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Rhythm as Form of Psychological Process (part 1)

- Recherches

- Le rythme dans les sciences et les arts contemporains

- Psychologie - Nouvel article

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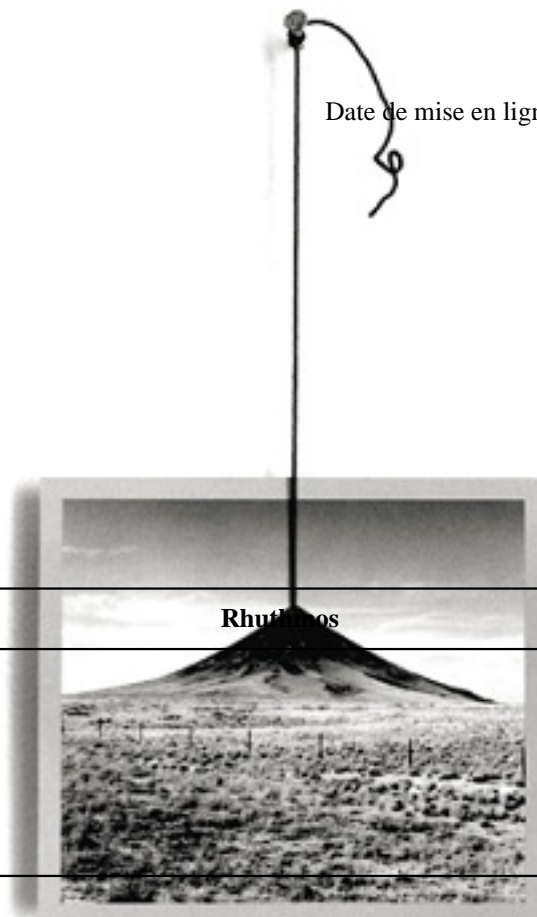


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During the last decades of the 19th century, psychology began to emancipate itself from physiology even though the latter remained an important basis for its development. This mutation allowed psychology to become an academic discipline in its own right and to be recognized in the university curricula.

Psychology then contributed to the remarkable surge of interest in rhythm which marked the Belle Epoque. When, in 1913, Christian Ruckmich compiled a list of the recent psychological studies on rhythm, he cited more than two hundred entries and the research propagated at such a pace that he had to update his bibliography again in 1915, 1918 and 1924 [1].

In psychology this development was integrated into larger cosmological and evolutionary views. It was also accompanied by a clear transformation of the concept of rhythm, which was increasingly conceived of as *regular beat* and *wave*, as in physiology, physics and natural science. Finally, it was the occasion of an interesting discussion on the relation between body and mind.

Rhythm in Cosmological Perspective (Bolton - 1894)

In 1892-1893, the young American psychologist Thaddeus Bolton (1865-1948) developed at Clark University, Worcester, Massachusetts, an innovating research program on rhythm whose results he published in 1894 [2]. He was only twenty-nine and his enterprise announced an important shift in the history of the rhythm concept. This was actually the first time that rhythm became the main topic of a scientific investigation in psychology. Whereas Wundt still considered it as a secondary subject, Bolton placed it at the center of his concerns. His contribution is, for this reason, of great interest to us. It illustrates the fast-growing interest in rhythm after 1890. It also evidences the semantic shift of the concept which occurred during the decades before WWI. It exemplifies the cultural and social presuppositions which were, henceforth, to be strongly associated with the Platonic paradigm.

Bolton's study consisted in two parts: a lengthy "Introduction" to the problem of rhythm (p. 1-34) and a presentation of his "Experimental Investigation," its protocol and results (p. 35-94).

Quite remarkably, Bolton started by presenting rhythm defined in the most modern terms as "regular alternation," "periodic recurrence," or "wave" (see vol. 2, chap. 2) as a "universal and natural phenomenon" which concerns the cosmos as well as all living beings in it. Since this cosmological assertion, which had already been sustained by Schelling at the beginning of the 19th century (see vol. 2, p. 133 and 145 sq.), rapidly spread and became a powerful cliché, which lasted at least until the 1940s and had replicas as late as the 1960s (e.g. Lamouche's *Rythmologie universelle*, 1966), it is worth looking into it carefully.

Rhythm is so universal a phenomenon in nature and in physiological activity, and underlies so completely speech, that I desire to call attention to some of its manifestations in detail before presenting the experimental study.

Rhythms in Nature: Natural phenomena very generally, if not universally, take a rhythmic form. There is a periodic recurrence of a certain phenomenon, sometimes accompanied by others, going on continuously in all that pertains to nature. Motion, whether in the broader field of the universe or upon the earth, is very generally periodic. Light, heat, sound, and probably electricity, are propagated in the form of waves. (*Rhythm*, 1894, p. 2)

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The "cosmic rhythms," i.e. the cosmic "periods" and the "regular alternation of light and darkness," were the "the cause of many other rhythms in plant and animal life."

The cosmic rhythms, however, are the most fundamental and important of natural phenomena. They may be shown to underlie in a measure and be the cause of many other rhythms in plant and animal life. The regular alternation of light and darkness due to the rotation of the earth upon its axis is the most striking rhythm in the cosmos. The two periods of light and darkness constitute a unit the day which remains always the same in length. (*Rhythm*, 1894, p. 3)

One could think that Bolton was only anticipating what was to be called "chronobiology" in the second half of the 20th century. He indeed rightly noticed that "the revolution of the moon" and that "of the earth about the sun" had "tremendous influence upon animal and plant life" and gave a series of well-chosen examples of the latter.

The two periods of light and darkness constitute a unit the day which remains always the same in length. Days are grouped into months by the revolution of the moon about the earth, and into years by the revolution of the earth about the sun. These periodic changes have had a tremendous influence upon animal and plant life, and have stamped their impress upon all living organisms in the most striking manner. [...] In the vegetable kingdom some plants show a daily growth and repose; their flowers bloom in the morning and close before the evening. Some turn their petals towards the sun, and make a daily revolution in order to keep them so. In certain latitudes all vegetation shows normal periods of growth and fruitage which are not necessarily cut short or lengthened by early or late frosts. [...] The influence of these cosmic rhythms is not less upon the animal kingdom. The daily rhythm causes the daily periods of sleep and waking, from which no terrestrial creatures of the higher types are exempt. [...] The lunar period has had a far-reaching effect upon animal creatures, especially as regards reproduction and the nervous system. The periods of gestation and the recurrence of heat and menstrual flow in both human beings and animals bear a very close and striking relation to the lunar period. The period of gestation in some lower mammalian animals is one month. In the higher forms it is a certain number of months. (*Rhythm*, 1894, p. 3)

But Bolton was actually developing an argument which was encompassing much more than the present chronobiology does. Not unlike his German and Austrian contemporaries Wilhelm Fliess (1858-1928) and Hermann Swoboda (1873-1963), who at about the same time coined the term "*Biorhythmus* - biorhythm," he believed in "rhythmic cycles" which would affect human beings' life, and even claimed that they were related to certain cosmic cycles such as the periodic appearance of "sun spots."

Although we find that these cosmic rhythms have stamped themselves upon the organism more or less permanently, they have wielded a far mightier influence upon the minds of men. [...] Sun spots make their appearance in great numbers once in about eleven years, and the attempt has been made to connect these with great financial disasters and religious awakenings which seem to recur in the same time. The social customs of the race show similar changes, which may prove to have some connection with sun spots. The coincidence warrants an investigation and allows speculation. (*Rhythm*, 1894, p. 4-5)

Moreover, arguing, as medieval and Renaissance physicians (see vol. 1, chap. 9 and vol. 2, chap. 1), that they share

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a periodic form, Bolton suggested that the cosmic recurrences were of the same nature as human phenomena such as "pulse, respiration, walking and speech." These phenomena had empirically nothing in common but Bolton thought possible to associate them.

Physiological Rhythms : No fact is more familiar to the physiologist than the rhythmic character of many physiological processes. In physiology it means the regular alternation of periods of activity and periods of repose or of lesser activity. The term is also applied to any alternation of activity and repose, whether it is regular or not. These periods of activity and intervals of repose may succeed one another at very small intervals of time, as in the case of a clonic contraction of the muscle, or at very much greater intervals, as in the case of sleep and waking, or better still, in the periods of growth in children. Several of the most vital and important bodily activities are distinctly rhythmical, and will serve as types of all physiological rhythms. Of these, might be mentioned the pulse, respiration, walking and speech. (*Rhythm*, 1894, p. 5)

Noticeably, Bolton used the term rhythm to describe the succession of phases in the development of the embryo but also in children growth. To my knowledge, this was one of the first times ever that rhythm was used in this particular sense (see the discussion of the opposite view in vol. 2, chap. 5).

This rhythm in growth, which is observed in the embryonic development, is characteristic of the physical and mental growth of children. For several years previous to puberty, great increase in stature is observed, puberty itself being a period of slow growth. From fifteen to eighteen is another period of growth, in which the full stature is generally reached. (*Rhythm*, 1894, p. 8)

Once again loosely associating unrelated phenomena, Bolton introduced the idea that, in human beings, attention "manifests itself in a wave-like form" and constitutes "series of pulses." Unlike the revolutions of the planets or even the heartbeat, these rhythms were strangely "discontinuous and intermittent," but this did not deter Bolton from comparing them, under the aegis of an authoritative list of scientists no less than Charles S. Pierce, Wilhelm Helmholtz, and William James.

Attention and Periodicity: The most casual observer will discover that his attention is discontinuous and intermittent. It manifests itself in a wave-like form. It is a series of pulses. [...] Charles Pierce says in his "Philosophy of Attention" that there is "no continuum." This periodicity in attention has been observed by Helmholtz with the stereoscope and commented upon at considerable length. [...] Two seconds seem a long time to hold any object which has no relation before the attention. James says : "There is no such thing as voluntary attention sustained for more than a few seconds at a time." Does it not, then, seem reasonable that during each wave or pulse of attention only one undivided state of consciousness can arise? (*Rhythm*, 1894, p. 8)

Climbing further up or down, according one's own view the cosmic ladder, Bolton finally addressed the question of rhythm in speech. "Being an involuntary and habitual function," i.e. ingrained in the body, the human speech, he

claimed rightly, "might be expected upon *a priori* grounds" to be "rhythmical."

Rhythmic Speech: The most distinguishing, and in many respects the most important, function of the human body is vocal utterance and articulate speech. Being an involuntary and habitual function in a large measure, it might be expected upon *a priori* grounds to be rhythmical. (*Rhythm*, 1894, p. 12)

But the rhythm in ordinary speech was only "the regular recurrence of strongly accented sounds in a series." This idea, which was obviously based on the English linguistics, could not account for Chinese or even for French, but Bolton claimed that syllable accents were the bases of human language rhythm.

Speech becomes rhythmical not simply by sounds succeeded by pauses, but also by the regular recurrence of strongly accented sounds in a series. Aside from the simplest shout or exclamation of joy or pain, all vocal utterances are primarily rhythmical. Every word that contains more than one syllable consists of strong and weak syllables. These accents occur upon every other syllable in varying intensity, or at most the accented syllables are separated by two unaccented syllables. (*Rhythm*, 1894, p. 12)

Bolton seemed, however, to recognize that this simplistic definition was not sufficient to account for the whole organization of human speech especially when the latter becomes poetry. When he addressed the problem of what makes a poem into a whole, he interestingly considered it as an organic structure made of time relations, successions of accents, sound relations, and spread of themes.

By what coordinations and subordinations of sounds with respect to their properties and meanings is the whole structure of the poem held together ? [...] How is the carrying power of the mind increased to such an extent? The answer is to be found in the fact that unities are formed out of the simplest elements of speech by coordinating some with others in respect to their time relations; secondly, unities are formed of unities by subordinating them with respect to their intensities, and sometimes, their time values; thirdly, by coordinations and subordinations with respect to intensities and qualities, higher unities still are formed ; and fourthly, by coordinations and subordinations with respect to theme and aesthetic forms, the greatest unities are accomplished. (*Rhythm*, 1894, p. 12-13)

But the two most important phenomena were, as in the most common metric theories in the 19th century, timing and accentuation of sound recurrences. Both allowed the mind to transform sheer acoustic "rhythmic series" into perceived and felt "rhythmical series," i.e. to make "a rhythm in speech" rise in the human mind. By varying the intensity of the accented sounds, "larger groups" could even be formed.

In the first place vocal utterances are related as regards time, that is, the same sound may recur at regular intervals, in which case the series thus formed might be termed a *rhythmic* series a series which may become rhythmical. In the next place this series might be made up of louder and weaker sounds alternating with each other. The series would then be composed of groups of sounds and might be called a *rhythmical* series. This is a rhythm in speech. If now the louder sounds in each group were given different intensities, these smaller groups might be brought into larger groups still. In this way the mental span may be made to extend itself over a very large number of simple impressions. (*Rhythm*, 1894, p. 13)

The whole cosmos, whatever the scale chosen for the observation, was thus covered and organized by rhythms i.e. *regular beats and waves*.

Rhythm in Evolutionary Perspective (Bolton - 1894)

Following this first cosmological approach, Bolton introduced rhythm in a grand evolutionary view.

Since the language itself was an offshoot of the body, poetry and literature must have risen from the dance, he said. Poetic rhythm was a sheer translation into language of the "simple swaying of the body or the tramping of the feet in the march." In prehistoric times, there was no metric rule and the verse consisted of a continuous "alternation of accented and unaccented syllables," regularly interrupted, though, by "a pause" between two accented syllables.

When language appeared as literature, it took the form of the simplest possible rhythm. Even then it was the vocal accompaniment of a dance, and there are many analogies to the simple swaying of the body or the tramping of the feet in the march. There were no fixed rules in regard to the number of syllables to the measure. The verse, so far as we can speak of a verse, consisted of an alternation of accented and unaccented syllables. Very generally it began and ended with an accented syllable, so that a pause occurred between each verse. (*Rhythm*, 1894, p. 23-24)

In these early times, poetry was thus "naturally" based on very elementary repetitions, dualistic structures, symmetries. Since there was no "extant specimens of the first literary productions," we could nevertheless access to them through "the literature of primitive peoples and of children," which was still akin to them.

Two sounds, one strong and one weak, the one succeeding the other in time, cannot give an idea of a rhythm, but two groups of two such sounds certainly can. This being the simplest possible rhythm, we should expect that it would be the earliest form in which literature appeared. Since we have not probably any extant specimens of the first literary productions, for they were not committed to writing, we must judge from those which have come down to us from later periods, and from the literature of primitive peoples and of children, what the earliest form was. (*Rhythm*, 1894, p. 14)

As in dancing or better yet, marching, the succession of accents was, Bolton claimed, entirely regular. Even if specialists recall that "up to the fourth century, English rhythms were temporal and then became accentual," this, strangely, did not change the deep nature of rhythm. Poetry was like a march into the language, "sung in exact time." The *beat* was the fundamental rhythm even if Bolton downplayed his own assertion a little further down by noticing that "perfect time is the result of the application of scientific methods to music."

Early poetry was sung to the accompaniment of the harp and hence was sung in exact time. On this account Guest says that up to the fourth century, English rhythms were temporal and then became accentual. Previous to that time the syllable had a time value. This, however, is not to be taken in any absolute sense. Poetry was chanted in a kind of trance state, and the reciter aimed to produce such a state in his audience. For this purpose the thought was of minor importance. Great dependence was placed upon the rhythmical flow, and doubtless a very exact time was given to the syllables that the movement might be clearer. [...] It must be conceded that though some regard was paid to the time of syllables, no such exact time was maintained as modern musicians keep in their music. Perfect time is the result of the application of scientific methods to music. (*Rhythm*, 1894, p. 24-25)

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A short history of English verse since the 5th century was mobilized to furnish some evidence supporting his evolutionist view. According to ancient poetry specialists, the oldest extant specimens of Anglo-Saxon verse formed "a kind of balance structure, in which the first section contained a rise and the second a fall."

The oldest extant specimens of English poetry are generally composed of verses of two sections, which are separated by a pause in the middle. Each section generally contains four, sometimes six, syllables, two of which are unaccented and two accented. [...] The two formed a kind of balance structure, in which the first section contained a rise and the second a fall. (*Rhythm*, 1894, p. 14)

In these early days when the Brits were still primitive people, speech rhythms were still closely linked with body rhythms. Poetry was commonly accompanied with dancing or better yet, dancing with poetry.

The phenomenon of accompanying the changes of intensity in a series of sounds with muscular contractions, led to the early association of dancing with musical and poetical recitation. Indeed, if we accept the current theory of the origin of language as arising during the celebrations of victory, dancing precedes even language. (*Rhythm*, 1894, p. 15)

Quite daringly, Bolton plunged into the most remote past when human beings were still close to their animal ancestors. Consequently, the rhythm "was scarcely more than the simple swaying of the body or the lifting of one foot and now the other."

Just as an animal jumps and frisks about as an expression of pleasure at seeing his master, so our ancestors danced for joy over a victory, or in the worship of their deity. They emitted certain vocal utterances in company with the tramping of the feet, which in time came to have definite meanings and also took on the rhythm of the dance. This rhythm was scarcely more than the simple swaying of the body or the lifting of one foot and now the other. (*Rhythm*, 1894, p. 15)

According to Taine, whom Bolton deferentially cited, the ancient Saxons did not properly speak they "shouted" or "growled."

The two-rhythm was apparently the prevailing rhythm in the history of our language, if not in some others. [...] Taine in speaking of early Saxon poets says: "His chief care is to abridge, to imprison thought in a kind of mutilated cry." "They (Saxons) do not speak, they sing or rather shout. Each little verse is an acclamation which breaks forth like a growl." (*Rhythm*, 1894, p. 16)

Some of those primitive traits still characterized, according to him, "Irish melodies," "popular songs," and "children's poetry."

There still remain in our poetical compositions certain evidences of some, at least, of the stages through which our poetry has passed. The choruses in many of our hymns are still made up of non-sense syllables. Irish melodies and popular songs retain this feature. Children's poetry by that I refer to such poetry as they enjoy and recite for their own amusement has a large element of purely unmeaning sounds in it. (*Rhythm*, 1894, p. 16)

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These primitive rhythms were common among "savages" and "children." But there were also those of certain "maniacs" or "foreigners."

Savage dances are often accompanied by recitations in which no meaning has been discovered. Again, savages and children are frequently found repeating for their own amusement a series of non-sense syllables in rhythmical form. The accents are very strongly marked, and frequently enforced by alliteration. The incoherent chatter of a maniac, or the sound of a foreigner speaking his language to one who is unacquainted with the language, is distinctly rhythmical. (*Rhythm*, 1894, p. 16)

Bolton dedicated a full section to "The Emotional Effects of Rhythm upon Savages and Children." According to his dualistic anthropology and philosophy of history, "savages," "primitive" or "uncivilized people" were to "civilized" men what "children" were to "adults." Whereas rhythms had a mild effect on the latter, they could strongly "excite" the former and even sometimes bring them into a "state of frenzy."

There is no more striking fact in the whole field of rhythm than the emotional effect which rhythms produce upon certain classes of people, savages and children. [...] Savages are well aware of the exciting effects of certain rhythms, and are accustomed to use them to bring about the state of frenzy in which their priests give their prophecies and in which religious dances are danced. [...] Such airs seem to appeal to the primitive sense common to all people, but upon savages, that is, upon children with the possession and power of men, its influence is immense, and the state of excitement into which an assemblage of uncivilized people may be wrought by the mere rhythm of drums and the repetition of a simple melody would hardly be created (*Rhythm*, 1894, p. 19)

Bolton noticed the well-known dancing performances during the Shakers religious services but he added that "a highly civilized people is not easily affected by mere rhythms." By contrast, in "the lower classes of people" or in "negro" communities the preacher "often resorts to recitative speaking to produce the desired emotional state in his hearers."

The religious services and singing among the Shakers are often accompanied by dancing, and more frequently by beating of the time by all the members of the congregation. The excitement among them never rises to an extreme degree. A highly civilized people is not easily affected by mere rhythms. A simple tone is not so expressive as it is to the lower classes of people. The negro preacher often resorts to recitative speaking to produce the desired emotional state in his hearers, which is generally known as the "power." (*Rhythm*, 1894, p. 20)

Quite inconsistently, he mentioned, however, the "variations of the rhythmical effects" and the new "harmonies" that musicians could find in "the negro melodies" of "our slaves" (sic) and went on to speak, in the same ambivalent spirit, of the "Hungarian melodies."

The musician who desires now to produce new effects, turns to the Volks-Lieder for a theme. He aims at variations of the rhythmical effects and introduces new harmonies. Mendelssohn is said to have remarked, when he heard some of the negro melodies of our slaves, that here was a field for a great musical talent. Wagner, taking the suggestion, has made such an adaptation of the Hungarian melodies, and with what success the musical world is well aware. (*Rhythm*, 1894, p. 23)

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With the civilization process, the simple binary and repetitive rhythms that had been borrowed in the early times from the dance became more complex.

The line of development along which poetry followed was an increase in the number of unaccented syllables as compared with the accented, and also an increase in, the number of accents to the verse ; the verse preserving for some time the same balance of structure that it had in the beginning. (*Rhythm*, 1894, p. 24)

Due to the growth of the Anglo-Saxon kingdoms and the sophistication of their culture, the rhythm of their language and poetry, which originally was only repetitive and binary, became more complex.

After the people became settled down in their new homes, they lost the ruder and rougher characteristics, and such wild outpourings would be no longer suited to their milder spirits. The changes that took place in the development of our literature are due in some measure to the change in the life and habits of the people. (*Rhythm*, 1894, p. 16)

As accentuation and strict timing lost ground to the thought that was carried by the poem, the alliteration, "which was very prominent in Anglo-Saxon, was gradually lost" and replaced by the "final rhyme" (p. 25-26). The poetic form, that was, according to him, originally almost empty of thought, became less important than the thought itself. In Bolton's evolutionary account, there was thus a kind of spiritualization of the rhythm, a penetration and occupation of the acoustic form by the mind.

Final rhyme succeeded alliteration. The chief reason seems to have been for a more emphatic or distinguishing mark of the rhythm than could be obtained through accents alone; especially when run-on lines came to be used and the thought was about to usurp everything. When two successive sentences or words begin with the same sound, it interferes with the understanding of them. Both the reader and hearer are more likely to confound them. For this reason alliteration must give way, except for purposes of emphasis, when the thought becomes of the first importance. Simple intensities are not sufficient as unifying factors ; they cannot be properly subordinated to give unity to the line. (*Rhythm*, 1894, p. 26)

[Next chapter](#)

[1] Ruckmich, C. (1913/1915/1918/1924. "A bibliography of Rhythm." *American Journal of Psychology*, 24, p. 508-512; 26, p. 457-459; 29, p. 214-218; 35, p. 407-413.

[2] Bolton, T. (1894). "Rhythm." *American Journal of Psychology*, 6, p. 145-238.