear in Figure 2,

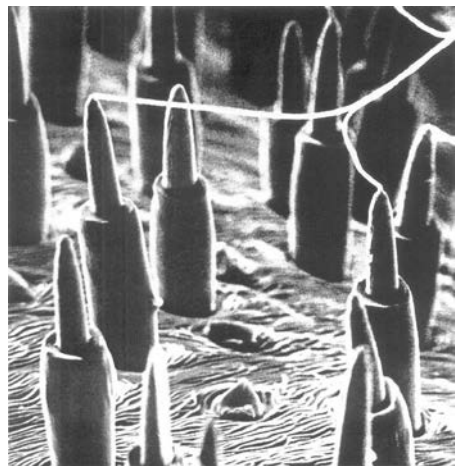


Figure 2: The spinnerets of *Uroctea*

1.3 The *Morpho rhetenor* butterfly

The South American butterfly *Morpho rhetenor* is depicted in Figure 3 under various magnifications so that the detailed structure of its wing scales can be seen (*Scientific American*, Vol. 245, Nov. 1981, p. 106). The wings exhibit marvelous colorful patterns, metallic blue above and brown underneath. The wings were analyzed for pigmentation, but none was found. How then can this colorful beauty be explained?

The detailed structure of the wings becomes apparent at 40 \times , 280 \times , and 16,000 \times levels of magnification. At the lower magnifications the structure resembles roof tiles, but at magnification 16,000 \times the secret is revealed. The structure is quite extraordinary: on the left side of Figure 3 is a regular grid of precisely constructed wedge-shaped ridges spaced at intervals of about 0.00022 mm. This pattern is repeated so accurately that the maximum deviation is only 0.00002 mm. What is the purpose of this marvelous structure, which would be impossible for us to manufacture with this precision?

A certain physical effect is utilized here in a fascinating way. It can be explained in terms of a simple example: when one drops two stones into a pool, concentric waves spread out from each point of impact. At some points of contact these waves cancel out and at other points they enhance one another. This effect is known as wave interference, and it is this effect on light waves that results in the observed colors. When the sun's light rays strike the stepped grid, called a *diffraction grating*, some colors are canceled out and other colors are enhanced. The grid

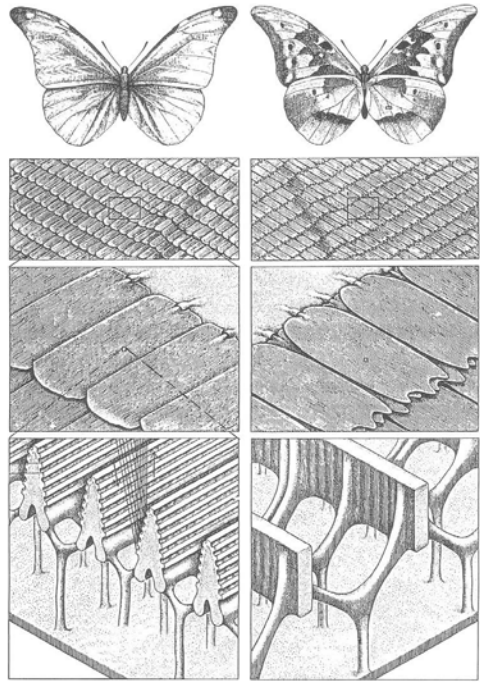


Figure 3: The South American butterfly *Morpho rhetenor* with wing surface sections under different magnifications.

spacing and the wavelengths of the incident light are precisely tuned to one another.

Furthermore, the deep black edges are caused by another fine structure: the scales are covered with pits about 0.001 mm across, with a high refractive index. Almost all light entering this pit is not reflected to an observer, but back into the material, so it appears almost completely black — blacker than any paint.

Another butterfly, *Lamprolenis nitida*, has two “blazed” diffraction gratings interspersed on single scales, which give two main color signals.

Did this simply happen accidentally, where everything is precisely formed to produce a special physical effect? That stretches credibility. It appears that, once again, the answer is most likely linked to **information!** (see chapter 5.9, Production Universal Information).

1.4 The development of human embryos

What happens during the nine months of human gestation is incredible. During the first four weeks of the new life, billions of cells are formed, and they arrange themselves according to an apparent plan to shape the new human being. Around the fifteenth day the first blood vessels appear. A few days later, within the tiny breast of the 1.7-mm-long embryo, two blood vessels join to form the heart, which begins to pump blood through the minuscule body before the end of the third week. The tiny new heart provides the developing brain with blood and oxygen. In the fourth month the heart of the fetus¹ is already pumping 30 liters of blood per day; at birth this volume will be 350 liters.

After two months the embryo is only three to four centimeters long. It is so small that it could literally fit inside a walnut shell. At this stage all organs are already developing — including lungs, eyes, and ears, even though they are not used yet. During the following months the organs increase in size and assume their eventual shape.

Various stages of human embryonic and fetal development are shown in Figure 4 [B3]:

A: A four-week-old embryo that is 4.2 mm long:

- 1) Boundary between back and abdomen
- 2) Incipient shoulder groove

1. **Fetus:** After 12 weeks no new organs begin to form. When organogenesis (embryogenesis = the growth and differentiation of cells at the sites of new organs during the first 12 weeks) is concluded, the embryo is referred to as a *fetus* (Latin for “offspring”) and its further growth is known as fetal development.

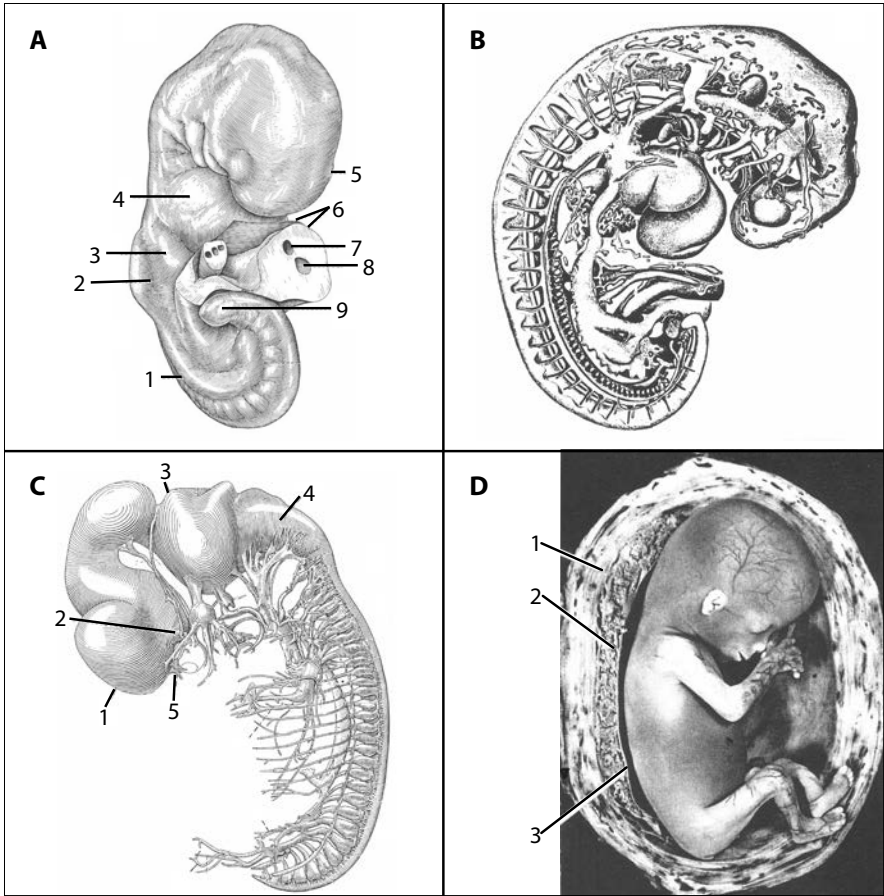


Figure 4: Various developmental stages of a human embryo.

- 3) Liver bulge
- 4) Heart bulge
- 5) Eye
- 6) Thin and thick part of the navel funnel
- 7) Anulus umbilicalis
- 8) Anulus umbilicalis impar
- 9) Coccyx

B: The embryo at four weeks when it is 4.2 mm long with internal structures exposed.

C: The exposed nervous system of a two-month-old embryo that is 17.7 mm long:

- 1) Telencephalon (= the front part of the first brain vesicle)

- 2) Optic nerve
- 3) Cerebellum
- 4) Medulla oblongata
- 5) Olfactory lobe (sense of smell)

D: Three-inch (75-mm) fetus shown inside the uterus:

- 1) Placenta
- 2) Myometrium (= muscular wall of the womb)
- 3) Amniotic membrane (the amniotic fluid has been removed)

How is it possible that embryonic development does not entail a disorderly growth of cells, but is systematic and purposeful according to an apparent timetable? A precise plan, in which all stages are programmed in the finest detail, underlies all these processes. In this case, also, **information** is the overall guiding factor.

1.5 The organ-playing robot

Would it be possible for a robot to play an organ? In Figure 5, Vasubot, a Japanese robot, enralls music lovers. It has two hands and two feet that are able to manipulate the keys and the pedals as it reads sheet music by means of a video camera. The notes are converted to the required

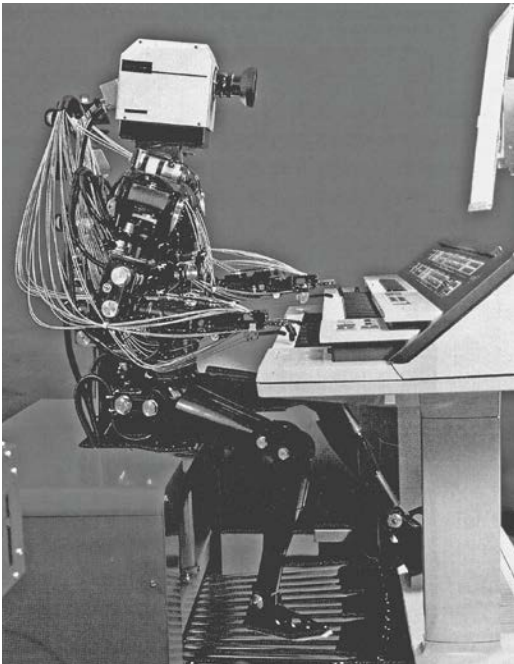


Figure 5: The organ-playing robot, Vasubot. This robot was exhibited at EXPO '85 in Japan. It was developed by Prof Ichiro Kato of Wasedo University, and was built by Sumitomo Electronic Industries. The robot is now on display in the official Japanese Government building EXPO '85 (tsukuba). This illustrates the capabilities of this level of technology and its limitations, i.e., this robot can only perform that which has been pre-programmed.

robotic hand and foot motions. This robot can read and play any piece of music without first having to practice it. The reason for this ability is that information is provided in a program together with all the required mechanisms. If the program is removed the robot cannot do anything. Information is the essential ingredient.

Consequences: Looking at the above examples, all of which are non-random in behavior or organization, we must consider that built-in information is their common factor. None of these systems could operate if their intrinsic information were removed. To better understand the processes occurring in living as well as in inanimate systems, it is necessary to study the concept of information in much greater depth. Werner Strombach, Professor of Informatics at Dortmund (Germany), briefly expressed an idea with which I could agree:²

Whoever can identify the original source of information holds the key to explaining the world. [S13]

2. I would add that it is not clear from the statement whether God is being referred to or whether He is excluded. The question of the source of the information is acknowledged to be of fundamental importance, but without the Spirit of God no one can really understand this world, even if they could logically and correctly answer the question about the source of the information. If the Bible really is the Book of Truth, as it so often indicates (e.g., John 17:17), then it is actually the Bible that is the key to understanding the world.