INDEFINABLE PHYSICS PROPERTIES

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The universe operates as a unit. For this reason, it is self-evident that universal unity exists. Our theories cannot accurately describe the operation of the universe unless they embrace this fundamental unity. Complete unity must exist at the beginning and continue throughout correct theory. If the theory has been designed without it, then it cannot be achieved afterwards. Today's theories are theories of disunity. They fail to achieve unity from the fundamentals onward. If the fundamentals have been designed to lack unity, then disunity spreads throughout the growth of the theory. Artificiality is introduced in the form of fundamental disunity and extends, like branches of a tree, into higher-level theoretical interpretations.

For example, theoretical, fundamental disunity was introduced when $f = ma$ was interpreted. There are three steps involved in the definitions of force and mass. One is the imagining of unique fundamental mechanical causes for the properties of force and resistance to force. The assignment of fundamental, mechanical, uniqueness treats them as if we know something for certain that is not known. The second step is to give these theoretical, unsubstantiated, mechanical causes names. The use of names gives the impression the unknowable has become known. Instead of saying an object resists force for an unknown cause. we say an object has *mass*.

The third step is the introduction of units of measurement to mathematically represent theoretical properties. This step solidifies theory into the mathematical equations. Theoretical properties are represented in mathematical equations by the introduction of unique units of measurement. Some properties, such as mass, are singled out for very special treatment. Their units join those of distance and time as a special class of units. The units of distance and time are both naturally indefinable. For theoretical reasons, the units of mass are arbitrarily classed with them.

By this act, all mathematical relationships that include mass are made subservient to theory. For this reason, they cannot move us toward fundamental unity. These theoretical, therefore probably artificial, indefinable units detour the path. The detour is set by what is calculable and what is not calculable. The numbers are calculable. Writing $6 \text{ newtons} = 2 \text{ kgms} \times (3 \text{ meters/sec}^2)$ includes the numerical calculation $6 = 2 \times 3$. However, it also includes an equality statement about four units of measurement. Three of these units are not calculable. For example, meters cannot be divided by seconds. For these two, this is not a theoretical problem. Both kinds of units are based upon real, unique properties.

We directly witness the existence of distance and time. We know we exist within them. Space and time are each unique in their natures. We know they are not the same thing. However, we do not know their natures. We cannot experiment on either one of them. We cannot handle them for empirical purposes. All experiments credited with involving space and time, are experiments that involve only the substitution of motion of matter to make relative measurements within either space or time. They are, therefore, naturally indefinable. Their units of measurement are also rightfully chosen as being indefinable. All other indefinable units are artificially created by theorists.

Theorists made the units of mass indefinable. Indefinable units are not calculable. This means they are not compatible with each other. In other words, none can be expressed in terms of the others. In contrast to this are definable units such as newtons. Newtons are defined as *kgms x (meters/sec^2)*. The units of force, newtons, are definable in terms of the other three units. This important difference between units of measurement affects other theoretical properties. The units of energy are joules. They are defined as *meters x kgms x (meters/sec^2)*. Both newtons and joules are divisible by meters, whereas kgms are not divisible by meters. Indefinable units contain only their own unique identity. Definable units contain assemblages of other units.

The negative effects of using the indefinable units of kgms to quantify resistance to force, infects other units such as Joules. Joules have only theoretical value because they include kgms in their definition. Joules are established by including a theoretical indefinable unit of measurement. This act establishes Joules as also being theoretical units of questionable validity. Joules are no more reliable for accurately representing empirical properties of the universe than are kgms. In this manner, the theoretical guess about the fundamental nature of resistance to force spreads its lack of empirical validity into the theory of energy.

Kilograms, and the other theoretical indefinable units, make it impossible for us to achieve full theoretical unity. The problem is the act of substituting philosophical guesses to cover over unknown aspects about the nature of the universe. This practice is repeatedly relied upon. Each such step has the very high probability of taking us further astray from scientific truth. For example, this practice of introducing, for theoretical expediency, indefinable units adversely affects our understanding of the cause of electromagnetic effects.

Electromagnetism includes the use of another theoretical indefinable property. Coulomb's Law $f = kqq/(rr)$ is interpreted by identifying q as the cause of electrical force. It is given the name of *electric charge*. This act is inherently artificial. Causes are never a part of the terms of mathematical equations anymore than are the objects themselves. Objects are represented only by their properties. All causes are represented by the equal sign. The idea that something on either side of the equal sign represents cause is an error of theoretical physics.

By this unempirical means, a theoretical cause is guessed into existence. It is defined as a fundamental, unique property of the universe. It is the *theory of electric charge*. Its units, coulombs, are introduced as being indefinable. The units of coulombs join those of distance, time and mass. They are treated as being in a special, unique, most fundamental class. The success of the theory of electric charge does not establish the correctness of this act.

Prediction is a matter of mathematical extrapolation. The mathematics reflects the patterns found in empirical evidence. For this reason prediction is not sufficient to prove theory. It is only sufficient to demonstrate the correctness of form of the mathematical equations. This means all theory, even the most successful, could be wrong. The mathematical forms are generally

correct. That is to say, they are correct in form in so far as their empirical basis is concerned. It is the added on theory that is prone to error.

New, more unified equations would have the same general forms as the currently accepted but less unified equations. However, their terms would have different interpretations. They would be recognizable because they could produce unity beginning at the fundamental level. Also, the corrected theory, freed from artificial constraints, would make new equations possible. These new equations will have a far greater range of successful predictions. The equations would do this in the same manner as do all equations of physical motion. Known initial conditions of an event are used to calculate expected final conditions.

Our mathematical equations contain initial conditions represented by numbers and units of measurement, and final conditions also represented by numbers and units of measurement. So, it is the numbers and the units of measurement that must be made right. The numbers are not the source of our theoretical problems. The meaning of the equations, insofar as mathematical theoretical value is concerned, is carried through the establishment of units of measurement.

It is important that the meanings represented by units of measurement are meanings that reflect the real nature of the universe. The units of $f = ma$ are crucially important for the rest of physics theory, and they must not be based upon ideas that are guesses. The units of force and mass must be defined by means of a direct connection with the two units of measurement by which all empirical knowledge is made known.

Our empirical knowledge is filtered to us through measurements of distance and time. For this reason the units of distance and time are fundamental and do not have to be defined. They simply are chosen. In the equation $f = ma$ we can rely upon acceleration to reflect the natural operation of the universe. Insofar as the units of mass and force are concerned, they must be definable in terms of distance and time or we are lost at the fundamental level. How can units of force and mass be formed from those of distance and time? We need first to discover how to define one of them. The second can be solved in terms of the other.

First we determine a connection that seems reasonable based upon non-theoretical knowledge. If we solve for $f/m = a$, we see that the combined units of force and mass must be reducible to those of acceleration. In other words, the replacement for newtons divided by the replacement for kilograms must reduce to meters divided by seconds squared. In addition, we can expect that they must have a reasonable chance of making physical sense. All physical sense is made known by changes of velocity. We can try the guess that they have units of velocity or even guess they have units of change of velocity. There is also the possibility that one of them does not have units.

As a first effort at solving this problem, we may begin with the simplest possible interpretation for force. This interpretation is that force represents a ratio of two quantities of the same property. This would define force without units. It also assigns units of inverse acceleration to mass. If this solution is real, then force may be the ratio of object acceleration to a more fundamental acceleration.

If this kind of relationship could be established, then what we would be looking for is a pervasive form of acceleration that becomes traded off for object acceleration. It would be a matter of *conservation of acceleration*. Unity requires that we avoid concluding it is a mysterious new

property of the universe. We can expect it to be an acceleration of a single, most fundamental, property.

To where would such a radical change lead? There is a great deal of successful theory that would also have to change radically. Almost everything would have to change. The operation of the universe would remain the same, but its theoretical interpretation would be redeveloped. However, if the choice is correct, the result should be very rewarding. Fundamental truth will certainly outperform artificial theory. Two, far from ordinary, results of following the path suggested here are:

$h = kec$

This says: Planck's constant is numerically equal to Boltzmann's constant times proton charge times the speed of light.

$f = k\omega$

This says: Photon force is numerically equal to Boltzmann's constant times frequency.

The change of units for force and mass, made as described above, leads to these equations. When these changes are made, the units for these equations match. They are evidence that new knowledge is possible at the fundamental level. They are evidence that a great deal of theoretical revision is in order.

As radical and revolutionary as this approach may seem, it is definitely more scientific than is the practice of making unverifiable guesses about the natures of several, critical, fundamental properties. Empiricism is true knowledge. Theory is just theory. We must adhere as closely as possible to empirical knowledge. All empirical knowledge involves patterns of changes of velocity. Velocity measurements involve knowledge about relative measurements of distance and time. The physics fundamentals must be directly derivable from that knowledge.