Triple Clock. New Division of Time

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1. Abstract

A change of something important in our life that has not changed for decades is a remarkable matter. A new system has been launched here to re-divide the daily time with new designs for watches that fit the new division and highlight the impact of this change on our daily life. The article contains two basic aspects, one is to change the daily division of time and the second is to suggest a new system of units of measurement appropriate to change the unit of time measurement in the international system of units. Finally, a suggestion to take advantage of the new watch designs at present.

Key words: new watch design, minutes system, shape of watch, daily division of time.

الساعة الثلاثية .. تقسيم جديد للزمن

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وزارة التربية , بغداد , العراق

الخلاصة : ان تغيير امر مهم جدا في حياتنا اليومية لم يتغير منذ عصور هو حدث مثير للاهتمام . تم اقتراح نظام جديد لأعادة التقسيم اليومي للزمن مع وضع تصاميم جديدة للساعات تناسب التقسيم الجديد , وتسليط الضوء على تأثير هذه التغيرات في حياتنا اليومية. يتضمن البحث جانبين , الاول هو تغيير التقسيم اليومي الحالي للزمن , والثاني هو اقتراح نظام وحدات قياس جديد يناسب التغير الذي من الممكن ان يحصل في النظام الدولي للوحدات بعد تطبيق التقسيم الجديد للزمن . واخيرا اقترحنا الاستفادة من التصاميم الجديدة للساعات وتطبيقها على التقسيم اليومي الحالي .

2. **Introduction**

Measuring time is one of the exciting matters of thinking since ancient times, when we measure time as a physical quantity, we are dealing with something not tangible, yet it can be felt other than length, mass, etc. The daily, monthly and yearly division of time went through several stages and divisions, all of which are based on one basis. Regarding the daily division of time, it can be found that it depends on the spinning of the earth around its axis and the formation of day and night. Because of research limitation, history of these divisions will not be investigated further, but it can be said that there is no physical reason for the current daily division of time, i.e. the division of the day into 24 hours and the hour into 60 minutes, the minute to 60 seconds, but all backgrounds are mathematical and are based on what is called the sixtieth system, which includes dividing the circumference of the Earth into 360 longitudinal lines, i.e. 360 degrees by angle system, then dividing between the lines into smaller bands to form minutes and seconds [1,2].

The question is whether there were attempts to change the daily division of time?

In the year 1793, the French Revolution imposed what is called the decimal system, where the day was divided into 10 hours and the hour into 100 minutes [3-5].

As well in1795 starting of creation of the decimal metric system, which is an elegant scheme with three interrelated basic units meter, liter, and gram that replaced hundreds of local measures that coexisted in a disorganized fashion all around France [6].

This division related to French Revolution is just a manipulation of numbers that represent longitude on the circumference of the earth, but the basis is the same, which are the rotation of the earth around itself and the formation of day and night.

The idea is that there is no evidence that the division of time in the sixtieth system is more scientifically correct than the division of time into the decimal system or any other system, and vice versa, that is, there is no evidence that the division of time in the sixtieth system is incorrect. In spite of all the obstacles that lead to the inaccuracy of measuring time in this way, such as changing the speed of rotation of the earth, yet this system dates back thousands of years and up to the present time, no one ever tried to change it for a dare.

In 1967, the second as a unit of time was usually defined as the old definition was that it represents a period of 1/86400 of the solar day and later was changed to: taking the fixed numerical value of the cesium frequency $\Delta\nu_{Cs}$, the unperturbed ground-state hyperfine transition frequency of the caesium-133 atom, to be 9 192 631 770 when expressed in the unit Hz, which is equal to s^{-1} [7-10].

This means renouncing the concept of the Earth's rotational time around itself as a reference for measuring time. But despite the importance of this change, it must be realized that it is not a change at all, as we see that this definition will not add or change anything in the hours that we use in our daily life, where our watches are still with the same system and the same time division. This article may be the second attempt to re-divide the daily time, and the first attempt to change the current designs of watches.

3. **Methodology**

3.1 One unit of time measurement

Judicious look at the mass and its unit of measurement in the international system, we will find that it is measured in kilograms (kg), although this unit is not an independent unit, but rather is a multiple of grams, since the kilogram is 1000 grams, there is another unit of measure, which is(ton) suitable for large masses. Now if the units of the mass was unified, i.e. abolishing the unit of the ton and expressing it in the base unit, which is the gram, then all we will do is put ($x10^6$ g) or ($x10^3$ kg) instead of the word ton.

Likewise the daily timing is hours, minutes, and seconds. Also, these divisions are approved as units of time.

Now if time measured by one unit of measurement, such as the Meter for length, Volt for potential difference and Ampere for electric current and we relied on its parts and its multiples? In fact, if this idea were to be implemented on the ground, our life would be completely changed [8-11].

Suppose the minute here as a unit for measuring time, the reason for choosing the minute is clear, because it is an average unit of measurement between large and small units and can be dealt with easily in our daily life.

What would the time be like if we applied this suggestion? In fact, this will be reflected in two aspects:

The first is the daily division of time and the second is the system of units of measurement.

3.1.1 The daily division of time

The duration of the day will be (1440) minutes, and this means canceling the unit of the hour and the second and relying on the parts and multiples of the minute. So how will we deal with the time and how will we measure it? This will lead to the assumption which is a new system of watches that accompanies the new division of time. What will this watch look like? What will its divisions be? Will it be called a new name?

3.1.2 Need for new watch designs

The current watches will become completely inconvenient due to the difficulty of dividing (720 lines) in a small area, therefore all future watches will be electronic depends on a screen to display the time and I called this new design (Triple clock) because it is a new model that combines mechanical, electronic and smart watches.

Some designs for future watches that operate on minutes system and its fractions only illustrated below:

a - The ordinary electronic watch after removing the hours and seconds from them and replacing them with minutes and parts.

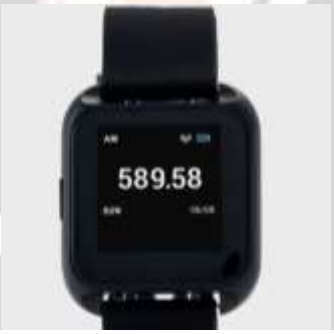

Figure (1) ordinary electronic watch with minutes system

b - Rhombus watch: It is an electronic watch with a new design, in which each side is divided into (240) scales except for the line between two triangles It will contain two grades, one at the top and the other at the bottom, and thus the upper triangle will represent the first half of the day, while the lower triangle will represent the other half. The time will be known by a light point moving around the rim of the rhombus over time and at a regular speed to cut one gradient every minute, that the location of the light point will represent the time at that moment. A screen is placed up or down to display the time completely. It is possible to change the color of the light point when moving to another triangle. The screen can display the time as minutes and parts of minutes after the comma. As for the light point when you stand on a specific gradient, the gradient number is written automatically at the location of the point. This means that the gradient numbers will not be written with the gradient line, but rather the light numbers accompanying the light point.

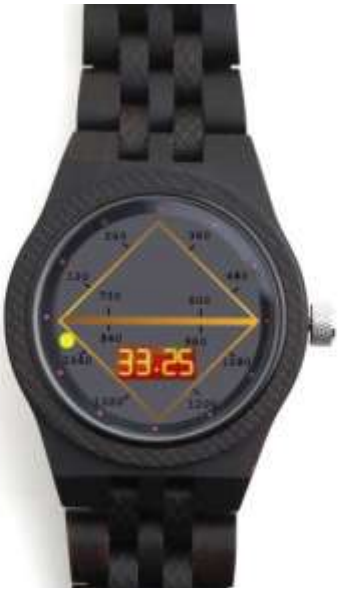

Figure (2) Rhombus watch

C - wavy watch: The idea of this design is the same as the previous design idea (a light point that moves on a divided path), but this design will be the path in the form of a wave, this curve will contain one peak and one bottom that contain a total of (720 scales) at the upper surface of the curve and (720 scales) at the lower surface of the curve. Accordingly, the light point will move in the first half of the day from left to right and in this case the gradient will be read above the curve, and at the end of gradient number 720 the light point will begin to move in the opposite direction to complete the day's cycle and in this case the gradient will be read below the curve. It is also possible to change the color of the light point when its path is reversed, and a screen is displayed to display the entire time at the top or bottom or one of the angles. As for the graduation number, it will be light as in the previous styling.

d - The spiral watch: in this design, the path of the optical point is spiral-shaped and with the same top and bottom gradients of the previous design, including the reflection of the direction of the movement of the light point.

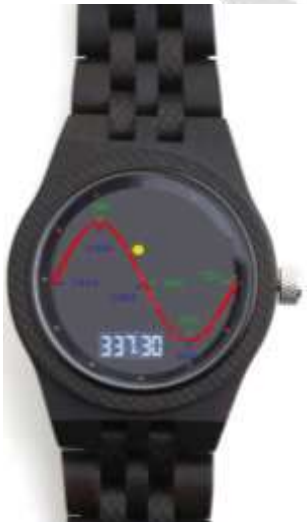

Figure (3) wavy watch

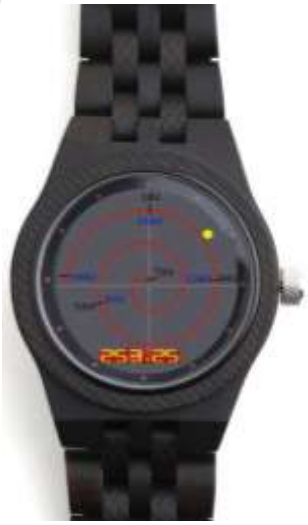

Figure (4) spiral watch

e - Orange watch: It is called by this name as it simulates to the cross section of the orange, and here the design is a circle with 8 lines inside, each line represents the radius of the circle and is divided into 180 gradations and by this the total of the graduations will be 1440 gradations, the movement of the light point of gradient number 1 from the center of the circle towards the circumference and the number of The gradient is also light accompanying the light point during its movement, and when it moves to the other line the direction of movement is reversed, meaning the gradient No. 181 begins from the circumference towards the center of the circle and so on, and the movement of the light point continues back and forth, And the first step number is written at the beginning of the line from the circumference of the circle, either the entire time reading will be through a screen below or above the circle , taking into account the change of the color of the line that is completed by the light point. As for the light point when you stand on a specific gradient, the gradient number is written automatically at the location of the point.

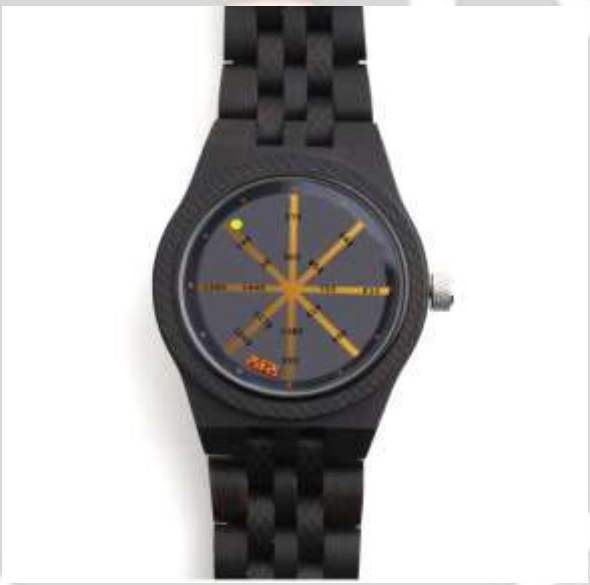

Figure (5) orange watch

Other designs can be made by changing the shape of the light point path. This type of watches will be called Triple Clocks.

It may seem from the shape of these designs that they are drawn from science fiction films, but they are not. Rather, they may mark the bidding farewell to the era of current watches.

It is possible at the present time to consider our idea as an invention to present a new independent watch model that differs from the electronic or mechanical model, which we will call (the triple model of watches) depending on the movement of light points on a certain path, it is remarkable by that it combines mechanical, electronic and smart watches, as shown in the appendices.

3.2 Measurement units system

This point does not concern our daily life, but rather the student, the teacher and everyone who has to do with scientific issues.

3.2.1 International System of Units

This is known as the metric system, it is the system currently used in most countries of the world. It is a well-known system that contains seven basic units [12,13].

If the minutes system applied that do not contain the hour and the second, how will the researcher measure time during his research or experiment? How will mathematical, physical, and chemical questions be formulated?

3.2.2 Suggested system (kg.m.min)

This is what the new system looks like if the minute is considered as a basic unit of measure. Here the difficulty lies in changing the time-dependent derivative units, as the value of the physical constants will change to express the new system such as the value of acceleration of gravity will shift from 9.8 m/s^2 to 35280 m/min^2 or the value of the speed of light in a vacuum of $3x10^8$ m/s would be $180x10^8$ m / min.

Consequently, the definition of all units dependent on time will change.

Before deciding the impossibility of changing the system of units, you should know that Britain was using the imperial system of units of measurement and gradually changed over trade and industry to the metric system [14-16].

4. **Results**

Dealing with daily events more accurate in time. For example, when we ask about time, the hour and the minute will be used, but in some other aspects of our life we only use the minute, which means using of minute more than the hour and the second in our daily life. These ideas led to new dividing of daily time and get five new watch designs.

Regarding the units of measurement, all units are dependent on the unit of measurement of time, if the unit of measurement of time will changed; this requires changing the definition of all other units.

5. **Discussion**

In our daily dealings when asking what time is it? If the time is (17 past 9), the answer is impossible to be with such accuracy, but either (quarter past 9) or (20 past 9) with an error of 2- 3 minutes.

Whereas in the minute system, the answer will be (minute 560 in the morning).

On the other hand, when calculating any time period for a specific event, such as the time interval from one place to another, or the waiting period at a some place, rounding will be used here as a large measure such as rounding from one hour and four minutes to one hour, or rounding from one hour and 27 minutes to one hour and a half.

As for the introduction of the new design for time meters, it is of great importance to get out of the repeated stereotype decades ago for watches and move to a new design that gives a sense of modernity and change.

Finally, if the two systems were merged, the minute system will be applied to the daily division of time with a change in the design of watches. Otherwise, scientific researches and experimental field will remain on the same metric system that depends on the second as a basic unit of measurement of time, that is, the current watches that calculate hours and minutes and seconds will be called (Scientific watches) and will be for scientific use only.

6. **Conclusion**

Incorporation of accuracy, modern and creative layout, elegancy in this new era watches and clocks is a revolutionary. Of course, that such an effect will not happen suddenly, but may need years to apply and transform the world into a new temporal system, it needs a long time also to adapt the human mind to it, but it is not impossible. On the other hand there are many aspects that will directly affect our daily life including:

- Cancellation of all types of current watches and clocks of all shapes.

- Re-update all time-dependent smart device software, such as mobile phones, laptop computers, cars, etc.

- Change the world time clock.

- Change flight watches.

- Sports matches: the current calculation of the time of sports matches is in minutes, and even when adding an additional time, as in football matches, it is added in minutes, so there will be no change in the account of the time of matches except for changing the old referee watch with the new proposed design.

- Stop watch: the current stopwatch that is used to calculate the timing of a specific event in a more accurate way up to calculating parts of the seconds whose new shape will be the calculation of the event time in minutes and its parts, and the higher the ranks of fractions, the more accurate the measurement.

- official hours of business: if the official working hours are 8 hours, then its duration in the minutes system will be 480 minutes, meaning that the official working hours start at the 480^{th} minute AM and end at the 240^{th} minute PM.

At last, the world is constantly evolving and these ideas may be the entrance to a new temporal world with new watches designs, no matter how difficult the ideas to apply, we ought not to rule out their adoption in the future if they are useful and make people's lives more accurate.

7. References

[1] R. Dunn, "Ships, clocks and stars: The quest for longitude," *Signals 115*, p. 2, 2014.

[2] E. Anderson, "Time differences, communication and trade: Longitude matters II," *Review of World Economics 150.2,* pp. 337-369, 2014.

[3] G. Fremont-Barnes, in *Encyclopedia of the age of political revolutions and new ideologies 1760 – 1815,* London, Greenwood Publishing Group, 2007, p. 103.

[4] L. F. L. S. &. F. M. Frey, in *The French Revolution,* Greenwood Publishing Group, 2004, p. xxiii.

[5] F. Aftalion, "The French Revolution: an economic interpretation," *Cambridge University Press,* p. xvi, 1990.

[6] H. Vera, "Decimal Time: Misadventures of a Revolutionary Idea,1793–2008," *KronoScope9.1–2,* pp. 29-48, 2009.

[7] S. Bize, "The unit of time: Present and future directions," *Comptes Rendus Physique 20.1-2,* pp. 153-168, 2019.

[8] S. V. Gupta, "New Definitions of SI Base Units. Units of Measurement," *Springer, Cham,* pp. 119-131, 2020.

[9] E. Gibney, "New definitions of scientific units are on the horizon," *Nature, 550(7676),* pp. 312-313, 2017.

[10] V. S. B. R. &. W. W. Kose, "General principles for the definition of the base units in the SI," *Metrologia, 40(4),* p. 146, 2003.

[11] B. N. Taylor, "The International System of Units (SI)," *NIST, Special Publication 330,* pp. 5-8, 2001.

[12] A. a. B. N. T. Thompson, "Guide for the Use of the International System of Units (SI)," *Special Publication (NIST SP)-811,* p. iii, 2008.

[13] B. Taylor, "Guide for the use of the International System of Units (SI): the metric system," *DIANE Publishing,* p. iii, 1995.

[14] E. Williams, "Metrication in Britain," *The Arithmetic Teacher, Vol. 20, No. 4,* p. 261, APRIL 1973.

[15] G. Bowen, "Metrication Experience in the United Kingdom," *Building Research 10.1,* pp. 31-36, 1974.

[16] M. Elliott, "United Kingdom: Parliamentary sovereignty under pressure," *Int'l J. Const. L. 2,* p. 545, 2004.

Appendices

1 - The current circular model :

It includes the same current divisions with the removal of hands and the use of light points, the big point represents the hours and moves on the outer or inner circumference, and the middle point represents the minutes and will move on the inner circumference, while the small point will represent the seconds and move on the outer circumference as well .

Figure (3) circular model

2- The rhombus shape model :

The rhombus shape consists of two opposite triangles. The upper triangle will be divided into 6 steps, representing the hours for each side, 2 steps, and within each statement, 5 sections representing minutes .

As for the hands, they will be canceled and replaced by light points of different size and color. The location of the big light point represents the hours, the smaller represents the minutes. In the middle of the day, the points move on the upper triangle, and in the other half, the points move on the lower triangle, changing its color or the color of the whole triangle, and also taking into account the lack of movement of the two points on the same line. The second point moves on the circumference of the triangle with successive rotations, the duration of the cycle is one minute . As for the gradient numbers, they will be either written on the base of the clock or moving light numbers with the light points .

3 – Waveform :

Its shape will be one peak and one bottom, i.e. the two halves of the circle, separated and connected as one path. This path is divided into 12 parts representing hours and gradations of minutes are between them. It is possible here to make two top and bottom grades that represent the two halves of the day. That is, at the end of the first gradient, the movement of the light points is reflected and we start reading the other gradient . the gradient numbers, they will be either written on the base of the clock or

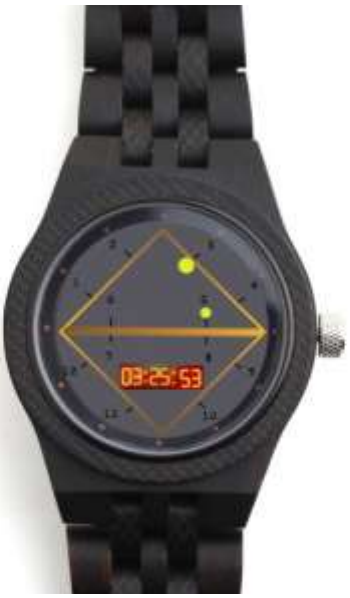

Figure (2) rhombus shape model

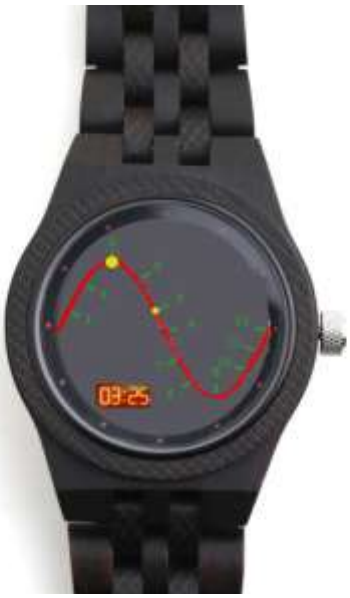

Figure (3) Waveform

4 - the spiral model:

It carries the same idea as previous designs with changing the shape of the light point path to a spiral path .

5 - Orange Model:

Here the number of lines within the circle will be 6 lines, each line is divided into two grades that represent the hours, and between them are the gradations that represent the minutes. As for the movement of light points and gradients, it will be the same as the previous models .

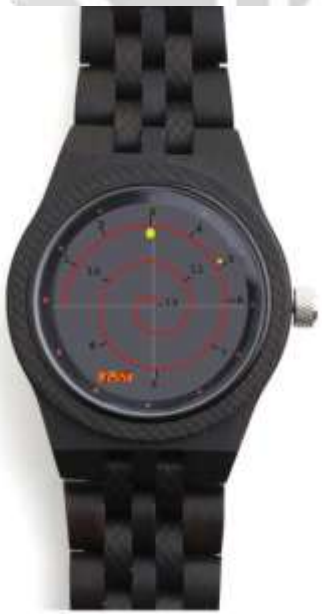

Figure (4) Spiral Model

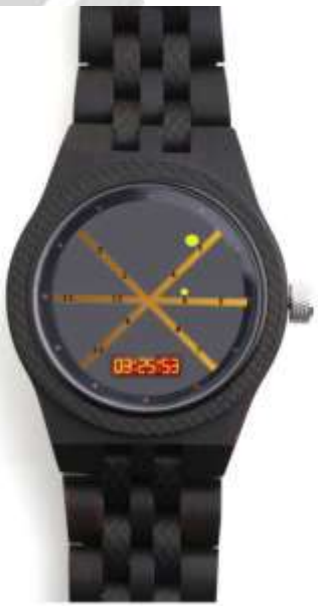

Figure (5) Orange Model