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THE FUNCTION OF PERCEPTION v1.0

Introduction v1.0

The relationship between Mind and Body has long been a subject of debate. Speaking broadly, there have been three main outcomes to this discussion, and no agreement between the outcomes. The three most common resolutions are that mind and body are distinct entities (classic dualism), that everything is body (empiricism), and that everything is mind (Buddhism).

Some approaches include Spirit when explaining the relationship of Mind and Body. Again speaking broadly, this affords two more possible outcomes - Spirit is composed entirely of Mind and Body (Spirit is everything), and Spirit is a separate mediating force between Mind and Body, composed of Mind and Body and another essence.

Yes, it is a merry-go-round of conjecture.

The importance of resolving the Mind-Spirit-Body issue may not seem apparent at first - on the surface the world goes on whether we agree on an answer or not. But these five possible outcomes lie at the doorstep of the most fundamental of our abilities - the ability to perceive. Perception is so basic that it defines the phenomenon of life. Perception is the root of consciousness, feelings, and stored knowledge. Without perception there would be no awareness of existence itself.

It is fair to say that a better understanding of the gift of perception would provide us with a greater understanding of the Universe, and our place in it.

A solution to the Mind-Spirit-Body question built using all five possible outcomes seems impossible, but such a solution, if it did exist, would present a unified framework for investigations of every kind - philosophic, scientific and creative. A unified framework is another way of saying that there would be a standardized method of investigation. Standardization has many benefits, not the least of which is clarity into the construction of any conclusion derived from an investigation. Another benefit is a relevant transference of results from one discipline to another.

If we can reasonably show that ideas have a physical aspect, we can create a chain of relationships between the body, the spirit and the mind. This chain of relationships would be the structure of our unified framework; it would modify the meaning of the five outcomes stated above, allowing them to exist concurrently at a basic level of inclusiveness. More specifically, a reasonable argument concluding that ideas have a physical element would add a common

dimension to each outcome - a common shared bridge of physicality linking the outcomes into a single structure.

Such a unified structure would therefore allow us to examine in a standardized way that most fundamental of human abilities - perception. In the following sections we will present arguments supporting the contention that ideas are non-physical, and follow that with arguments supporting the opposite viewpoint – that ideas are physical objects. From there we will present the chain of physicality from raw energy to ideas, and a functional definition of perception that arises from this chain of physicality. We will conclude with selected implications of this unified structure, particularly as they relate to our understanding of Truth.

ARGUMENTS SUPPORTING NON-PHYSICAL IDEAS v1.0

Ideas are the currency of knowledge, storehouses of facts and relationships garnered over thousands of years of human history. The currency of ideas can take multiple forms, and collectively we call these forms “communication”. For our purposes, we will call the various forms of currency “dialects”.

When the currency of ideas is an international dialect - such as mathematics, photography and music - people across cultures can communicate directly using that dialect. When the currency is a linguistic dialect - English, Spanish, Russian and the like - communications require a translation step moving from one language to another. This translation necessarily alters the raw data, and the potential for miscommunication makes translated data an indirect form of communication across cultures.

Whether communicated directly or indirectly, ideas carry information about traditional physical objects, about other ideas, and about relationships between and among ideas and physical objects. If you define Spirit as a part mind, part body entity that carries information between physical objects and between ideas, you could draw an analogy of Ideas-Relationships-Physical Objects that reflects the Mind-Spirit-Body triad discussed above.

Ideas are expressed in many ways. They can be sounds - music and spoken language. They can be visual, as letters, symbols, pictographs, moving images, facial expressions and body language. They can also be expressed with touch, taste and smell.

Ideas are expressions of the natural world - wind, rain, a full moon - and of our interactions/relationships with the natural world – hot, cold, wet. Ideas also express relationships between and among ideas themselves. Each idea is unique, in the sense that each idea is distinguishable from other ideas. This is another way of saying that each idea has a unique definition.

Ideas appear to be ethereal, dream-like, weightless and amorphous - invisible objects conjured by an imagination that is also invisible to anyone except the imaginer. In a phrase, ideas are

considered to be non-physical entities. This is in spite of the fact that most people agree that a mind can influence the actions of a body.

There are many arguments supporting a conclusion that ideas are non-physical. A spectrum of these arguments would include: we can't hold ideas in our hands like we hold a pen or spoon; when we dream about driving a car, it may seem real, but when we wake up we realize the car is parked outside and has not moved; different languages use different sounds to express the same idea, undermining any sense of uniformity and solidity; a picture is worth a thousand words, giving ideas a visual quality not associated with physicality; abstractions like good and evil are considered descriptions of feelings and physical objects, not as objects in and of themselves; ideas do not appear to occupy space, nor do they have the measurable physical dimensions we expect physical objects to possess; and last but not least, when an idea is spoken, the idea disappears with the fading sound.

Let's look at each of these arguments in turn.

Argument 1 - We can't hold ideas in our hands like we hold a pen or a spoon.

This is literally true in the traditional sense of palpability, especially when we consider abstract terms like "metaphysics" and "Baroque". However, this presupposes that an object's physicality can only be determined by its palpability. An answer to Argument 1 would require a definition of palpability that encompasses palpability in the traditional sense, and also in a clearly related sense that somehow included ideas.

Argument 2 - When we dream about driving a car, it may seem real, but when we wake up we realize the car is parked outside and has not moved.

Dreams may "feel" real, but they do not appear to have a direct effect on physical objects. A counter-argument to the "unreality" of dreams would have to show that the ideas in dreams are physical, but not necessarily the same object as the physical object it refers to - in this case, the dreamed car is not the same as the car parked outside. However, this counter-argument would necessarily have to elucidate direct relationships between the dreamed car and the car parked outside.

Argument 3 - Different languages use different sounds to express the same idea, undermining any sense of uniformity and solidity. Similarly, ideas are wave patterns in the brain whose structures are subject to dialects and factors such as brain health and development.

The basis of this argument is the apparent amorphism of ideas. Essentially, if the same idea can be expressed by different sounds, spellings and images, there is a sense that the idea has no definite structure. Since we associate structure with physical objects, we do not associate physicality to ideas.

Any counter-argument must associate a permanence to an idea like "category", while allowing the expression of an idea to vary. However, that counter-argument must necessarily show a direct physical relationship between an idea and each and every expression of that idea.

Argument 4 - A picture is worth a thousand words, giving ideas a visual quality not associated with physicality.

Many times images affect us without an intervening explanation - there is no "translation" via language, for example. The image could be a sunrise, a snapshot or a Monet. The "data" seems invisible and weightless until it is processed and interacts with our minds and feelings.

Any explanation of the physicality of ideas must show that visual data is physical. Similarly, showing that the method of data transport is physical would create an underlying assumption that the data being transported is also physical.

Argument 5 - Abstractions like good and evil, happiness and sadness are considered descriptions of physical objects, events and feelings, not as objects in and of themselves.

The very word "abstract" defies a physical connotation because it is an idea about other ideas. In a broader sense, the act of thinking is not considered a physical act, to the point that thinking and physical activity are considered opposites.

Any argument supporting the existence of physical ideas must build a solid physical path from an abstraction such a "Good" to the ideas the abstraction is referring to, and from those ideas to the physical world.

Argument 6 - Ideas do not appear to occupy space, nor do they have the measurable physical dimensions we expect physical objects to possess.

Traditionally, the most fundamental aspect of a physical object is its measurability – height, width, radius, frequency, volume, area. This type of measurability uses standardized physical tools that cannot be used to measure ideas. One could say that the ability to measure an object is all the proof needed to confirm that object's physicality.

We may colloquially refer to "big ideas" and "small minds", but these terms refer to relative, not precise measurements. Traditionally, relative measurements are ideas about ideas, while measurements made using standardized tools are ideas about physical objects. It would then follow that if ideas are not measurable, then ideas about ideas are similarly not measurable.

Any argument supporting the physicality of ideas must explore the relationships between and among ideas, measurability and physicality. Further, the argument must reasonably explain how an apparently inexactly measurable entity like an idea can be considered physical.

Argument 7 - When an idea is spoken, the idea disappears with the fading sound.

Absent special equipment, spoken ideas have no obvious form or visibility, and once spoken, cannot be retrieved for re-examination as a traditional physical object can be re-examined. The

sound carrying the idea dissipates, and that dissipation is associated with the idea. In our daily experience physical objects generally do not instantaneously dissipate. This evaporation leaves us with the sense that there is no physical permanence associated with the spoken idea, and therefore no physical existence for the idea.

Any argument supporting physical ideas must explain the apparent transience of spoken ideas. The explanation must also provide a reasonable explanation of the difference between an idea's expression and an idea's physical existence.

At first reading these seven arguments all make sense. Taken individually, in varying degrees each argument stands alone as a reasonable explanation supporting the non-physicality of ideas. Taken together, they present a fortress protecting the conviction that ideas are non-physical. The task is clear - any argument supporting the physicality of ideas must completely refute all seven arguments.

We take on that task in the next section.

AN ARGUMENT SUPPORTING THE PHYSICALITY OF IDEAS v1.0

Ideas clearly play an essential role in our lives, but as the Mind-Spirit-Body question shows, there is no clear agreement as to how ideas interact with the body. Despite this, most people agree that a mind can influence the actions of a body.

Obviously there is a missing link here. We need a rational explanation describing how a non-material "phantom" like an idea can influence the construction of a physical entity like the Taj Mahal. Even if you hold the empiricist view that everything is body, there is no generally accepted and simple explanation that distinctly rationalizes why ideas should be considered physical entities.

Empirical science is the practice of aligning physical evidence with theory – which is another way of saying that science is the practice of aligning physical objects and the actions of physical objects with ideas. This alignment, when it occurs, is called objective truth.

Scientific findings of objective truth are cross-cultural and permanent. Objective truth is inflexible, except in cases where new evidence requires the formulation of a new objective truth that includes both the new evidence and all or some of the old evidence. Strict adherence to the principle that theory must align with physical evidence is the hallmark that gives science its truth-seeking status.

There are two scientific theories which, when taken together, will lead us to an explanation supporting the physicality of ideas. Both theories have so far stood the test of time, and both are supported by physical evidence. Both are taught in high schools around the world.

The first theory is the Big Bang, which postulates the Universe was created 13 billion years ago in a Big Bang of energy. This implies that everything in the Universe is composed of that energy, including any and all forms that energy may take.

The second theory is Albert Einstein's equation $E=MC^2$ - a quantity of energy is equivalent to a quantity of mass times the speed of light squared. This theory states that energy can be viewed as mass moving at great speed.

Both theories employ the term "energy" using exactly the same definition. One theory states that the Universe is entirely composed of energy, and the other states that all energy has a mass component. Because the energy referred to in both theories is the same object, we can say that both theories "share" the term energy.

You can see where we are going with this. If everything in the Universe is composed of energy, and energy has a mass component, then ideas that exist in this Universe also have a mass component. If we can show that mass is a physical object, we can show that ideas are physical objects.

So what is mass? Physicists define mass as the amount of matter in an object – meaning, simply, that mass is matter plus a number. Remember that every idea has a unique definition - its uniqueness is what distinguishes it from other ideas. If we remove matter from the definition of mass, we have created another, different idea – it is no longer mass. Mass must contain matter in order to be called mass.

By applying the implications of the Big Bang with the implications of $E=MC^2$ in concert we are given a reasonable argument that ideas contain matter and therefore can be seen as physical objects. Everything in the Universe is composed of energy; energy has a mass/matter component; ideas exist in this Universe; therefore ideas have a mass/matter component.

Physical ideas require us to look at ideas in a fresh light. An idea's definition can now be seen as a unique physical object. A "category" or pool of ideas – for example, all the unique species of orchids - will contain objects shared by all the species in the category (stems, roots, petals, etc.). But the pool also includes objects that distinguish each unique species from the other thirty-five thousand species of orchids – combinations of colors, shapes and sizes.

These distinguishing characteristics exist physically in the flowers and physically in the pool of ideas. This is a straightforward example of the one-to-one relationship of ideas with the objects they refer to – both the idea of a physical object, and the physical object it refers to are composed of matter, and each requires the other for its definition and visibility.

This interdependence and interaction of physical objects is the purview of the physical sciences. With the introduction of physical ideas, Mind, Spirit and Body have a shared physical structure.

In the previous section we listed seven common arguments supporting the non-physicality of ideas. Considering that we now have a reasonable argument supporting the physicality of ideas, let's take another look at that list.

Argument 1 - We can't hold ideas in our hands like we hold a pen or a spoon.

This argument essentially states that we can recognize mass when we hold mass in our hands. However, ideas have mass, as determined by the reasoning above. If an entity's mass is too slight or indistinct for our senses to register it is not an argument against the mass of that object – we cannot feel the physical mass of an individual atom or bacterium either. Argument 1 is correct only when the mass of an object is sufficient to trigger a recognizable response - it does not preclude the existence of mass that does not trigger a recognizable response.

Argument 2 - When we dream about driving a car, it may seem real, but when we wake up we realize the car is parked outside and has not moved.

Dreams are composed of ideas, so this argument can be re-stated as: "When we think about driving a car, we are not actually driving the car we are thinking about. " There appears to be a clear distinction between our thoughts about the car, and the car itself.

This distinction is based on our traditional assumption that ideas are abstract and insubstantial – that ideas and material objects are by their nature different types of objects. Granting ideas a physical aspect, however, changes the dynamic. The ideas in dreams are physical objects, as is the physical car.

Note that the dream refers to your physical car in enough detail to allow you to distinguish your car from all other cars. This is a key point, because it establishes that there is a connection here between specific physical objects. The physical dreamed car and the physical car outside must each necessarily contain enough common physical objects (color, model, size, condition, etc.) to associate the dreamed car specifically with the car outside, and not to a different car.

Put another way, both the dream and the car outside share physical objects common to both. This does not mean that there is a complete one-to-one relationship between the idea of the car and the car itself. It does mean, however, that there are some physical dimensions composing the idea of the car that are directly related to dimensions integral to the car.

We might ask then, what do we mean by "directly related"? Because we are talking about the relationship between physical objects, we can re-state this as "What are the mechanics of this relationship? How does it work?"

Consider that a dream consists of multiple unique ideas, just as a car consists of multiple unique parts. Both the ideas and the car parts are physical objects. Then the cleanest explanation of their relationship is that both the dream and the car share one or more of the same unique physical objects.

We need to be clear here. We are not saying that the door in your dream and the door of the car outside are one and the same. Instead, we are saying that the door in your dream and the door in the car outside are defined physical objects composed of other defined physical objects. There are dimensions of the door - design, weight, length, etc. - that uniquely define it as a

particular door. Each of these dimensions is itself a relationship defined by the physical objects composing it.

For example, consider the dialect English and the dialect Japanese. Linguistically and alphabetically each dialect expresses the Sun in a different way. Within each dialect the Sun is defined the same way – each includes objects such as heat, distance, and sunlight in the Sun's definition. The fact that linguistically and alphabetically heat, distance and sunlight are expressed differently within each dialect does not negate the relationships among those objects within each dialect. Thus though the expressions of the relationships differ in each dialect, the relationships beneath the expressions are the same.

It is these relationships that are mirrored in the dream and the door outside. We cover this point from another perspective later in this presentation, but the takeaway is that objects are composed of other objects, and are defined by the relationships among these composing objects. The relationships do not depend on the dialect used to express them – in this case the dreamed car and the car parked outside. Identical relationships exist across every dialect that is both internally consistent and powerful enough to support them.

This is very like Plato's "Forms" - immutable ideas amenable to different types of expression. In the terminology used here, Forms are physical relationships among objects that can be expressed in different dialects. Identical Forms composing ideas in the dream, and also composing the traditional physical objects in the car, create the connection between the dream and the car outside.

Think of the annotated CAD/CAM drawing of the door as the dream, versus the manufactured door built to the specs of the drawing. The relationships of height, weight and shape in the drawing are transferred to the door. The Forms exist in both the drawing and the traditional physical door. Two dialects expressing the same underlying relationships.

To be sure, the physical ideas in your dream and the physical door outside share some, but not all objects. The dream and the door outside are different complete objects because there are additional objects in one and not the other. The door is composed of different atoms than the atoms in your mind. Additionally, the door outside may have features – say electric windows – that are not included in your dream. However, while the dreamed door and the door outside are not identities, they do share one or more identifiable objects existing in the composition of both the dream and the door outside. The shared objects link them into a relationship.

This is metaphysics in its widest sense. Physical ideas require the traditional definition of physicality to expand. The correspondence between physical ideas and the physical objects to which they refer are a function of the relationships they commonly share.

Argument 3 - Different languages use different sounds to express the same idea, undermining any sense of uniformity and solidity. Similarly, ideas are wave patterns in the brain whose structures are subject to dialects and factors such as brain health and development.

Essentially, this argument is saying that if each idea is unique, and each idea can be expressed in different ways, how can an idea have a unique physical existence? Put another way, if each idea has a unique physical design, what is the relationship between the idea and the expression of the idea?

The answer to Argument 2 also applies here, but we can re-state it in an interesting way. Every idea is actually a selected composite of other ideas – that is, its “definition” is a definition of its relationship to other ideas. Considering that ideas can be viewed as physical objects, the panorama of all ideas can be viewed as an immense structure of individual physical ideas dependent on other ideas for their “meaning”.

Any coherent communication dialect – mathematics, Spanish, logic, politics, oceanography – is a structured approach to definitions and to the relationships we call meaning. When an idea has the same unique definition across multiple dialects, the objects composing that idea must necessarily exist in each of those dialects. It is not the form of expression that defines an idea – instead, it is solely the relationships of the objects composing that idea.

For example, the ideas “mother” and “father” in their plainest meanings are the same across all dialects that contain those ideas. The sounds used to express these ideas will vary according to the rules of a dialect, but the structure of their relationship to other ideas within that dialect will not.

The bottom line is that an idea’s expression is relative to the dialect used, but meaning is relative to an idea’s relationship to other ideas within that dialect. Different expressions of an idea are relevant to the dialect used to express the idea, but expressions are not relevant to the existence of an idea as a physical object. The underlying relationships that give an idea meaning are independent of the dialect used to express the idea.

Argument 4 - A picture is worth a thousand words, giving ideas a visual quality not associated with physicality.

This argument is similar to Argument 1, which stated “We can’t hold ideas in our hand like a pen or a spoon.” The ideas streamed to us through our eyes appear to be weightless despite their constancy and plenitude. The lack of effort needed to receive these ideas adds to their apparent impalpability.

This argument can be resolved in a couple of ways. One - sight requires physical objects - photons, visual receptors and neurons – to function. Thus sight is a physical process, implying the visual data being transported is also physical. Two, as in Argument 1, this is a case of physical objects whose palpability lies outside the parameters of our senses.

Argument 5 - Abstractions like good and evil, happiness and sadness are considered descriptions of physical objects, events and feelings, not as objects in and of themselves.

Ideas are often generically called abstractions. The word abstract is derived from the Latin meaning “to draw away, to separate” – so from its beginnings the word implied detachment and independence.

Beyond that, within the pool of ideas there exist ideas about ideas – ideas that comment on other ideas – that make them even more removed, more abstract. These higher level abstractions in particular - Impressionism, Existentialism, zeitgeist – appear to have no direct connection to physical objects at all. In this way the higher level abstractions lend support to the traditional view that ideas are non-physical entities.

Since we have proposed an argument that supports the conclusion that all ideas are physical entities, we must accommodate these higher level abstractions into our argument. If higher level abstractions are physical objects, they must share a physical relationship with the ideas they comment on. This physical relationship can be most easily understood as a relationship of composition. Higher level abstractions are composed of the ideas they comment on. In addition, their composition also includes other ideas that provide the commentary.

Very simply, physical objects imply a physical structure. Ideas may specify lower level individual physical objects like a particular pen or paint brush, or more inclusive higher level categories like “communication devices”. Because the physical structure of “communication devices” must include at a minimum all pens and all paint brushes, we can say that the physical ideas of pens and brushes are part of the composition of the physical idea “communication devices”. Therefore the higher level abstractions are themselves composed of physical objects, making them physical objects.

Argument 6 - Ideas do not appear to occupy space, nor do they have the measurable physical dimensions we expect physical objects to possess.

There is a comfort level in defining physical objects as entities that occupy space and have standardized, measurable dimensions, where standardized measurements are meters, grams, ounces and the like. Such objects are often palpable, and this tactile, physical-to-physical affirmation lends proof to the object’s actual existence.

Any traditional definition of physicality includes measurability and/or palpability, and in an appropriate context the definition can end there. However, we need to remember that only recently we have discovered physical objects present outside the grasp of our unaided senses. Ultra-violet wavelengths, bacteria and quarks are examples of non-palpable physical objects that lay hidden from us until we extended our senses using specialized tools.

Certainly there is a sense that some ideas are larger than others – the idea “foot” intuitively seems larger than the idea “toe”, simply because the complete definition of a foot is necessarily larger than a complete definition of a toe. Ideas are measurable relative to other ideas, even if they are not measurable using traditional standardized tools.

Indeed, relative measurability is the criterion by which we differentiate ideas from traditional physical objects. Standardized measurement is a dimension of physical objects, while relative measurement is a dimension of ideas.

This leads us to a key point – the definition of physicality must be expanded to include objects that have standardized measurable dimensions, and also objects that have relative dimensions. It is the relative size of one idea versus another idea that gives ideas a sense of space and measurability.

We should note that specialized tools require the invention or modification of ideas to help us create those tools, and to interpret the data the tools produce. When we limit our definition of physicality, we limit the invention of tools that would allow us to explore the limits of physicality.

Argument 7 - When an idea is spoken, the idea disappears with the fading sound.

This is not really an argument against physicality at all. It is an argument against the relative permanence of spoken ideas versus physical objects. There are technical arguments supporting the permanence of sound waves, but they are not persuasive here because the point is that once the sound becomes inaudible, it appears that the idea disappears too.

Argument 7 is easily refuted by considering that an idea is not dependent on the dialect used to express it – rather, it is dependent on the idea's relationship to other ideas, as described above in Arguments 2 and 3. Similarly, if the idea can be expressed as a reproducible image or written term, its permanence may exceed the permanence of other, more traditional physical objects.

These seven arguments supporting the existence of physical ideas are not meant to be rhetorical. Physical ideas have powerful implications, which we explore in the next three sections.

THE MESH OF PHYSICALITY v1.0

We have discussed the traditional reasons that ideas are considered non-physical entities, and we have provided what we think is a reasonable counter-argument that endorses the physicality of ideas. This begs the question – what are the implications of physical ideas?

The primary implication is based on an assumption we are all familiar with – that physical objects can influence other physical objects. Gravity, Newton's Laws of Motion, and kicking a soccer ball are all testaments to this. Demonstrating that ideas have a physical aspect provides a plausible explanation of how ideas can influence objects we traditionally define as physical.

Logic, once an abstract commentary on ideas relating to physical objects, now becomes a physical science. Put more succinctly, Logic is itself composed of physical objects. Because Logic is the basis of every science, every organized field of inquiry is now a physical science. The Universe is no longer divided into ideas and matter, or ideas, spirit and matter. The

Universe is now a unified whole of physical objects. Relationships among objects create a mesh of physicality throughout the breadth of the Universe.

If we see the Universe as a collection of physical objects, we can see how the mesh of physicality connects objects in all directions. No object can be uniquely defined without reference to other objects – thus each uniquely defined object is a composite of objects. Each individual object of the composite is a dimension of the object. Informally, you can think of a dimension as an aspect of an object, a way of looking at the object (think height, weight, color). More formally, a dimension is equivalent to a contextual point of view.

Relationships among objects are “constructed” when dimensions in one uniquely defined composite object are identical to dimensions in another uniquely defined composite object. In these cases we say the objects share the same dimensions, and this sharing is the physical manifestation of the relationship.

Absent a pre-conceived bias, in a Universe of composite objects there is no up or down, left or right, forward or backward direction to shared dimensions. Physicality is re-defined to include all dimensions of a physical object, and all relationships among all objects. Logic is itself composed of physical objects; it is a composite of dimensions just as every other object is a composite of dimensions.

The mesh of physicality uniting ideas and matter does not alter the realities of our Universe because the chain has always existed; all that is needed is a tool that helps us see it. If you accept physical ideas as an appropriate tool, we can apply it to our understanding of perception. That application is discussed in the next section.

A DEFINITION OF PERCEPTION v1.0

Physical ideas propose a continuum of physicality from sub-atomic particles to the loftiest of human ideals. This continuum gives us a new perspective that we can apply to life’s most fundamental activity – perception. In effect, the continuum is a tool that allows perception to look at itself - and into itself. This reflection will in turn let us see the form equals function of perception.

Let’s begin with the obvious questions. What is perception? Where does it come from? How does it work? Where is it? Why does it exist at all?

Perhaps no human ability is less understood than perception. We can talk in generalities about perception, which is what we “generally” do. There are many terms used interchangeably with perception - awareness, consciousness, understanding, intuition, wisdom, insight and inspiration are common examples. But upon closer examination, we can see that all these terms rely on the apprehension of a new object – an apprehension implied by any minimal definition of perception. Indeed, perception is the fundamental ability that initiates the activity these terms

refer to. These terms require perception for their definitions, and in turn perception requires them for its own complete definition.

So we have what looks like a paradox – we need to use perception to define perception. It is not unlike asking a flashlight to examine its own construction at midnight – we are asking the light to shine in all directions when we think the light is designed to shine in only one direction.

But the paradox is only apparent. Physical ideas allow us, and in fact require us to shine the light in all directions. The Big Bang tells us that all energy emanated from a single unified event. Every form of energy is therefore related at birth to every other form of energy, including when that energy is expressed as physical ideas. Objects sourced from the same whole natively share relationships with each other, however distant those relationships may appear to be.

The Big Bang and $E=MC^2$ taken together imply that the Universe is an unimaginably vast mesh of energy, mass and relationships. The mesh extends in all directions from the point of the Big Bang, and is expanding along with the Universe because it *is* the Universe. Within this mesh, relationships among ideas are most easily visualized as a massive network of highways connecting one to another, and less easily visualized as a vast network of shared nodes.

However you comprehend it, the mesh image is striking in that there is no sense of implied direction in the mesh. You can move left, right, up, down, sideways, circularly, diagonally, forward and back, in any combination, as far as you like. Take any idea and mentally follow its associations, and soon enough you will get a sense of the directions and distances you can travel.

This mesh of networked relationships is the foundation that allows us to build our definition of perception. It is important to note that perception itself is included in this mesh of relationships. It is composed of the same energy that originated with the Big Bang. Perception is necessarily part and parcel of the objects it perceives.

One way of looking at the integration of perception and the objects it perceives is purely physical - perception is partly physically composed of the objects it is perceiving, and partly physically composed of other objects that complete the physical definition of perception. Objects within a definition are related via the shared dimensions of each object in the definition. These shared dimensions are manifestly the interaction of physical objects. The interaction of physical objects is a physical activity, therefore perception, which is composed of shared dimensions, is a physical activity.

The advantage of viewing perception as a physical activity is that this approach offers a clearly explicated, standards oriented approach toward understanding perception. Put another way, the scientific method is used every day to study traditional physical activity such as the motion of objects. Applying the scientific method to the study of perception will allow us to explore our most fundamental human ability in an exacting light.

Before we can build our definition of perception we need to define the terms we will use in our construction, because careful definitions are a prerequisite to clear communication. In a physical Universe containing physical ideas, all ideas must be defined with reference to their physicality.

We will use the term *definition* to mean the grouping of physical objects via the shared dimensions of the objects in that definition. An *architecture* is the physical design of a defined physical object. Each object in an architecture is a *dimension* of the architecture, such that any architecture can be viewed in terms of any of its dimensions. *Logic* is an appellation applied to the grouping of objects via their shared dimensions; all logical groupings are definitions. A *relationship* is any instance of a shared dimension between two objects; all relationships are definitions, and all relationships are logical. Finally, a *human mind* is a finite architecture of logical definitions.

At this point we should state the obvious – an object without definition is an undefined object. Undefined objects have no detectable composing dimensions and are therefore invisible to our senses. Only defined objects are visible to our senses. Hunches, inklings, instincts, premonitions and similar initiators superficially appear to be undefined objects, but the aspect that initiates the hunch is not undefined. The aspect certainly may be vaguely defined as a “feeling”, or something “just not right”, but ambiguity, obscurity and indetermination are based on visible aspects no matter how slight their definition.

We can now proceed to build our definition of perception. Our definition is “built” in the sense that we are assembling physical objects into a physical architecture. Our “nails” are shared objects. To avoid tedium, some building blocks are conclusions supported by arguments presented earlier in this presentation.

A Definition of Definition

- 1- A definition is the grouping of unique physical objects into a unique physical architecture.
- 2- Each physical object in a definition is itself a defined object whose definition is unique to that object.
- 3- Each defined physical object in a definition is a dimension of that definition.
- 4- Each defined object can be seen as a collection of dimensions.
- 5- A definition groups physical objects via common dimensions in the composition of each grouped object.
- 6- Unique objects with common dimensions in their definitions form logical relationships.

A Meshed Network

- 7- Physical objects cannot exist independently of other objects, because each object requires other objects for its definition.
- 8- Physical objects form physical relationships by sharing their common physical dimensions.
- 9- Physical objects grouped via their shared dimensions exist in a logical relationship to each other.

- 10- The totality of physical objects in the Universe create a meshed network of relationships.
- 11- Relationships within a meshed network can form in any direction.
- 12- Physical objects in relationships with other physical objects form a physical architecture.
- 13- A meshed network is a physical architecture of logical relationships.
- 14- The Universe is a physical architecture of logical relationships.
- 15- The Universe is an infinite architecture of logical relationships.
- 16- The Universe is an infinite meshed network.

Mind

- 17- A human mind is a finite architecture of definitions.
- 18- Each definition is a collection of logical relationships.
- 19- A human mind is a finite architecture of logical relationships.
- 20- A mind is a finite meshed network.

Perception

- 21- Defined objects are visible to human senses.
- 22- Defined objects exist in logical relationships with other defined objects.
- 23- Objects in a logical relationship form a physical architecture.
- 24- Perception is a visible object.
- 25- Perception exists in this Universe, therefore perception is integrated into the meshed network of the Universe.
- 26- Perception is a physical object composed of other physical objects.
- 27- Perception is a physical object that exists in one or more relationships with other physical objects.
- 28- Perception is a physical architecture.
- 29- Objects forming logical relationships with perception are integrated into the architecture of perception.
- 30- Perception is at least partly composed of the physical objects it is perceiving.
- 31- Because perception is at least partly composed of the physical objects it is perceiving, perception must perceive parts of itself to function.
- 32- A human mind is an architecture of logical relationships.
- 33- Perception is an architecture of logical relationships.
- 34- Perception associated with a particular human mind forms an architecture with that human mind.
- 35- The formation of logical relationships is a physical activity.
- 36- The interaction of objects with a human mind is a physical activity.
- 37- The interaction of objects with perception is a physical activity.
- 38- The interaction of objects with a combined architecture of perception and a human mind is a physical activity.
- 39- Perception interacts with the architectures of objects and a human mind.
- 40- Perception is an architecture of logical relationships between and among objects and a human mind.

Physical objects require physical definitions. If we define ideas as physical objects, then we are required to define ideas in physical terms. We don't need a new dictionary; we just need to supplement existing definitions.

Perception is the foundation of cognition. In the next section we look at how our definition of perception affects our understanding of reason, consciousness, and that most elusive of concepts, truth.

THE FUNCTION OF PERCEPTION v1.0

Perception is a physical activity that integrates objects into its own architecture, and therefore into any other architecture – such as a human mind – with which it shares logical relationships. Perception is a mechanical activity that sorts objects according to the shared dimensions of the defined objects it is perceiving.

Definitions are collections of logically grouped objects. Perception therefore is the machinery of definition. Dimensions of objects are themselves objects, therefore we can state that objects are composed of other objects, and we can also state that objects are composed of dimensions. Perception organizes objects/dimensions into a physical architecture based on the common dimensions in the architectures of the objects it is perceiving. These shared dimensions play a key role in determining the design of the architecture. In a physical Universe, design determines the “meaning” – the function – of the architecture relative to other architectures.

The architectures created by perception are logical structures because the sharing of dimensions defines a logical relationship. These architectures are more than the structure of logic – they *are* logic. When discussing logic, the design and function of logic (i.e., the form and function of logic) are equivalent terms.

Because logic is integrated into every definition, we can use logic's physical definition to help us modify other definitions. For example, *reason* is the science of logical thinking, therefore reason is the science of organizing physical objects via their shared dimensions. You can think of reason as perception logically related to a pre-existing set of definitions such as a human mind. *Consciousness* has various definitions: for example, it can be thought of as perception logically related to a limited superset of definitions, or as perception logically related to the totality of definitions (“becoming One with the Universe”), and so on.

In no way are these minimalist definitions of reason and consciousness meant to inhibit other interpretations. Their complete definitions rely on the multitude of pre-existing definitions that perception includes in its architecture. The presented definitions are merely the underlying mechanics of definitions that can and do vary widely across cultures and agendas.

The fact that common terms can have multiple definitions segues us into a definition of Truth. Not to worry, we are not going to embroil ourselves in a philosophical discussion of the types of truth, or the morality of truth, or any similar analysis. Instead, we will define Truth at the physical, “molecular” level.

A true object is an object shared by two or more definitions. Put another way, any shared dimension is a true object, making any logical relationship a truthful object.

All logical relationships are true in the sense that all logical relationships are physical architectures united via the shared dimensions of objects in those relationships. Truth in a physical Universe is solely a physical phenomenon.

This definition allows us to quantify truth by counting the number of shared objects in an architecture. More shared objects imply a more robust architecture than fewer shared objects, and therefore a greater truth. This implies that both “This apple is red, therefore all apples are red.” and “This apple is red, but that apple is green, therefore all apples are either red or green.” are both true. However, the second statement contains more definitions in its architecture and more true objects – so it is more true than the first statement.

We might be tempted to say that “All apples are red.” is a half-truth, but that would only be correct if we also knew there was a definition “This apple is green.” and we chose to exclude it. If our pool of definitions did not include green apples, then “All apples are red.” would be considered a completely true statement. This points to the fact that both objective truths and subjective truths tend to change over time as more definitions – containing more truth objects – enter the pool of definitions.

Reason is the science of logic. Reason works because it exists as part of the architecture of physical ideas – more precisely, it is integrated into the architecture of perception. If line of reasoning “B” unifies more definitions/dimensions than line of reasoning “A”, then B is more true than A. Both A and B are true; but B is more truthful.

The function of perception is to organize definitions via their shared dimensions. Therefore the function of perception is to create true objects. The implication here is obvious, and somewhat profound. Simply stated, truth is a consequence of perception.

The relationship of truth and perception has a mathematical analogy, which is relevant because mathematics is a logical science. In the calculus, an elementary derivative defines a relationship between two quantities – as one quantity changes, so does the other in a predictable way. Quantities are ideas and therefore they are physical objects. This allows us to say a derivative defines a relationship between two objects – as one object changes, so does the other in a predictable way.

In terms of the calculus, the dependence of object “y” upon object “x” means that y is a function of x. This is expressed as $f(x) = y$. Truth is dependent on the objects organized by perception. If p = perception, and t = truth, then $f(p) = t$. As p changes with the integration of new objects, t also changes.

Perception, logic, mathematics and truth are intertwined into a single physical architecture that corresponds to what we call human nature. Exploring the unknown, seeking new experiences and new relationships, and of course searching for the truth are common desires that stretch

across history and cultures. The driver for these desires is built into the most fundamental of human activities – perception. It is perception that unifies the human spirit.

The ideas presented in this essay are part of a broader theory called the Geometry of Ideas. The discussion of perception is a larger topic than the introduction presented here, involving the relationship of Dominant and Recessive Rules (i.e., dominant and recessive definitions). However, the essential point that more powerful truths contain more shared dimensions than less powerful truths remains the same.

We conclude with a few quotations that add depth and variety to the ideas presented in this essay. We hope you find them interesting and thoughtful.

The limits of my language means the limits of my world.

Ludwig Wittgenstein, Philosopher

Ideas rose in clouds; I felt them collide until pairs interlocked, so to speak, making a stable combination.

Henri Poincaré, Scientist

Every great and deep difficulty bears in itself its own solution. It forces us to change our thinking in order to find it.

Niels Bohr, Scientist

A man may imagine things that are false, but he can only understand things that are true, for if the things be false, the apprehension of them is not understanding.

Isaac Newton, Scientist

Beauty: the adjustment of all parts proportionately so that one cannot add or subtract or change without impairing the harmony of the whole.

Leon Battista Alberti, Architect

Appearances are a glimpse of the unseen.

Anaxagoras, Philosopher

We are searching for some kind of harmony between two intangibles: a form which we have not yet designed and a context which we cannot properly describe.

Christopher Alexander, Architect

All the mathematical sciences are founded on relations between physical laws and laws of numbers, so that the aim of exact science is to reduce the problems of nature to the determination of quantities by operations with numbers.

James C. Maxwell, Scientist

The object of pure physics is the unfolding of the laws of the intelligible world; the object of pure mathematics that of unfolding the laws of human intelligence.

James Joseph Sylvester, Scientist

Science is a differential equation. Religion is a boundary condition.

Alan Turing, Scientist

Thus, the more succinctly a train of thought was expounded, and the more comprehensive the unity of its basic idea, the closer it would approximate to the prerequisites of the mathematical way of thinking.... And despite the fact that the basis of this mathematical way of thinking in art is in reason, its dynamic content is able to launch us on astral flights which soar into unknown and still uncharted regions of the imagination.

Max Bill, Architect and Artist