

# Benjamin Franklin's Concept of Time

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*For Presentation to Wisconsin Area Association of Physics Teachers Meeting,  
Viroqua, Wisconsin, April 9 and 10.*

## 1 Introduction

I wish to report why I consider Benjamin Franklin's animate concept of time a better concept than the clock concept of time presently accepted by many modern physicists.

Franklin, one of the signers of the Declaration of Independence and one of America's first-rate physicists, conceived time to be one of the stuffs life is made of. Franklin recommended, therefore, that if you love life, then don't squander time.

In modern physics textbooks it is written that time physically is simply what you measure with a clock. This presupposes that you know what a clock is.

The modern physicist's operational definition of time is much like saying that speed is what you measure with a speedometer or that an electric current is what you measure with an ammeter.

Man-made clocks assume many diverse forms, but all are made more or less to measure and record some part or other of time. Furthermore, all living creatures, both plant and animal, are designed with built-in biological clocks, essential to the regulation and control of our rhythmic vital processes.

Nevertheless, for use in contemporary physical research, particularly biophysical investigation, I find the approved operational definition of time in terms of clocks at best quite questionable and at worst somewhat inadequate and even erroneous.

### 1.1 Shortcomings of the Clock Concept of Time

Any particular clock can measure only some small part of the finite time progression. Time itself is much more than what any clock can measure; in fact, it is infinitely more. However, I do not fault the operational definition of time on this score. I am well aware that it is not an essential purpose of a definition to be exhaustive.

I am also aware that not every term of physics or of any other science can be logically defined.

I regard TIME (together with SPACE and MOTION) as the fundamental terms of physics, chemistry and biology. The meaning of the fundamental terms of science must be postulated rather than defined. But while we must postulate the meaning of so basic a term of science like TIME, we do have a choice about how we do this. We can implicitly indicate without examination what time shall mean by arbitrarily adopting the operational definition of time or we can carefully examine the situation and discover how our basic terms are specifically interrelated objectively in the realms of the universe most closely accessible to us. Albert Einstein and modern physicists chose the first course. Isaac Newton and Benjamin Franklin chose the second course.

Three practical disadvantages of the clock concept of time may be identified and mentioned.

To begin with, a clock measures only one component of time, what I shall call CLOCK TIME. A clock cannot and does not measure a second component of time, what I shall call COORDINATE TIME.

Those who believe that a clock can measure all of time take it for granted that time has only ONE degree of freedom, that time is 1-dimensional. In fact, TIME has and must have as many dimensions as SPACE and I know no one who thinks that SPACE is 1-dimensional.

Secondly, a clock fails to disclose that isolated time does not singly exist any more than does a magnetic monopole. TIME only exists inseparably from MOTION and since SPACE also exists inseparably from MOTION, TIME exists. Furthermore, only inseparably from SPACE.

Thirdly, a clock does not reveal the quantized character of time, space and motion. A clock in measuring duration represents time as continuous when in fact physical units of time less than one quadrillionth of a second don't actually exist. Similarly, a meter stick in measuring distance represents space as continuous when actually units of space less than one millionth of a centimeter are non-existent. The basic unit of discrete motion is the rate of progression of one unit of space with respect to one unit of time, equivalent to 30 billion centimeters per second.

## 1.2 Advantages of Franklin's Concept of Time

In my opinion, the merits of Franklin's concept of time, that it is one of the stuffs life's made of, has been quite underestimated and neglected.

Time IS a stuff life is made of. If time did not exist, no man-made clock would exist, since humankind in the form we know it would not have come to be either on earth or anywhere else in the physical universe. Whatever level of human existence may occur outside of time and space, the human body does not exist outside of time and space or else death would be unknown and human cadavers non-existent. Likewise, the bodies of animals and plants are made of space-time or motion and do not exist outside of time and space.

Time is an aspect of motion, as Aristotle recognized. The only other essential aspect of motion is space. Motion is an INVERSE relation between time and space. Consequently, without time and space neither light nor darkness, which is merely empty space and time, can exist. Without space-time or motion, electricity, magnetism, matter and such-like entities of the physical universe, would not exist.

The conspicuous advantages of Benjamin Franklin's animate concept of time is that it remedies the three main deficiencies of the clock concept of time.

1. The animate concept of time acknowledges the 3-dimensional character of time.
2. The animate concept of time explains the inseparability together with the distinctness of time and space.
3. The animate concept of time accounts for the quantized character of time and space as well as of energy and matter.

Benjamin Franklin's animate concept of time is preserved in the first fundamental postulate of Dewey Larson's *Reciprocal System of physical theory*:

The physical universe is composed entirely of one component, motion, existing in three dimensions, in discrete units and with two reciprocal aspects, space and time.