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years to decades until they become symptomatic in young and middle aged patients. Today they can be identified in advance by noninvasive vascular/brain imaging (CTA/MRA). However, it is largely unknown why some patients develop aneurysms and others do not. Surgery may be indicated in patients with a high risk for bleeding complication and after SAH in the presence of multiple aneurysms.

In summary, the history of stroke and cerebrovascular diseases covers more than 2000 years of well-known but misunderstood clinical signs and symptoms. Emergency management, prevention of first ever and recurrent events has only very recently been achieved. Today we are faced with challenging questions about recovery and rehabilitation as important mechanisms of brain reorganization and plasticity anticipating healthy aging as well as repair mechanisms after detrimental lesions. With increasing age of modern populations, neuro- and vascular degeneration of the brain will become a major issue for translational research (= basic experimental and clinical research) to prevent people from dementing illnesses causing disastrous cognitive decline and loss of intact personality.

## Cross-References

- ▶ [Dementia](#)
- ▶ [History](#)

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## Ceremony

- ▶ [Ritual](#)

## Chan

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## Description

The term “Chan” contracts *channa*, the Chinese transliteration of Sanskrit *dhyāna* or meditation/contemplation. Chan denotes a school of Chinese Buddhism that, generally speaking, values meditative insight over scholastic knowledge. Chan denies to be based on scriptural exegesis (as is the case with all the other schools of Buddhism) and therefore sees itself as a unique – and superior – tradition within Buddhism in general. Its key concepts are those of transmission and immediacy.

This entry will present Chan in terms of its intradenominational characterization, its hagiography, its religious practice, and its relevance as an object of scholarly analysis.

## Characteristics

Central to Chan’s self-representation is the claim that the Buddha transmitted not only teachings as pointers toward and mediations of truth but also awakening itself as immediate realization of truth. The transmission of awakening is based on direct communication between the heart of the Buddha (and/or his successors, the so-called Chan patriarchs, *chanzu*) and the heart of the disciple. This process is commonly called “using the heart to transmit the heart” (*yixin zhuanxin*) and crystallized in a lineage of Chan teachers who took custody of awakening, passing it on unaltered through the ages. Thus, every Chan practitioner, if a part of this enlightened tradition, has access to the same awakening that the Buddha himself had experienced.

Chan is, in general, critical of what is taken to be the scholastic profanization of language and hesitant to employ discursive and argumentative

prose. This is because in light of the importance of heart-to-heart transmission, the communication between master and disciple holds soteriological significance that supersedes linguistic interpretation or textual analysis. The disciple is urged, not to intellectually understand a certain dogma but to transform her existence precisely by abandoning the intellect's restrictions. Specific communicative models include nonverbal elements (blows, gestures, silence, shouts, etc.) as well as sophisticated verbal strategies (anecdotal and poetic quotations, seemingly random interjections, pithy remarks, spite, etc.). These are used to weaken the student's rational attachment to self and world. Having deconstructed rationality as the main impediment to immediacy, the student is referred to the ancient patriarchs and her present master as objects of mimesis. Awakening is, in a manner of speaking, rehearsed mimetically, and at some point, the student achieves the same immediate realization of truth as the Buddha. She is then acknowledged by her master as a follower of the Chan tradition and thus a direct successor of the Buddha himself.

In summary, by traditional account, Chan:

- Establishes neither words nor letters
- Is a separate tradition beyond the teachings
- Points directly to the human heart
- Reveals awakening in every practitioner's nature and perfects the Buddha

## Hagiography

In keeping with the pivotal role accorded to authentic transmission, Chan relies heavily on anecdotes that present the ancient masters as blueprints of impersonated enlightenment. This tendency resulted in a vast corpus of anecdotal literature that typically belongs to the "recorded sayings" (*yulu*) genre. These texts form an integral part of Chan's self-understanding and concisely outline its hagiography. Some examples shall be given below.

In the traditional account, the Buddha, having awakened to the ultimate truth by way of silent meditation, began his teaching career. But as his awakening surpassed the limitations of

verbalization, his teachings could not but remain at the level of mere approximation, relative in nature, and as such incongruent with the absoluteness of reality. Out of this incongruity, Chan derives its founding myth: On one occasion, instead of delivering the expected sermon, the Buddha simply presented a flower to his congregation. This met with incomprehension in every but one case: Kāśyapa, a long-standing disciple of the Buddha, smiled in understanding. Thereupon, the Buddha declared that a transverbal transmission had taken place and that Kāśyapa was to be revered as his successor and the future custodian of awakening (Wumenguan 2005, case 6).

Through Kāśyapa, a lineage of transmission had formed that in its 28th (sometimes also 29th) generation reached China in the person of the Indian monk Bodhidharma around the turn of the sixth century. When Bodhidharma had spent 9 years in unbroken and motionless meditation inside a cave, he accepted his first disciple (though only after the latter had cut off his own arm below the elbow to prove his determination; Wumenguan 2005, case 41). Thus, Bodhidharma came to be regarded as the founding father and first Chinese patriarch of Chan. His exchange with emperor Wu of Liang (r. 502–549) is among the most famous of Chan anecdotes. Upon their first meeting, the emperor, being an ardent supporter of Buddhism, inquired as to how many merits his considerable endowments had earned him. Bodhidharma cut him short: "No merits at all." When the emperor then asked about the nature of truth, Bodhidharma again gave a short-spoken answer: "Everything lies in plain view, and nothing sacred is in sight" (Biyantu 2003, case 1), thereby thoroughly negating the possibility to earn merits, rationally explain truth, or speculate on the underlying nature of reality.

By the Tang dynasty (618–907), a Chan community had begun to grow on Chinese soil that over the years drew more and more followers. The fifth Chinese patriarch, Hongren, supervised a congregation of considerable size but was unable to decide on a suitable successor. Having called on his advanced students to give expression to the profundity of their insight in rhyme, he praised his disciple Shenxiu's work above all

others: “The body is the *bodhi* tree under which the Buddha had his awakening, and the heart is like a bright mirror’s pedestal. Take pains to always wipe it clean! Let no speck of dust settle upon it!” However, Huineng, an illiterate kitchen helper, heard about these verses and in reply had his own version inscribed on the monastery’s walls: “Actually, there is no tree in awakening, and a pedestal has nothing to do with the bright mirror. Originally, there is not a single thing. So how could there be any place for dust to settle upon?” (Liuzu tanjing 2008) Officially, master Hongren scolded Huineng for his temerity but in secret revealed him to be the actual inheritor of the Buddha’s awakening.

Subsequently, a dispute over the patriarchal succession arose, and Chan was divided into the Northern school of Shenxiu and the Southern school of Huineng. As the quotation above indicates, matters came to a head over the ideological issue of whether enlightenment was a gradual process (the Northern position) or a sudden breakthrough (the Southern position). Within only a few decades, the gradualist position had relegated into other, more speculative and scholastic traditions. Subitism became the only ideological and rhetorical standard for Chan. Even today, every existing lineage traces itself back to Huineng as sixth patriarch and adheres to the sudden enlightenment approach he advocated.

A series of great masters furthered Chan’s development in the eighth and ninth centuries and produced parallel lineages: the so-called Five Houses (*wujia*) with distinct “family styles” (*jiafeng*). These ranged from metaphysical speculation (Caodong faction) to eclectic considerations about the fundamental unity of Buddhist diversity (Fayan/Yunmen factions) and to radical antinomianism (Linji/Guiyang factions). These diverse readings of what constitutes the Chan tradition dominated the general Buddhist discourse in China well into the Song dynasty period (960–1279). Under the guidance of the Five Houses, Chan reached its apex. Later Chinese developments are traditionally regarded as mere repetitions at best, deteriorations at worst. In this mature form Chan was transmitted to Japan (where it is called Zen) in the late twelfth and

early thirteenth century and was made known internationally in modern times.

Nowadays, Chan remains a dynamic, even vibrant tradition in Taiwan and continues to draw followers also on the Chinese mainland. It has had major influence on the development of Korean Son, Japanese Zen, and meditative forms of East Asian Buddhism as received in the Americas and Europe.

## Practice

In terms of practice, Chan relies heavily on seated meditation (*zuo chan*; hence its name). Roughly speaking, two different meditative techniques may be distinguished:

- Insight into an Anecdote (*kanhua*): The master presents her disciple with an anecdote or a rationally irresolvable dilemmatic question (a so-called *gong’an*, literally “public notice”) which forms the basis of meditative practice.
- Silent Illumination (*mozhao*): Practice is reduced to silent, objectless sitting meditation; prolonged practice produces spontaneous enlightenment.

Beyond these, however, in Chan monasteries – while entertaining close ties to a considerable community of lay followers, Chan has developed forms of monasticism that have had major impetus on the general development of Buddhist institutions in East Asia – there is also an array of rituals that may be employed in varying degrees. These include work around the buildings and gardens (*zuomu*), one-on-one encounters with the master (*canchan*), question-and-answer sessions (*wendang*) during which a student’s doubts are addressed or her enlightenment put to the test, recitation of scriptures (*kanjing*), teachings and interpretative readings by advanced monks (*fayu*), and observations on memorial days, prayer, social work, etc. If based on the proper Chan-like attitude, all these are seen as spiritual practices of equal value.

## Criticism

While the traditional narrative outlined above remains unbroken in denominational circles,

Chan's self-characterization in terms of authenticity and immediacy has increasingly been challenged from philological and historical perspectives and in academic circles is counted as a hagiographical and ideological construct. This antitraditional reading of Chan became possible, above all else, by the discovery of a large corpus of Chinese manuscripts dating from the fifth to the eleventh centuries in a sealed cave near the Silk Road oasis of Dunhuang (Gansu prefecture, western China) in the year 1900. This corpus included several hitherto unknown Buddhist texts that shed new light on the historical development of Chan and resulted in the acknowledgement that Chan had to be seen not as a transhistorical absolute but as a phenomenon in historical context (cf. especially the groundbreaking studies by Yanagida Seizan (1922–2006)). In scientific terms, Chan is, far from being a manifestation of unchanging reality beyond the contingencies of time, a relatively late development in the history of Buddhism that draws on a plurality of sources for inspiration and legitimation.

While this viewpoint has met with considerable resistance from the believers' side (cf. the dispute between Hu Shi (1891–1962) and Suzuki Daisetsu (1870–1966) in *Philosophy East and West* 3/1 (1953)), the “Golden Age” of Chan iconoclasts during the Tang era has been proved to be a mythological construct. For the sake of securing religious prestige – and actual political power as well – Song dynasty adherents of Chan developed a narrative that allowed them to present their own tradition as the superior form of Buddhism. In consequence, Song Chan has come to command scholarly attention (cf. Gregory and Getz 2002; Schlütter 2008). At the same time, efforts continue to contextualize Tang Chan, resulting in the deconstruction of traditional hagiography (cf. McRae 1986; Faure 1991; Welter 2008). To give a few examples:

- Bodhidharma has been disclosed as a pan-denominational figure that is not only an anti-nomian Chan master but also incorporates ritual aspects as well as scholastic modes of argumentation.
- The schism between the Northern and the Southern school has turned out to be rather

a product of subitist rhetoric that attempted to marginalize gradualism and deny its influence.

- An analysis of the tenth-century texts has yielded data that the traditional focus on meditative experience and authoritative lineage had been challenged by scripture-focused approaches within Chan itself.
- Ritual has been emphasized as a main, if not the major concept in an analysis of Chan practice, casting doubts over the claim to radical iconoclasm and meditational authenticity (cf. Heine & Wright, 2008).
- Chan's self-representation has convincingly been shown to be a Song era and even later product that owes much of its present-day popularity to the missionary efforts of Suzuki and his epigones.

Thus, in recent years Chan has come to be understood less as a monolith of religious truth but as a historically conditioned, highly complex sociopolitical phenomenon. Its critical analysis continues to produce relevant insights into, among others, the historical relation between state and religion or society and tradition, respectively; the role of meditation vis-à-vis ritual in religious practice; strategic issues centering on the authoritative nature of scripture versus tradition; and problems in the transcultural reception of religions and ideas.

## Cross-References

- ▶ [Awakening](#)
- ▶ [Buddha \(Historical\)](#)
- ▶ [Buddhist Canonical Literature](#)
- ▶ [Buddhist Meditation Practices](#)
- ▶ [Ritual](#)

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## Character

- [Personality Psychology](#)

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## Chemical Thermodynamics

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### Related Terms

[Energy](#); [Entropy](#); [Gibbs energy](#); [Helmholtz energy](#); [Rate of entropy production](#); [Self-organization](#); [Thermodynamics](#)

### Description

Thermodynamics originated from study of heat engines, engines that convert heat to mechanical motion. Prior to the invention and the use of steam engines (James Watt obtained a patent for his version of the steam engine in 1769), the machines of the eighteenth century were driven by wind, water, and animals: They transformed one type of motion to another. In contrast, the steam engine converted heat to motion: an entirely new way of generating motion, which heralded the industrial revolution. Only in the following century, when the steam engine's role in transforming society was plainly visible, was a systematic study of its fundamentals undertaken. The most significant contribution to this field came from Nicolas Léonard Sadi Carnot, who discovered the fundamental limits to the efficiency of heat engines that convert heat to mechanical energy. This line of work eventually led, in the hands of Rudolph Clausius, Lord Kelvin, and others, to the formulation of the Second Law of Thermodynamics. This law established the fundamental irreversibility of natural processes, or the arrow of time as an objective reality ([http://en.wikipedia.org/wiki/Entropy\\_2999](http://en.wikipedia.org/wiki/Entropy_2999)).

During the nineteenth century, with the new instruments that were constructed, heat, electricity, and chemical reactions were investigated and many new laws governing these phenomena were formulated. It also became evident, that all these phenomena were interrelated: Chemical reactions could produce heat (exothermic reactions), and heat could drive chemical reactions (endothermic reactions); so it was with electricity which could drive “electrochemical” reactions and vice versa; heat could generate motion and motion could generate electricity. While these interconnected processes were being investigated, the idea that there was one quantity, the energy, that was conserved in all these transformations was born. Many contributed to this concept, most notably, James Prescott Joule, Germain Henry Hess, Julius Robert von Mayer, and Herman von Helmholtz. This development and understanding of the concept of energy and