

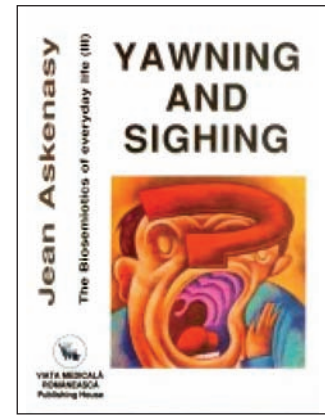
BOOK REVIEW

Yawning and sighing

by Jean Askenasy

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Trained at Gheorghe Marinescu's Romanian School of Neurology, well known neurologist and sleep medicine specialist at Tel-Aviv University, **Professor Jean Jacques Askenasy** is also a remarkable essayist. Starting from the teachings of his mentors Vlad Voiculescu, Arthur Kreindler or Ion Hațieganu, he completed his studies and professional training in great universities like Mount Sinai School of Medicine in New York, and Charcot Clinic of the Salpêtrière Hospital in Paris, and was appointed associate professor at the "Pierre et Marie Curie" University. He led for 16 years the Sleep Medicine Institute at Sheba Medical Center affiliated to the Tel-Aviv University; he is president of the Israeli Sleep Medicine Society, vice president of the Asian Sleep Research Society, honorary member of the French Society of Neurology, as well as of the Romanian Academy of Medical Sciences and of the Romanian Society for Cell Biology "Nicolae Simionescu".

Besides the medical activity, Prof. Jean Jaques Askenasy also has an active publishing activity. He is the author of 15 books, 13 chapters, 91 specialized articles, and over 170 papers presented at specialized congresses.

The present publication, "Yawning and Sighing", is the second volume of the series "Principles of Essential Medicine: The Biosemiotics of Everyday Life". Published in 2011, the book approaches two phenomena that have aroused interest for both physicians and philosophers. The book deals separately with "Yawning" and "Sighing".

The first part of the book, "Yawning", consists of 10 chapters which carry the reader from the "History of Yawning" to its significance. The study of yawning has started since antiquity; the author divided the history of this phenomenon into three periods or stages: ignorance, transition and scientific stage. Hippocrates was the first to describe yawning as "a response of the body meant to evacuate damaged air from the lungs". Later, the Mayans had the belief that by yawning the soul could escape the body, which is why they fully covered their mouth when yawning. In the transition stage, the 19th century, one begins to make the connection between yawning and pathology (e.g. infectious diseases, cerebral hemorrhage, trauma). During this period, Johann Muller established the connection between the brain and yawning. In the same chapter we learn that Rene-Frederic

Alexandre Troutmann (1901) developed the first physiology thesis in medicine with focus on yawning. Moreover, Jean Martin Charcot discussed for the first time, in front of Freud, the relationship between yawning and hysteria.

The first connection between a specific pathology and the occurrence of yawning was established in 1906 by Mosso: "Patients suffering from cerebral anemia or disorders of the cerebral bulb yawn very often." The scientific stage is the period when one discovered most of the pathologies that may accompany or determine yawning: tumors, brain hemorrhages, strokes, alcohol, drugs etc.

Going through the chapter "Yawning in Animals" we find that this phenomenon has existed for over 50 million years in these species. The author reminds us, from the first sentences, the three evolutionary stages of the brain described by MacLean - reptilian, paleomammalian, neomammalian -, yawning manifesting since the reptilian stage. Over the years, studies were performed on fish, birds or mammals. The author informs us that yawning in fish is manifested by slowness of movement - "they turn the head towards the surface, unfold their dorsal fin in the form of a fan..., widely open their jaws and opercula and lower their hyoidian apparatus." In the case of birds, Andrew Gallup discovered that parrots react by yawning to changes in temperature. In contrast, in the case of penguins yawning is part of the mating ritual. In wild mammals (predators - lion, hyena) it seems that meal time triggers yawning. For all these reasons, Charles Darwin stated that: "By watching a dog, a horse, a monkey and a man yawning, I feel how similar the structure of all animals is."

The chapters "The Mechanism or Physiology of Yawning" and "The Neurochemistry of Yawning" help the reader understand the phenomenon called yawning from the medical point of view. In the first chapter, the author informs us that there are three basic components of yawning: neuromuscular, respiratory and sonorous. The neuromuscular component helps to decipher the involvement in this process of muscle groups and nervous centers. It is known that "to yawn" means a wide aperture of the mouth, deep inhalation through the nose and mouth, neck extension, raising of the shoulders, stretching of the arms and, finally, expiration. The author helps us understand that, although it is not known if there is a nerve center for

yawning, it is believed that this one might be located in the reticulated formation of the cerebral trunk. This theory is based on the connection existing between yawning and the respiratory and cardiovascular centers, as well as on the existence of the nuclei of the cranial nerves V, IX, X, XI, XII (involved in the occurrence of yawning) in the reticulated substance.

Along with the anatomical arguments, the idea of the existence of a nerve center for yawning is also supported by physiological arguments (yawning redresses the tendency to vascular collapse, returns to normal arterial circulation and respiratory volume), ontogenetic arguments (the occurrence of yawning in anencephalic children, who only have the cerebral trunk), phylogenetic, clinical and experimental arguments.

Experimental arguments helped to explain the phenomenon of contagion, through the existence of a direct connection between the reticulated formation and the neocortex. The author details the bond existing between the yawning center, located in the reticulated neural complex, and the key functions of the body - breathing, cardiac reflexes, wakefulness, sleep, blood circulation and attention - which originate in the same nucleus. The relationship between the cerebral trunk and the hypothalamic-pituitary tract explain the influence the concentrations of ACTH and MSH have on the occurrence of yawning. By analyzing the respiratory component, we find that during yawning, due to inhalation of a massive quantity of oxygen and exhalation of CO₂-rich air, an acceleration of the arterial circulation occurs, together with a dilation of the bronchial musculature, thereby increasing the metabolism.

Browsing "The Neurochemistry of Yawning" we learn that a series of neurotransmitters or substances - hypopretin, oxytocin, vasopressin, adrenocorticotrophin - are directly involved in the occurrence of yawning. "Frequency, Age and Duration of Yawning" are new information that the author brings to our knowledge. Thus, we learn that in the first year of life we yawn 25-30 times a day, and get to 12 a day in the seventh decade of life. This phenomenon occurs as early as fetal life, being observed in the 15-week fetus. Even duration of yawning differs according to age (about 2 seconds in adults and about 5 seconds in newborns). "Yawning Contagion" is a human-specific process and is due to the relationships between the cerebral trunk and the human brain.

At the end of the chapter, the author introduces us to "Clinical Yawning", briefly presenting the causes that may lead to the occurrence of this phenomenon. We find out about the differences between physiological yawning (occurs in a healthy person - boredom, sleepiness, contagion) and the pathological one (neurological or psychiatric disorders, drugs intoxication or overdose etc). Though not given a space as wide as in the case of yawning, the second part of the book - "Sighing" - takes us through 11 chapters, all equally interesting and exciting. From the history of sighing we keep in mind that the first information about its existence appeared in the Bible. Over time, sighing has been interpreted as a sign of distress. By reading further, we learn that five components are involved in the occurrence of sighing: nervous, respiratory, sonorous, emotional and cognitive. Browsing "The Nervous Component of Sigh-

ing", we find out that the nervous system is the initiator of sighing; the cranial nerves VII, IX, X, XI, XII and the phrenic nerve also contribute to the occurrence of sighing.

In "The Respiratory Component of Sighing" the author presents, first of all, a few notions of respiratory physiology, in order to be able to understand why sighing has a particularly important role in changing and maintaining within the normal range the mechanical properties of the airways. In adults, sighing improves air transport in cases of bronchoconstriction, by increasing the pressure in the vena cava and the blood flow in coronary and bronchial arteries.

Similarly to yawning, sighing has a "Sonorous Component". From this chapter we learn that, from an anatomical point of view, the sighing sound is produced by the larynx ("the main instrument in the sound tone production", as the author himself tells us), the extrinsic and intrinsic laryngeal muscles, the pharynx. Besides the anatomical mechanism, the nervous mechanism is also described through involvement of the cranial nerves IX, X, XI, XII and the phrenic nerve. The latter plays an essential role, since in the paralysis of the phrenic nerve sighing is absent.

Next, the author introduces us to the mysteries of the "emotional and cognitive" components that complete the picture of sighing. Unlike laughing, sighing has always been associated with negative emotions. The author considers that "the relationship between emotion and sighing is at the basis of the association lamentation - hyperventilation". Once realized, sighing turns into a cognitive reaction, emotions taking over the thinking. Unfortunately, there is still no consensus whether sighing is only determined by negative emotions or also by positive ones.

"Sighing - Code of Body Language" helps us to understand this phenomenon in all its complexity. Body language is part of the inter-human communication, sighing being a piece of the puzzle of this code.

By reading "The Neurochemistry of Sighing" we understand that excessive accumulation of CO₂, nitric oxide, increased CSF pressure (tumors), pulmonary neuroreceptors are elements that may determine the occurrence of sighing. This information is supplemented in "The Pathology of Sighing" where the author describes spontaneous sighing (sign of decreasing attention) going up to pathological sighing (hypoxia, trauma, metabolic diseases, neurological and psychiatric disorders etc). Analyzing as a whole Professor Askenasy's book, we realize that, although the information we have about sighing is much less as compared to yawning, the two phenomena have many common elements. The author himself concludes that: "The resemblance between sighing and yawning is due to the signalling role of the modification of homeostasis".

The present book aims to remove from the ordinary the phenomena "Yawning and Sighing", transforming these two enigmas in two entities that incite further research.

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