

# Western Brain and its Japan Landscape, Temples, and Town Houses a Neurophysiologic Approach

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Two physicians, both grown up in West Europe, educated also in this area (supplemented by many visits of the United States), travelled 20 years ago to Japan for scientific reasons and they changed thereafter in their mental sight of the world. In a first part, the neurophysiologic basis of sensation from the sensory receptor up to the cerebral cortex ("bottom up"), the mechanisms of building memories and the influences of the contents of the memories on the bottom up ("top down"), thus constructing an apperception, are described. These functional elements provide a first approach to that what might be going on when Western brain encounters Japan. In a second part, the deduced neurophysiologic processes are illustrated by photographs (HS) and works of art (EJS). The sensory processes generate a "Gestalt" which is transformed to non-verbal "Extrakte Kunst".

**Keywords:** Brain; Neurophysiology; Japan; Memory

What is a western brain? On the basis of our own experiences we are able to answer this question very precisely. Born in the northern part of Germany and educated also in this region. We finished our university studies in Vienna (Austria) and Münster (the former West-Germany). We travelled through almost all west European countries the west coast of the Mediterranean Sea included. Special focus was on the capitals of these countries. Our experiences in West Europe were completed by numerous visits of the United States of America. The reasons of these activities were science and art. Beyond that, our interest was in philosophy since emersion the ancient Greece up to the modern developments in Europe and the States. Intensive emphasis was on the Christian religions. As a whole, this was not a complete but more or less a topographic restriction in mind. This euro centralism was interrupted in a radical manner 20 years ago. At this point of time we had to go to Japan to participate in a scientific congress. Suddenly and unexpectedly, our hearts, i.e. our brains, began to beat in Far East as well as in Europe – with equal intensities. From this event we spent nearly every year a month in Japan.

From the neurophysiological point of view the question arises what was and what is going on in our brains. A brought glimpse of that is shortly outlined at hand of the following figures. In the first days of our lives the

sensory receptors mostly located at the outer and inner surfaces of our body take up the stimuli sent from the environment as far as they can. In this context it should be mentioned that there are many environmental stimuli which can not be detected by humans but by animals; e.g. pigeons are able to record magnetic fields humans not. In its functional aspect the sensory receptors are positioned at the border zone (1, 2) between environment and the part of personality of the organism. In the visual system the receptors represent the eyes (Figure 1 A). To continue with the visual system the next step in information processing is the physical construction of a small image in the rear part of the retina; in the example of Figure 1 a small image of a football. After this mere optical procedure the further processes consist in a scanning of the image by the neuronal elements of the retina thus transforming the optical image in an electrical one. That resembles what our digital cameras do closely. The bioelectrical events then conducted via the optical tract to the occipital lobe of the cerebral cortex where an electrical image appears equivalent to the object in the environment (Figure 1 A) (2-7).

The different processes can be summarized and subdivided into functional spaces linked to each other (Figure 1 B) (2, 4). The first one is located in the environment, in the present example the football which sends light waves

into the eye. It is followed by the functional spaces “image construction (optics)” and “transformation, image scanning” and is eventually finished by “conduction up to the cerebral cortex”. The information running through the functional spaces from the environment to the occipital lobe is depicted in the flowchart of Figure 1 B and summed up as “bottom up”. That leads to the sensory brain activity called sensation.

The outlined processes finalized in sensations take place in the first day of our life and continue to do so with ongoing life (Figure 1 A and C) (2, 4). But there is a decisive difference between the complex brain functions in the first day and in adulthood. During the first day sensations appear only meaninglessly. The head of our mother and a football can not be differentiated. For filling the bottom up sensations with meaning (sense) further brain function have to come into play.

The essential brain functions to make sensations useful for our organism are the abilities to storage information. That is commonly called memory and the filling of memory is named learning. With ongoing life the basic sensation “round and black and white” is combined with the written or spoken word “football” which is then stored in the memory structures of the brain together with “round and black and white” (Figure 1 C) (2, 4). Now the functional situation is changed. When the bottom up process is taking place the brain is “looking” whether this activity pattern is stored and finds it is associated with the label “football”. In this way the content of the memories comes down to the bottom up and provides it with a meaning and an apperception is performed (Figure 1 D). The same holds true for houses, streets, moving cars etc. The described functional coupling between bottom up and top down processing is essential for the orientation of the organism in his environment. As a whole, it is essential for surviving.

The memories are not only filled with physical data but also with valuations of situations and emotions. Thus we have learned that the situation is bad if a football is in the goal of our team and that it is good if it is in the goal of the opposite team. But why? The reason is that the top down is formed by education in a very wide sense and not at least by self-experience. The consequence is with ongoing life the top down comes more and more in the foreground and the organism becomes better and better in arranging itself in the environment but the true, i.e. naive sensations (as in the first day of our life) shrink progressively. As pointed out, the development of top down is essential for surviving. However the accompaniment of this development with a decrease of feeling our intimate surrounding, such as nature, things and human situations is necessary. All becomes constructed by the brain on the basis of the top down acting memories (2, 4).

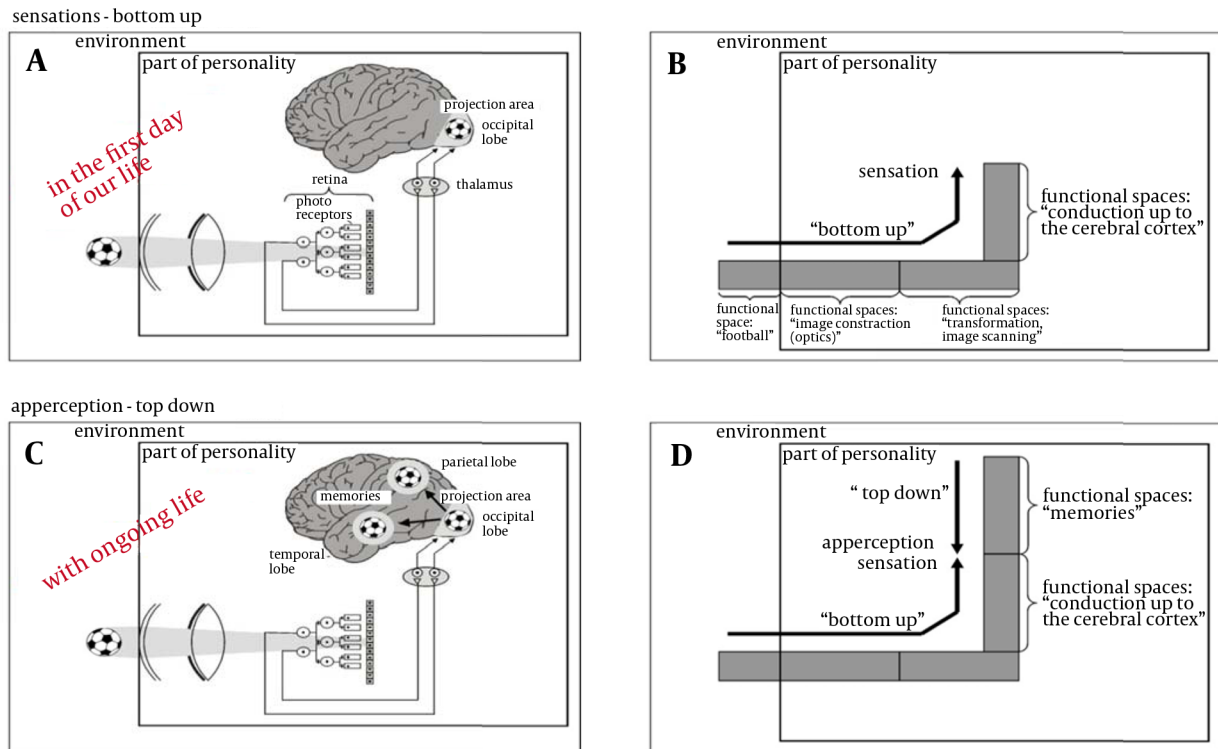
What can we do in this dilemma? The top down has to be persisted but there is a chance on the basis of the fact that it can be interrupted transiently for a defined period

of time (Figure 2 A). That can be done in several ways. One is to present the sensory system instead of the everyday football something what is not seen before and due to during the bottom up modulators, e.g. serotonin (5-hydroxytryptamin), dopamine, vasopressin or oxytocin are released, making the brain captivated and happy. Since the object is not (or at least not in this presentation) in the memories, instead of the all determining top down, a pure and blessing sensation appears. This occurs with the apperception of art (Figure 2 B) and the triggering object in the environment is a work of art. Therefore, art is often found to be the last exit of the strong top down and the entrance into a “new” life (Figure 2 A). This is not only the case with the visual system involved but also with many other sensory channels. Most popular is the auditory system which picks up longitudinal air pressure waves called music (2, 4).

When we went to Japan for the first time what is described in the last paragraph happened exactly. When we arrived, our bottom up and top down worked perfectly (Figure 3 A). After a very short time, only some days, nearly all of our sensory systems were captivated by extremely new sensations. Our bottom up systems released modulators which influenced our brains making them content and calm and filled them with a special kind of happiness. An overall sensation built up, worldwide known as Gestalt (Figure 3 B). “Gestalt” characterizes a compound apperception established by all bottom ups and top downs of sensory channels which are active. It is the result of a synergistic come together and therefore much more than the sum of the single apperceptions (8-12). It was and it is our Japan-Gestalt which was as such transferred to our memories. The development of our “private” Gestalt was certainly supported by the fact that we were unable to understand and to speak a word of the local language. During the last 20 years we consciously avoided to learn the language since we know that language is an important factor for building up an uncontrolled top down (2, 4). Now we have two top downs a west European one and a Japanese one. There is a peaceful coexistence with many cross talks - endlessly fruitful.

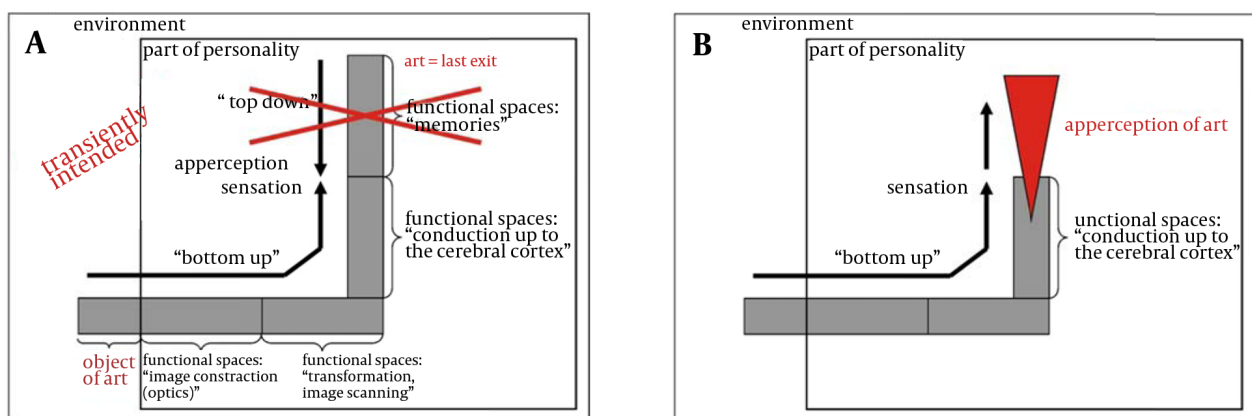
In the further course we would like to illustrate our Japan-Gestalt by photographs (HS) and paintings (EJS). In this context we will focus on two parts: Landscape and temples on the one side and town houses on the other. As far as the paintings (and the sculptures; not shown in this article; see Speckmann (13)) are concerned the “stile” is defined by E.J. Speckmann as “Extrakte Kunst” (14). That means that EJS makes from his apperception Gestalt a “coming to the point art object”; the brain of EJS performs an extraction from the Gestalt in his brain (Figure 3 B). Why paintings and sculptures and not a scientific excursion as he did so often in his scientific life and also at the beginning of this article? The clear answer is: An extraction of Gestalt is beyond words and language at all.

**Figure 1.** Principle Mechanisms of Cognition



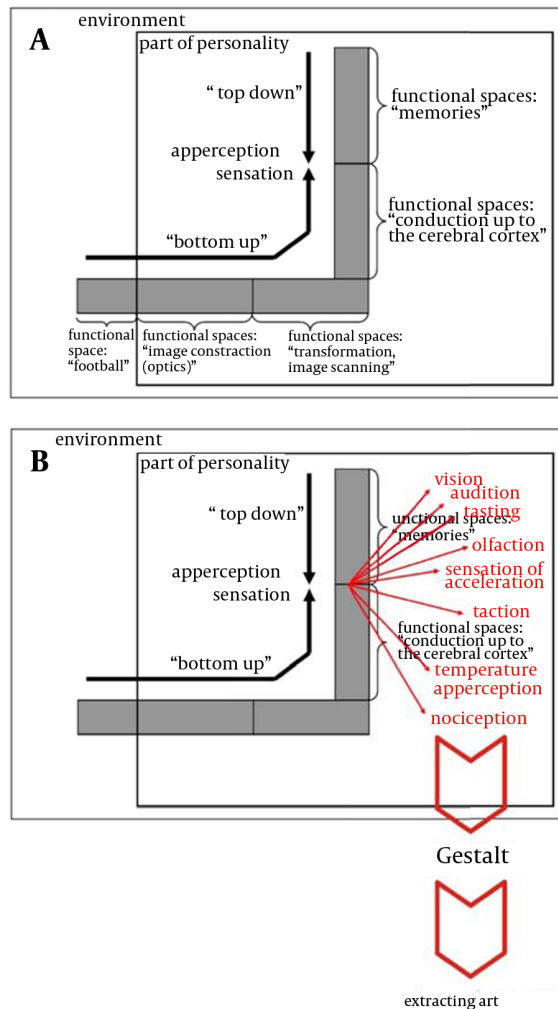
A and B, "In the first day of our life". A, From the object in the environment to bioelectric projection in the neocortex. B, Flow chart of sensation. Via the bottom up process to sensation. C and D, "With ongoing life". C, Establishment of memories. Interactions between memories and actual projection. D, Flow chart of apperception. Modification of bottom up by top down.

**Figure 2.** The Construction of an Apperception by the Brain is Essential for Surviving but Can Transiently be Interrupted With the Aim to Establish Also Transiently a Sensation Like That in the First Day of Our Life, i.e. Not a Constructed One by Our Brain



A, that can be done by art which is literally speaking the "last exit" to a free brain. B, Flow chart of naive sensation leading to an apperception of art.

**Figure 3.** Building Up the “Gestalt” as a Basis for Extracting Art (“ExtrakteKunst”)



A, Construction of apperception by bottom up and top down processes. B, Flow chart leading to apperception and sensory “feelings” and in further consequence to “Gestalt” and extracting art.

There are many natural areas in Japan and living in nature is a part of the lifestyle over there. The landscape of Japan is dominated by mountains (Figure 4 A), most of them volcanic in origin, by rivers and trees, exploding in the spring to an ocean of blossoms, and by flowers. All of them are being felt to be filled with a special kind of spirit. Therefore humans see and approach them with awful respect which is not at least reflected in the Shinto religion. This all life reflecting experience was and is a fruitful ground for the Buddhism. In further consequence, a huge number of Buddhist temples have been erected. Most of them appear as wooden buildings excessive in size. These temples are carefully arranged in the holy landscape (Figure 4 B). Along the centuries the landscape became also an instrument for spiritual practice. This is evident especially in the “gardening” of temples of Zen-Buddhism: The holy elements of nature are translocated to the holy places (Figure 4 C).

**Figure 4.** Landscape and Temples of Kyoto and Nara



A, Kamo river (Kamogawa) and Kyoto surrounding mountains. B, Pagoda of Kofuku-temple (Kofuku-ji) in Nara. C, Zen-Garden of Kennin-temple (Kennin-ji) in Kyoto down town.

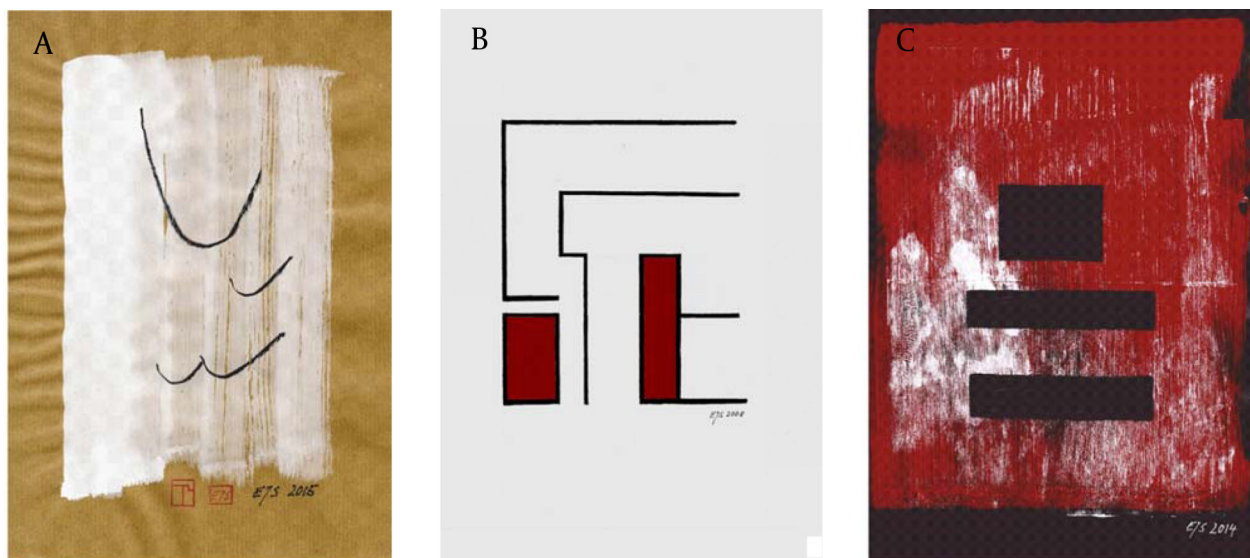
In the artificial extracting these Gestalt apperceptions lined out very roughly before numerous paintings and sculptures are developed. A selection of them is presented in Figure 5. They belong to the work group (Werkgruppe) "Japan" (14). As far as the sculptures are concerned, see "Erwin-Josef Speckmann - Skulpturen- 1997 - 2009" (13). The paintings represent works of oil colours on canvas but most of them on paper (4). Choosing paper and becoming extremely familiar with this material is undoubtedly due to encountering the Far East. The grounding colours are white (Figure 5 A and B) or red (Figure 5 C). The figurative structures are drawn by black ink using a brush; which is a very common method in the East. Thus, the triad white-black-red appears which is often found in Japan (15, 16).

From outside the sensation of dark and nearly black predominates is interrupted by rectangular sunshades and bays (Figure 6 B and C). Horizontal and vertical lines

forming rectangles as well as black, white and red areas superimposed. Each area led the inferior to shine. This form is the basis for the artificial extraction of the loved Machiyas (Figure 7).

Starting from their first visit the authors were captured by the small town houses called Machiyas in Japan. They can be found all over the country but they are concentrated in Kyoto down town (17). Machiyas are one and a half; two or three stored wooden buildings (Figure 6). Walls consist mainly of clay and roofs are covered by baked tiles. They are used as living, trade and craft houses or as all in combination. Very small gardens are located before, within or behind nearly every Machiyas and represent also the close connection to nature. The construction of these buildings is well adapted to the extreme climatic situation with very cold winters and very hot and humid summers (16).

**Figure 5.** Selected Paintings of the Workgroup "Japan" (Werkgruppe "Japan")



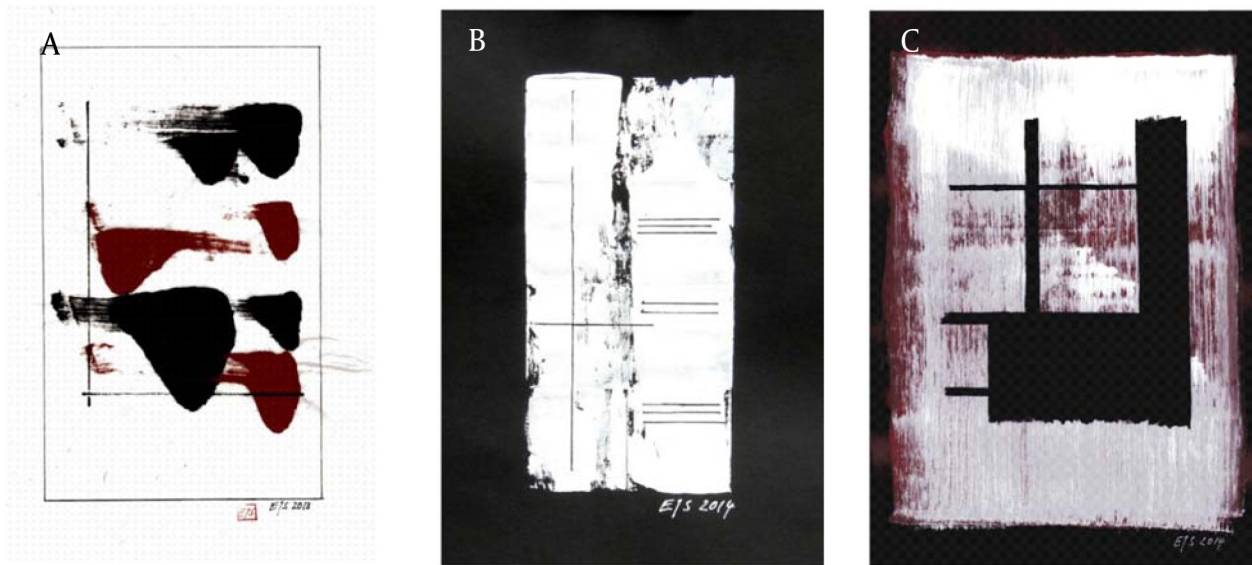
Paper, Gouache, Acryl, ink brush, A, "Japan # 271" (2015); 29 × 21 cm. B, "Japan # 115" (2008); 22 × 18 cm. C: "Japan # 241" (2014); 42 × 31 cm.

**Figure 6.** Town Houses (Machiya) in Kyoto Down Town



A, Fleet of houses. B and C, details of the street side of the Machiyas.

**Figure 7.** Selected Paintings of the Workgroup "JapanischesHaus" (Werkgruppe "JapanischesHaus")



Paper, Gouache, Acryl, ink brush. A, "JapanischesHaus# 119" (2013); 29 × 18 cm. B, "JapanischesHaus# 150" (2014); 22 × 10 cm. C, JapanischesHaus# 191 (2014); 38 × 27 cm.

## Note

This article was an invited article.

## References

1. Kobbert MJ. Kunstpsychologie. Kunstwerk, Künstler und Betrachter. Darmstadt: Wissenschaftliche Buchgesellschaft; 1986.
2. Kobbert MJ. In: Wahrnehmen ist die halbe Kunst. Chaos und Selbstorganisation in der Dynamik künstlerischer Entwicklungen. Editor: Metz-Göckel H. Gestalttheorie aktuell. Handbuch zur Gestalttheorie - Band 1. Metz-Göckel H, editor. Wien: Krammer; 2008.
3. Mizuno K. Invitation to Machiya in Kyoto. Kyoto: Mitsumura Suiko Shoin Publishing Co.; 2011.
4. Pape HC, Kurtz A. In: Physiologie. 7th ed. Silbernagl S, editor. Stuttgart - New York: Georg Thieme Verlag; 2014.
5. Rönn-Kollmann C, Speckmann H. Extrakte Kunst - Tiefe Fläche - E.-J. Speckmann. Münster: Daedalus; 2011.
6. Schütz E, Caspers H, Speckmann EJ. Physiologie - Lehrbuch für Studierende. 16th ed. München-Wien-Baltimore: Urban & Schwarzenberg; 1982.
7. Speckmann EJ. Experimentelle Epilepsieforschung. Darmstadt: Wissenschaftliche Buchgesellschaft; 1986.
8. Speckmann EJ. Einführung in die Neurophysiologie. 3rd ed. Darmstadt: Wissenschaftliche Buchgesellschaft; 1991.
9. Speckmann EJ. Das Gehirn meiner Kunst. Kreativität und das selbstbewusste Gehirn. 2nd ed. Münster: Daedalus; 2012.
10. Speckmann EJ. Grenzfächen. Prinzip der Lebendigkeit im Lebenden. Münster: Daedalus; 2013.
11. Speckmann H. Erwin-Josef Speckmann - Skulpturen - 1997-2009. Münster; 2010.
12. Speckmann H. Eingefangene Momente. Max J. Kobbert - Haiku. E.-J. Speckmann - Tuschkunst. Münster: Daedalus; 2013.
13. Speckmann EJ, Schulze H. Der Versorgungsteil des Organismus. Einführung in die vegetative Physiologie. Darmstadt: Wissenschaftliche Buchgesellschaft; 1990.
14. Speckmann EJ, Wittkowski W. Bau und Funktionen des menschlichen Körpers. 20th ed. München: Elsevier / Urban & Fischer; 2004.
15. Speckmann EJ, Hescheler J, Köhling R (Eds.). Physiologie. 6th ed. München-Jena: Urban & Fischer; 2013.
16. Yoshida T. Das japanische Wohnhaus. Tübingen: Verlag Ernst Wasmuth; 1935.
17. Zilles K, Rehkävery hot and humid summermper G. Funktionelle Neuroanatomie. Berlin-Heidelberg-New-York: Springer; 1998.