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Rhythm as Form of Physiological Process (part 4)

- Recherches

- Le rythme dans les sciences et les arts contemporains

- Psychologie - Nouvel article

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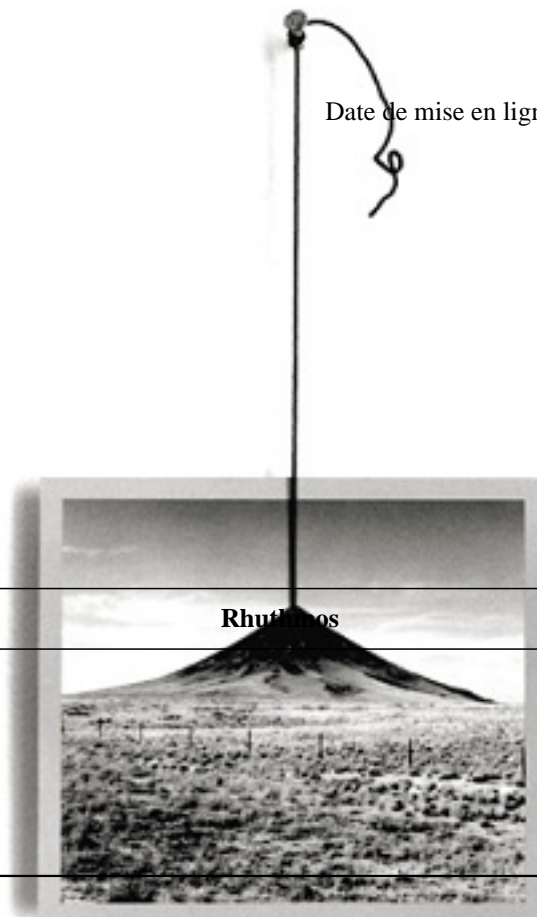


Table of contents

- [Auditory Rhythm as Cause of Time Idea \(Wundt - 1873\)](#)
- [Auditory Rhythm as Cause of Aesthetic Feelings \(Wundt - 1873\)](#)

[Previous chapter](#)

Auditory Rhythm as Cause of Time Idea (Wundt - 1873)

The second aspect that interested Wundt was the role of the rhythm, as it had been previously defined in the chapter dedicated to auditory ideas, in the constitution of our "idea of time." In the Chapter 16, which was dedicated to "Complex Ideas, General Ideas and Intuition Forms," Wundt started by borrowing from Kant the concept of "intuition of time" but he immediately added that the latter had to be explained psychologically, i.e. genetically, instead of being merely considered as innate.

Kant first proved that the forms of intuition [*die Anschauungsformen*] are actually *subjective* in nature. The problem arose then of explaining them psychologically, as soon as one went beyond the view still held by Kant himself [that] space and time are forms already set in us to which the sensory perceptions readily fit. (*Principles of Physiological Psychology*, 1873-1874, p. 580, my trans.)

In Chapter 13, elaborating on Augustine's well-known argument our idea of time derives from our interior capacities of expectation and memory (*Confessiones*, 11) but also, probably without knowing it, on a less well-known one time must be linked with the power to utter words rhythmically (see vol. 1, p. 383 *sq.*) Wundt had already claimed that the "intuition of time" derived from the existence of "rhythmic" successions of alternate auditory sensations and ideas. Even in a mere binary succession of beats, the ideas of *past* and *future* were given both through the regular division of the continuous flow of time and by the "memory" and the "expectation" entailed by this division.

An unchanging, continuous sound provides our consciousness with no hints as how to divide it into periods of time. The simplest way, in which such a division can be made, is that the sound, while remaining qualitatively unchanged, decreases and increases in intensity. As moments of *rising* (arsis) and *falling* (thesis) follow each other, they separate from each other in our consciousness. Each rise is considered as a repetition of the previous one. At the same time, as soon the alternation becomes regular, on every fall a new rise is expected, and vice versa. Thus, this simplest form of rhythmic structure [*rhythmischer Gliederung*] already contains the full intuition of time [*Zeitanschauung*] with its reference from the present sensation to those of the past and future. (*Principles of Physiological Psychology*, 1873-1874, p. 513, my trans.)

Rhythm as Form of Physiological Process (part 4)

He had also suggested a little further down that only a rhythmic succession of "a constant number of rises and falls" allowed to grasp the idea of *continuous duration* and that of its *division into segments*.

The rhythmic element which sustains all composite arrangements is the bar [*der Takt*]. Since it contains a constant number of rises and falls [*eine constant Anzahl von Hebungen und Senkungen*], it takes a *determined amount of time* [*eine bestimmte Zeitdauer*]. The idea of duration [*Die Vorstellung der Zeitdauer*] and its division [*und ihrer Eintheilung*], therefore, not only finds its expression in rhythm [*im Rhythmus*], but also realizes itself essentially through it. We have a reasonably accurate idea of the timing of an event [*von den Zeitverhältnissen eines Ereignisses*] only if it proceeds in rhythmic form [*in rhythmischer Form*]. (*Principles of Physiological Psychology*, 1873-1874, p. 517, my trans.)

In Chapter 16, Wundt elaborated further these suggestions by psychologically deriving the "intuition of time" from the rhythmic succession of ideas triggered by rhythmic perceptions, their persistence in the consciousness in the form of "aftereffects," and the resulting general idea that "they can easily be reproduced."

The *intuition of time* [*Zeitanschauung*] arises from the succession of different ideas [*Vorstellungen*], each of which remains available to the consciousness when a new one enters into it. But the nature of the idea of time [*Das Wesen der Zeitvorstellung*] does not consist in the actual reproduction of ideas [*Vorstellungen*] but in the *idea that they can be reproduced* [*in der Vorstellung, dass sie reproduziert werden können*]. Psychologically, this is only possible if every idea, when it disappears from consciousness [*aus dem Bewusstsein*], leaves behind an aftereffect, which lasts alongside the new ideas. Such an immediate aftereffect does not need to extend to all reproducible ideas. Rather, we have come to know facts in the temporal conception of the auditory impressions, which point to a rather narrow scope of the immediate conception of time. It is clearly indicated by those limits which the simplest rhythmic structure [*das einfachste rhythmische Gebilde*], the bar [*der Takt*], must conform to in order to be integrated into one whole. In the conception of the more complex rhythmic forms there is already a reproduction of such ideas, whose immediate after-effects have already disappeared from consciousness, and which have retained only the general characteristic that they can easily be reproduced. (*Principles of Physiological Psychology*, 1873-1874, p. 680-681, my trans.)

The "idea of time" was thus not innate but resulted from an "indispensable external condition": "the succession of sensory impressions" and their reciprocal resonance by means of "intermediate imaginary image," which he also called "memory images - *Erinnerungsbilde*."

The idea of time finds originally an indispensable external condition of its formation, in any case, in the succession of sensory impressions. Let us suppose, to start with the simplest case, that the same sound impressions, for example, pendulum strokes would follow each other at regular intervals [...]. If the first pendulum stroke has passed, an imaginary picture [*Phantasiebild*] of it will remain until a second one occurs. [...] this simple repetition of a previous impression provides all the elements of the idea of time [*Zeitvorstellung*]: the first sound is the beginning of time [*Zeitanfang*], the second the end of time [*Zeitende*], and the intermediate imaginary image [*dazwischenliegende Phantasiebild*] represents the stretch of time [*Zeitstrecke*]. At the moment of the second impression, all of a sudden, the whole idea of time [*Zeitvorstellung*] exists, for here all three elements are given simultaneously: the second impression and immediately the imaginary image, the first impression through the reproduction. (*Principles of Physiological Psychology*, 1873-1874, p. 681-682, my trans.)

Rhythm as Form of Physiological Process (part 4)

This psychological approach drove Wundt to challenge the usual infinite concept of time as too theoretical and practically inadequate, and underline instead the limits of our natural "intuition" and "idea of time" which seemed here to almost blend together.

According to this [the fact that our immediate conception of time is based on limited time stretches], our idea of time [*unsere Zeitvorstellung*] is far removed from the infinite extension which we ascribe to time according to its concept [*dem Begriffe nach*]. The latter, like every concept, is a postulate that is never reached by the ideation [*Vorstellung*]. Of course, we are naturally quite close when we think of the after-effects of the ideas which are necessary for the time intuition [*für die Zeitanschauung*] as faded pictures or remnants. But a series of simultaneous stronger and weaker ideas [*starker und schwacher Vorstellungen*] is not yet a time series. (*Principles of Physiological Psychology*, 1873-1874, p. 681, my trans.)

Time could not be conceived of as an abstract concept emptied "from any particular ideal content."

In forming the concept of time [*Begriff der Zeit*], we empty it from any particular ideal content [*Vorstellungsinhalte*], and thereby arrive at the assumption that time is a general form [*gleichbeschaffene allgemeine Form*], which is evenly available in every given moment [*in jedem Augenblick*], and which accompanies the ideas. The result is that image of infinite continuous straight line, forward and backward. [However], as far as the intuition of time is concerned, this picture has no reality at all. (*Principles of Physiological Psychology*, 1873-1874, p. 684, my trans.)

Our natural intuition of time had to be investigated practically. Since the flow of consciousness does not stop between strokes, the analysis of the rhythmic series could not be reduced to the mere recurrence of beats. On the one hand, due to the continuous activity of the mind, the impressions of the first and the second stroke were necessarily different; on the other hand, the echo of the first stroke would meet new impressions whose origin he did not explain before the second stroke enters the field of consciousness.

The elementary conditions, as they have been assumed here, must be made more complex since, first of all, the end-point is related with a different impression than the starting-point, and second, there is no pause between the two points but a series of different impressions. As a matter of fact, the memory image [*Erinnerungsbild*] of the first impression will accompany the ideas [*Vorstellungen*] that fill in the time stretch [*Zeitstrecke*]. (*Principles of Physiological Psychology*, 1873-1874, p. 682, my trans.)

Both facts explained that we can think of the time under two different guises as *limited time stretch* or as *unlimited time series* and to build upon the former the idea of the latter.

At the moment when the final impression happens, however, a couple of things are possible: it can either be related to the initial impression, so that it is reproduced as above; then again the idea of the precisely determinate time stretch [*die Vorstellung der bestimmt abgegrenzten Zeitstrecke*] arises. Or, there can be no reason for such reproduction; then the idea of the indeterminate course of time [*die Vorstellung des unbestimmten Zeitverlaufs*] arises. (*Principles of Physiological Psychology*, 1873-1874, p. 682, my trans.)

A further argument concerns the impressions located between beginning and end points. Each one of them still lingers in the memory after [actually] disappearing. So every intermediate impression becomes the starting point of a subordinate time stretch. If, according to the association laws, the last impression reproduce the first one, then all these tuned and superimposed time stretches recede behind the main stretch. If, [instead,] such reproduction does not happen, then all the time stretches are equal to one another, but all are, at the same time, indefinite. In both cases, the condition in which the consciousness find herself corresponds only to a very obscure sense of time. Nevertheless, it provides the basis for the formation of the *concept of time* [zur Bildung des Zeitbegriffs] in which the idea of the indeterminately limited [*unbestimmt begrenzten*] time series is elevated to the requirement of an *unlimited* one [*einer unbegrenzten Zeitreihe*]. (*Principles of Physiological Psychology*, 1873-1874, p. 682-683, my trans.)

Yet, the idea of "unlimited time series" was not yet complete because it still lacked the idea of *course of time*.

[The clear intuition of the *course of time* - *die klare Anschauung des Verlaufs der Zeit*] is not yet included in the indefinite idea of time. The addition of the new impression to the memory images only arouses in general the idea of a previous one. Since the new impression does not reproduce a particular preceding one, the idea of stretch of time [*die Vorstellung der Zeitstrecke*], which constitutes an element of the course of time [*in den Verlauf der Zeit*], is completely absent. For every particular course of time [*Zeitverlauf*] consists of stretches of time [*Zeitstrecken*], which must be marked by beginning and end points. (*Principles of Physiological Psychology*, 1873-1874, p. 683, my trans.)

Finally, only rhythm, "because the uniform reproduction of the previous [bar] gives clear marks to the beginning and end of each simple time stretch," provided the ultimate idea of *time-course* which had to supplement our sense of *infinite time*. Through the rhythm time was interpreted as "measurable quantities."

This accounts for the great importance of the *rhythm* for the formation of the idea of time [*Zeitvorstellung*]. Each bar [*Takttheil*] forms a simple time stretch [*Zeitstrecke*], which is integrated with others into a larger time series [*Zeitreihe*]. The course of the latter [*der Verlauf derselben*] is immediately grasped, because the uniform reproduction of the previous [bar] [*Vorangegangenen*] gives clear marks to the beginning and end of each simple time stretch [*Zeitstrecke*] and to the entire series [*ganze Reihe*]. In this case, therefore, the intuition of the *measurement of time* [*Anschauung zur Messung der Zeit*] becomes also immediate. The successive bars [*Takte*] are interpreted as quantities of time [*Zeitgrößen*], which are further subdivided into the rises and falls of the rhythm [*Hebungen und Senkungen des Rhythmus*]. (*Principles of Physiological Psychology*, 1873-1874, p. 683, my trans.)

This had two important consequences. First, Wundt opposed in advance Bergson's conception of time as *durée continue* and anticipated, by the same token, Bachelard's view on time as consisting of discrete time points (Bachelard, 1932 and 1936; see Lamy, 2014).

An often-used picture compares time with a line without thickness. Through this image one has been enticed to attribute to time an essential quality of space, *continuity*. But time itself is a *discrete* entity. It consists of individual ideas that fit together; a single unvarying continuous idea could never lead to time intuition. For that very reason the *number*, which according to its original meaning can only be referred to discrete objects, is a concept which first emerges from the idea of time. (*Principles of Physiological Psychology*, 1873-1874, p. 684, my trans.)

Second, since it entailed both concepts of time-infinity and time-measurement, rhythm was therefore granted the power to elicit "the *concepts of number and quantity*."

Thus, the rhythmic idea of time [*die rhythmische Zeitvorstellung*] first and foremost contains the condition for the emergence of two important concepts, the *concept of number* and the *concept of quantity* [*des Zahlbegriffs und des Grössenbegriffs*]. (*Principles of Physiological Psychology*, 1873-1874, p. 683, my trans.)

As for arithmetic operators, *addition* and *subtraction* were conceivable as extensions of any "arbitrary alternation of ideas," i.e. irregular series, but *multiplication* and *division* were "psychologically hardly imaginable without the rhythmic structure of the time series," so as the concepts of *power* and *root* which result from their repetition.

Any change of ideas [*Wechsel von Vorstellungen*] can lead to the number concept [*Zahlbegriff*]. [...] Since each time interval points to a preceding and succeeding one, the concept of number combines with [that of] the *unlimited*. The progress from one idea to another is the model of *addition*, the regression in the time series the model of *subtraction*. Yet, while these simplest forms of the concept of number can arise from any arbitrary alternation of ideas, the more complex forms of the progressive and regressive processes are psychologically hardly imaginable without the rhythmic structure of the time series [*die rhythmische Gliederung der Zeitreihe*]. Every compound rhythmic structure breaks down into simpler constituents. The generation of the bar [*des Taktes*] from its elements, the rhythmic series from the bars, corresponds to the *multiplication*, the splitting [*Zerlegung*] to the *division*. The relation of the simplest bar elements to the rhythmic series and periods finally provides the model for the repetitions of these processes, which lead to the concepts of *power* and *root*. (*Principles of Physiological Psychology*, 1873-1874, p. 684, my trans.)

Auditory Rhythm as Cause of Aesthetic Feelings (Wundt - 1873)

The last aspect of rhythm that attracted Wundt's attention, and the least developed as a matter of fact, was the part it plays in our "aesthetic feelings." In Chapter 17, he again compared and contrasted rhythm and harmony. Both were ways to bring order to sounds, in pitch for harmony, in time for rhythm. Endorsing a long Platonic tradition (see Vol. 1, Chap. 2), he attributed the aesthetic pleasure to this power of ordering a chaotic matter that would procure otherwise disagreeable impressions.

Because the sense of hearing brings order to [*ordnet*] the simultaneous as well as the successive impressions, it is endowed with two basic forms of aesthetic feelings: harmony and disharmony, rhythm and arrhythmia. The basis of *harmony*, as has been shown in detail, is the coincidence of certain partials of different sounds. [...] The *rhythm* provides pleasure through intensively or qualitatively related impressions, which are repeated in the alternation of different auditory ideas usually according to regular periods of time. (*Principles of Physiological Psychology*, 1873-1874, p. 692-693, my trans.)

Deaf to the experiments of the most important musicians of his time, not to mention the poets, who all tried to get rid of metric patterns (see Vol. 2, Chap. 8), and merely translating into "science" a rather classical taste, Wundt claimed that the most pleasurable series of sounds were those based on "regular alternation" and "repetition of the similar," within yet the range of human perception. Beyond a certain limit, the rhythm could merely not be recognized.

In order to create an aesthetic pleasure, at least two different impressions, rise and fall of the sound, as in 2/8 time signature, must follow each other in regular alternation. The rhythmic feeling likewise ceases when the series of different impressions becomes so long that the repetition of the similar can no longer be felt, as in 9/4 time signature or in other forms that exceed the limit of clarity. (*Principles of Physiological Psychology*, 1873-1874, p. 693, my trans.)

Rhythm as Form of Physiological Process (part 4)

There was a way, though, to "extend" the "rhythmic feeling" "over larger successions" with the help of the melodic and harmonic feelings, which could beneficially enhance the more primitive means of expression provided by the rhythm.

By combining the bars into rhythmic series, the series into periods, finally the musical periods into the divisions of the melody, the rhythmic feeling can be extended over larger successions. As the harmony, the rhythm is based on the easily manageable connection of ideas. Within the general regularity of succession, various forms of pleasure become possible, then, through the variable bar structure [*Taktgliederung*], [and] the faster or slower succession of impressions[forms of pleasure] which [can] expand infinitely, since they join, in the melody, with the laws of harmonic sound connection. (*Principles of Physiological Psychology*, 1873-1874, p. 693-694, my trans.)

Yet, Wundt concluded by giving the same psychological and aesthetic significance to harmony, which gave "direction to the mood," and to rhythm, which was supposed to "portray the alternation and waves of the emotions."

In the whole of the musical effect, it is the harmony which gives direction to the mood [*der Gemütsstimmung ihre Richtung gibt*], the rhythm which portrays the alternation and waves of the emotions [*das Wechseln und Wogen der Gefühle schildert*]. But both forms of expression are held together by the principle of unity governing the manifold. (*Principles of Physiological Psychology*, 1873-1874, p. 694, my trans.)

[Next chapter](#)