人骨の真形 : 日本における人体解剖の黎明期について

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The True Shape of Human Bones — On the Dawn of Anatomical Dissections in Early Modern Japan

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Abstract

The history of anatomical dissections in early modern Japan has been recounted many times, usually beginning with Yamawaki Tōyō (1706–1762) who conducted the first Japanese autopsy in 1754. As Yamawaki, and all those curious physicians who followed his example, consulted European anatomy books, their dissections are unanimously considered to be a response to Western stimuli. This view is based on the assumption that anatomical research in Japanese traditional medicine had fallen into a stage of stagnation, lacking any impetus toward further progress. However, a closer look reveals that Japanese interest in anatomy had already been rekindled in the first half of the 18th century, when osteopathic pioneers and an ambitious ophthalmologist had begun to prefer their own observations over the mere study of classical texts, and even ventured out to have a look into the interior of human cadavers. This paper traces these activities and their indigenous history.

要旨

享保１７（1732）年に烙刑に処された二人の男性の屍骸を観察した根来東叔は、９年をかけて二点からなる大型の「人身連骨真形図」を作成した。日本初の解剖を先駆的価値をもって認めた自然学者三浦梅園は、この人骨図を模写し、自著「造物余譚」（1781年）で紹介した。「人身連骨真形図」の写しは他に、中津市の村上医家史料館（宗田一旧蔵）及び大阪の森ノ宮医療学園所蔵の掛軸があるが、梅園のものは後世に写されたこの二点よりも原図を正確に伝えている。眼科医であった東叔が人体解剖の先駆者・山脇東洋よりも早く身体の「内景」に目を向けたのは、単に個人的な思いつきによるものではない。遺体の骨を調べる「験骨」という行為は、近世日本にも伝わっていた世界最古の法医学書『洗冤録』（1247年）で確認できる。『骨継療治重宝記』（1746年）など日本の整骨医書においても、観察に基づいて骨格や関節の構造と機能が紹介されていた。また、仏教僧が瞑想に用いた、腐敗していく屍体を段階的に描いた「九相図」も文化的背景として見過ごしてはならない。東叔に験骨への決断を促したのは、真言密教の成立と分離の時代にまで遡る根来流眼科の伝統や、視力、視覚、眼の構造の解明に力を注いだ東叔自身の専門的関心に加え、医学と医療の様々な分野からの刺激であった。また、死と屍体に対する人間の本能的な恐怖を克服し、亡骸の骨を動かしてそのつながりを知ろうとした東叔の冷静さは、おそらく仏教の不浄観を通じて会得されたのではないかと思われる。山脇東洋による「腑分け」は仏術に見なされてきた医療から逸脱する行為として相当な勇気と決断力が求められるものだったが、荒野で腐敗していく屍体の観察は、従来の「九相観」として、より実行しやすいものだったとあろう。「観相」から「観察」への第一歩は、それほど困難なものではなかった。西洋からもたらされた知識や技術が、近世日本医学に大きな刺激を与えたことは間違いが、その根底にあった伝統医学と一連の社会的・文化的要素もまた大いに注目に値する。
1 Traditional Representations of the Human Body

Japanese writings that adopt Chinese traditions contain essentially three basic types of visual representation of the human body.[1] The first is a flow chart of the ‘tracts and channels’ (Jap. keiraku 經絡) below the skin that serve the circulation of the pneuma-like Qi (Jap. ki 氣). Representations of this type show the male body from the front, side, and back. The organs are usually missing. In addition to pictures of the entire network, we also find some representations that demonstrate individual tracts. In many of these cases, half-naked figures that remind us of Chinese monks and scholars are depicted. This type of representation invariably displays the human body as alive and pervaded by dynamic flows (fig. 1 left).

The second type presents the so-called ‘five full organs’ or ‘five viscera’ (i.e., the liver, heart, spleen, lungs, and kidneys) and ‘six hollow organs’ or ‘six bowels’ (i.e., the large intestine, gall bladder, urinary bladder, stomach, small intestine, and ‘triple burner’), and the spine. Most of the illustrations of this ‘inner landscape’ (Jap. naiketsu 鎮物) give a lateral view of a limbless male body (fig. 2). They are said to go back to the ‘Truth-retaining illustrations’ (Chin. Cízhēn-tú 存真圖) compiled by Yáng Jiè (楊介), a Chinese physician of the Song dynasty (960–1279). The original drawings have not been preserved, but all later versions indicate that there has been little change since their creation. These depictions are, without doubt, based on anatomical observations. Similar to the “living anatomy” of Renaissance illustrations, the body is shown as transparent rather than as dissected. The oldest Japanese version of this type can be found in the ‘Quick guide to medicine’ (Jap. Ton i-shō 動醫抄), which was compiled in 1304 by the Buddhist priest and physician, Kajiwara Shōzen (1266–1337).[5] Kajiwara’s work also contains frontal and dorsal views of a torso, which has been reduced to the lungs, heart, spleen, liver, kidneys, small intestine, large intestine, stomach, and — as a kind of ‘entrance’ and ‘exit’ — the trachea and anal canal. In both China and Japan, this kind of work depicting the human organs was less widespread.

Certain characteristics of the eleven organs mentioned above are described in many texts, but these organs were always seen in terms of their functional relationships with the tracts and channels and the flow of Qi. Thus, when the body was ill, individual organs were never considered as isolated objects for diagnosis or therapy. This also explains in part why little need was felt for more precise anatomical observations and descriptions.

The two basic types of anatomical illustration mentioned above — the ‘flow chart type’ and the ‘inner landscape type’ — are found in books of the so-called ‘main road’ (Jap. hondō 本道) of medicine, which corresponds roughly to present-day internal medicine.

The third basic type of anatomical illustration involves the representation of ‘swellings’ (Jap. shumotsu 腫物), such as tumors, furuncles, and rashes. As maladies of the body surface, these ‘swellings’ belonged within the domain of surgery (fig. 1 right).

In all three basic types of illustrations, no muscles, sinew, blood vessels, body liquids, or shadows are shown nor are there any signs of death or dissection. In China and Japan, their basic traits remained almost unchanged for several centuries.

Fig. 1 Left: ‘Tracts and channels’ in an Edo period manuscript scroll[2]; Right: ‘Swellings’ in the ‘Brocade Bag of Secret Surgery Records’ (1795)[4]

The first signs of a change in thinking appeared in the early 18th century. In 1722, Hattori Noritada (服部範忠), an expert in traditional ‘materia medica’ (Chin. bēncáo, Jap. honzō) who practiced in Edo, raised the question of “how a physician can keep someone alive without any knowledge about the shape of the internal organs”. In his ‘Illustrated explanation of the inner landscape’ (Naiketsu zuzetsu 内景圖説), he presented a new ‘landscape’ that he had designed, along with the old teachings (fig. 2). Although he did not

Fig. 2 Traditional (left) and new depiction of the ‘inner landscape’ by Hattori Noritada, 1722[3]
make any actual anatomical observations, he was the first early modern physician to criticize the traditional representation of the organs.[3] But there is yet another field of anatomical studies that has almost completely escaped the attention of medical historians.

2 Negoro Tōshuku’s ‘True Shape of Human Bones’

Only a few authors writing about the history of dissections in Japan are aware of Negoro Tōshuku (根来東叔, 1698–1755). In 1732, this ophthalmologist came across the decaying corpses of two executed criminals who had been burned and left to rot, presumably in the outskirts of Nara. As the skeletons were still intact, he visited the site several times, made sketches, and investigated the function of the joints (Jap. kisu 機樞). Later, he expanded his sketches to large colored drawings of the skeletal remains, adding detailed descriptions of the ‘true shape of human bones’ (Jinshin renkotsu shinkei-zu 人身連骨眞形圖) that pointed out various differences from traditional writings. In autumn 1741, he finished this work in Kyōto, the very city where Yamawaki would dissect an executed criminal in 1754.

Several decades later, in 1781, the noted physician and philosopher Miura Baien (三浦梅園, 1723–1789) copied these drawings and explanations during his visit to the house of Negoro Tōshuku’s son Tōrin (根来東麟), who had served as one of the domain physicians in Nakatsu (Buzen Province) since 1765. Miura was also deeply impressed by astronomical and other books published by Jesuits in China, which were extremely difficult to smuggle into the country and quite risky to possess. A few months later, he incorporated his copy into an anatomical manuscript entitled ‘Residual remarks about creation’ (Zōbutsu yotan 造物餘譚), praising Negoro’s pioneering observations.[7]

Fig. 3 Negoro Tōshuku’s research on skeletons. Manuscript copy[6]

Fig. 4 Page from Miura Baien’s manuscript ‘Residual remarks about creation’, 1781[7]

Until the 1970s, Miura’s manuscript was the only source known to convey Negoro Tōshuku’s achievements. Then, two large-scale hanging scrolls emerged in Kyōto (fig. 3). They are now displayed in the Murakami Medical Archive (Nakatsu City). A few years later, another pair was identified in the collection of the Morinomiya College of Medical Arts and Sciences (Ōsaka). A comparison of the paper properties, brush writing, depiction of bones, and other aspects, revealed that both pairs of scrolls are copies, with the pair in Ōsaka being older than the pair in Nakatsu. With the exception of a few minor writing mistakes, both scroll pairs are identical and convey the large-scale design of Negoro Tōshuku, but neither of them shows several
important features Baien had recorded in 1781. Negoro’s original drawings have perished.[8]

3 Background of the Negoro Family

A genealogical chart kept by Mr. Negoro Masateru (fig. 5), and an outline of the historic background of his family written by Negoro Tōshoku in 1731, show that Negoro-style ophthalmology has its roots in the monastery medicine of the mighty Negoro Temple (Wakayama prefecture) and subsequently in the studies of Chinese medicine conducted by the founder of Shingon Buddhism Kūkai (or Kōbō Daishi, 774–835) and his followers, as members of Japanese missions to Tang China.[9] As in Europe, monk physicians treated the majority of patients in Japan throughout the middle ages. With the rise of artisans and merchants during the 16th century and the waning influence of Buddhism, eventually ‘civilian’ physicians appeared, many of whom continued to shave their heads as a sign of devotion to their profession.

While performing numerous cataract surgeries and through meticulous observations of the deformation of the pupil, Negoro developed a three-dimensional understanding of the military strength.[10] The medical expertise of its monks must have been immense, but in 1585 the preeminent general Hideyoshi Toyotomi, who feared the growing military power of the priesthood, burnt down almost every building, including vast amounts of scriptures and statues. Whoever survived this attack had to look for new means to secure a living.

4 Reviewing the Eye

One of the most important services provided by eye specialists in the East and West was the treatment of cataracts. The old Indian technique of cataract couching is mentioned in the first Japanese medical book Ishimpō (医心方, 984), and draws its information from the Chinese version of ‘Nagarjuna Bodhisattva’s Eye Sutra’ (Lónghù-púsà yǎnjīng 龍樹菩薩眼經). This technique uses needles to either push the cloudy lens to the bottom of the eyeball or to perforate the cataract and pull the pus through the needle hole. In Japan, it was further refined and dispersed by the Buddhist monk Majima Seigan (馬島清眼, ?–1379). According to Indo-Chinese traditions, the essence of the ‘five organs’ ascends to the eye. Here the ‘five rings’ (Jap. gorin 五輪) of the ocular structure reflect the conditions of the corresponding organ (fig.6). As the pupil represents the kidney, cataracts are seen as the result of kidney problems, that is to say, the result of internal disturbances.[11]
eye and its aqueous humor, which he called ‘divine water’ (shinzui 神水). Cataracts occur when this ‘divine water’ ceases to circulate. Then, the bottom of the pupil becomes opaque. Such concepts, which had never before been put forward, secured his place in the history of Japanese ophthalmology.

Negoro’s manuscript, ‘Elucidation of the sight’ (Ganmoku gyokai 眼目暁解, 1742), reveals a self-confident scholar, who stresses the importance of his own observations and a critical review of traditional teachings, taking a position quite similar to that of early modern European scholars in the Accademia dei Lincei (Academy of the Lynx-Eyed). Those who treat cataracts by uncritically adhering to old teachings, he writes, are “blind people who walk in the darkness of night and have lost their cane.”[12]

5 Bones in a 13th Century Chinese Book

With his research about the ‘true shape of human bones,’ Negoro Tōshuku earned himself a prominent position in the history of Japanese anatomy, but it is has never been discussed why he pursued a topic so far outside his area of expertise. A broader review of related material reveals that Negoro Tōshuku was not the first physician to turn his attention to human skeletons.

Traditional Chinese medicine centered on ‘internal medicine’ and put less weight on anatomical studies and surgery. Yet, the world’s oldest book on forensic medicine, the ‘[Collected records on] Washing away of unjust imputations’ (Xǐ-yuān jiù-lù 洗冤集録 or Xǐ-yuān lù 洗冤錄, 1247) by Sòng Ci (宋慈, 1186–1249), already contained a chapter on the ‘Investigation of bones’ (Yǎn gǔ 體骨) and another short one discussing anatomy (Lùn yǎn shēn gù mó 論眼身骨脉). Sòng Ci wanted to avoid wrongful executions, so his book mainly deals with the causes of death. However, this leads inevitably to the objectification of the human body. The author stresses the importance of careful, systematic examinations (and if necessary reexamination) of the corpse and of accurate records. As for the skeleton, he described the basic structure from head to toe and used two illustrations to give the names of the most important bones.

This text and almost identical later writings, such as the ‘Abolition of unjust imputations’ (Wū-yuān lù 無冤録), published by Wáng Yù (王與) in 1308, eventually came to Japan too. Advertisements in Edo period Japanese books reveal that the Wū-yuān lù was reprinted repeatedly since the latter half of the 17th century.[13] Obviously, there was a market for such a work on the investigation of corpses, and whoever used this guide book was cautioned by its author to observe closely and to pay attention to even minute details.

6 Japanese Osteopathic Pioneers

The contributions of Edo period practitioners of osteopathic manipulative medicine (seikotsu-i 整骨醫) to the progress of anatomical studies have not yet found the attention they deserve. The most outstanding pioneer in this field of study was Kōshi Hōyoku (高志鳳翼), from a village in the Province Setsu (now part of the Prefecture Osaka). In his ‘Therapeutical treasures of osteopathic manipulation’ (Honetsugi ryōji chūbōki 骨療治重寶記)[15], printed in 1746 shortly after Negoro’s observations and years before
Yamawaki’s dissection, he laid the foundations of what he called “bone-joining” (honetsugi 骨繼).[16] As such therapies did not work out without knowledge of bones, articulated joints, muscles and tendons, Kōshi devoted a great part of his book to anatomical details. Some of the numerous illustrations refer to traditional Chinese writings, while others, especially those that show single bones or areas with joints, are unique and obviously based on protracted observations. In a paragraph on the ribs and spine, he advised looking at skeletons that had been dumped in the fields and mountains, and described the dispersion of the spine over the years. Like Negoro, he moved such skeletons to find out more, particularly about what he called the ‘interlinking’ of the vertebrae.[17]

Kōshi’s medicine was deeply rooted in Chinese traditions. In his book, Kōshi refers to seventeen classics, such as Huangdi nei-jing (黄帝內經), Waike zhengzong (外科正宗), Jin kui (金匱), and Mo-ting (脈經). But, as he points out explicitly, in addition to this ‘old wisdom’ (koken 古賢), the osteopathic physician should also make himself familiar with the surgical therapies of the ‘Red-heads’ and ‘Southern Barbarians,’ that is to say, Europeans.[18] Kōshi’s illustrations were significantly better than anything else in previous Chinese and Japanese medical publications.

Stimulated by his pioneering research, Japanese osteopathic medicine began to be reshaped by the combination of indigenous traditions with Western elements while emphasizing the importance of observation. Even after Western anatomical teachings had found their way into mainstream Japanese medical literature, publications such as the ‘New book of osteopathic manipulation’ (Seikotsu shinsho 整骨新書, 1810) by Kagami Bunken (各務文献, 1755–1819) continued to recommend a high level of research in these circles.

7 Contemplating the Decay of Human Corpses

It has been repeatedly pointed out that cutting into a body, even a dead one, does not conform to Buddhist or Confucian notions, and that there was a kind of taboo that inhibited Japanese physicians from disturbing the integrity of a human body. But in a society where members of the samurai class tested their swords on corpses of criminals (tameshigiri 試斬), and executioners made a fortune by incorporating the human brain, liver, and gallbladder into pills for consumption (rögai 疗癒)[19], some doubts remain about the nature and extent of such barriers. At least there was no shying away from looking straight at decaying corpses, even in Buddhist temples.
and the gastrointestinal contents. They are described in the slime, feces, bile, blood and other impure things a body contains, such as snot, pus, spleen, lungs, bowels, intestines, stomach, etc.

Fig. 11 Illustrations in ‘Explanation of poems on the contemplation of the nine stages’ (Kusō-shi genkai, 1694): 1. newly departed (shinshi no sō 新死相); 2. bloating (hōchō no sō 肥脹相); 3. exudation of blood (ketto no sō 血塗相); 4. putrefaction (hōran no sō 蓬乱相); 5. being eaten by animals (tanjiki no sō 噙食相); 6. discoloration (青黒相, seio no sō); 7. bleached skeleton (hakkoisuren no sō 白骨連相); 8. dispersion of bones (kotsusan no sō 骨散相); 9. grave (古墳相, kofun no sō).[20]

To liberate the self from sensual desires, contemplations on the impurity of a decaying corpse (Pali Asubha bhāvanā, Jap. fujōkan, 不浄観), preferably the corpse of a beautiful young woman, have been included in the exercises performed by monks and ardent devotees since the early days of Buddhism in Japan. The roots of such practices go back to the ‘reflections on repulsiveness’ (Pali Paṭikkāla-manasikāra) of the parts of the body (hair, nails, teeth, skin, flesh, muscle, bone, marrow, kidneys, heart, liver, pleura, spleen, lungs, bowels, intestines, stomach, etc.) and all the other impure things a body contains, such as snot, pus, slime, feces, bile, blood, urine, sweat and the gastrointestinal contents. They are described in the Satipaṭṭhāna-Sutta (Jap. Nenjo-kyō 念處經), as well as in the Mahāsatipaṭṭhāna Sutta (Jap. Dai-nenjo-kyō 大念處經) and the Āgamas (Jap. Agon-kyō 阿含經). Although there was no clear-cut mind–body dualism in Japanese Buddhism[21], such meditations create a certain mental distance and eradicate attachment to the body.

Fig. 12 Seventh stage of decomposition. Edo period hanging scroll, Seifuku-Temple (Kyōto)

Since the Kamakura period (1185-1333), when power shifted from the nobility to the warrior class and Buddhism came into full flower, graphic depictions of the nine stages of decomposition served this purpose in various formats, including hanging scrolls, and handscrolls. Since the late 17th century, books made them available to the general public. In addition to quotations from Buddhist textual sources, poems were added to each of these stages, the most famous among them those written in classical Chinese by none other than the founder of Shingon Buddhism Kūkai.[22]

The anatomical precision of these depictions was low, but they were helpful to overcome fear, anxiety and other emotions vis-a-vis a dead human being. And that was an aim physicians too could easily understand and use them for this purpose.[23, 24] It is not by accident that some of the first hand scrolls depicting anatomical dissections were influenced by the iconography of these ‘nine stages pictures’ (kusō-zu 九相圖, 九想圖). In some cases, even dogs appear, sniffing around the cadaver. Both types of depictions usually end with a grave in a serene landscape. With the growth of anatomical expertise among Japanese physicians, this narrative character of medical illustrations faded away, but for a while, dissection, art, and religion continued to be closely related.[1]

Having grown up in a family deeply rooted in the traditions of Shingon Buddhism, Negoro Tōshoku’s encounter with decaying corpses at one of the many execution sites in the Kinki region must have evoked such pictures. In contrast to the later dissections conducted by Yamawaki Tōyō and others, the mere observation of a naturally decaying body was still within the traditional conceptual framework. Therefore, the step from contemplation (Jap. kansō 観想) to observation (Jap. kansatsu 観察) was comparatively small, especially for an ophthalmologist who believed in the power of the human eye as a mean of gaining new knowledge.
References/Annotations


[5] For more on Kajiwa Shōzen and his view on Sōng medicine, see Andrew Edmund Goble. “Confluences of Medicine in Medieval Japan”. Honolulu: University of Hawai‘i, 2011.


[12] Negoro Tōshoku. “Gamakiki gyokai”. MS copy, 1817. Chiba University Medical Faculty, Inohana Collection. (根来東叔「眼目瞭解」, 写本, 文化14年寫, 千葉大学医学部玄鼻文庫収蔵)


[16] The word honetsugi was first mentioned in the dictionary Shogen jikō-setsuyōshū (書言字考節用集, 1717, part 5) written with different Chinese characters: 骨杖 ホネツギ.

[17] “Honetsugi ryōji chōhōki”, maki 1, fol. 28. (「背骨は二十一節ありつつがひのひろらところは肋骨となりつひてあり山野にて示る鬪を書きせし年久くれば七節つに一椎々のひくみより分はなれ後には一節づくひくみよりはなり十四五の椎の間に背骨屈伸のところありすべて椎の形は子母環のごとく上下の椎より下の椎へをたてて入くみあり仰ときはほ下椎へ人俯ときはぞ出るなり）

[18] Some of Kōshi’s descriptions are based on Nakamura Sōyo’s ‘Surgical therapies of the Read-heads’ (Kōmō geka ryōji-shū), printed by Yamamoto Chōbē in 1684. (中村宗聰『紅毛外科療治集』山本長兵衛, 貞享元年刊, Collection of the author)


[23] Rotten corpses, skeletons, etc. are also depicted in illustrations of the Buddhist ‘Six Realms of Reincarnation’ (Jap. rokuu-e 六道絵). But in contrast to paintings of the nine stages of a decaying corpse their aim is to strike horror into the heart of the contemplator, serving as an emotionally charged admonishment to lead a righteous life.

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