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Analysis of a Unique Painting Presenting Gandantegchenlin Monastery in Ulaanbaatar around 1850

Introduction

Gandantegchenlin Monastery (T. dga'-ldan theg-chen gling, 'Joyful Mahāyāna Island/Temple/Monastery', GPS: N 47°55.242', E 106°53.689, shorty Gandan, T. dga'-ldan, Skr. Tuṣita)¹ is situated in Ulaanbaatar and is one of the most prominent centres of Mongolian Buddhism. Its first temples were built in the beginning of the 19th century, and it became the philosophical centre of Uрга (also known as Ikh khüree, Daa khüree or Bogdiin khüree), the monastic city where the reincarnating Bogd Jewtsündamba khutagt lineage (T. rje-btsun dam-pa) resided. A large number of lamas studied Buddhist philosophy at Gandan, coming from different rural monasteries and areas. As all the other monasteries, Gandan was closed in 1938 and many of its temples were destroyed following the Soviet-type ideology. Ceremonies started at Gandan again in 1944; and until the democratic changes in 1990, it was the only place of worship in Mongolia. About ten paintings are preserved today in different museums and private collections showing how this monastic site developed during the decades. The present article aims at the analysis of a unique painting presenting a view of Gandan by an unknown painter (Figures 1 and 2).

The painting is part of the private collection of the Swiss Nobelist, R.R.E., who has assembled during the past 45 years a remarkable collection of about 1000 items from Buddhist East-Asian countries, consisting of small tsaklis to large-size thangkas, wooden book covers, block-printed and handwritten books in Tibetan and Mongolian language, a few bronzes and numerous religious artifacts. An earlier group of items stems from Tibet and Nepal of the 13th to the 19th centuries, while a second and later group mostly originates from Mongolia during the 17th – 20th centuries.

The drawing of Gandan Monastery is painted by black ink on a sheet of handmade paper with the dimensions 35.1x25.5cm. It has been folded twice in a Leporello fashion, to end up with the dimensions 35.1x8.5 cm. Thus it fits well into a regular-sized Tibetan or Mongolian book with the same dimensions. It may be that it has indeed been part of a volume related to Gandan Monastery. The book, if it ever existed, has gone lost in the meantime. R.R.E. has bought

¹ Khalkha Mongolian, Tibetan (T.), Sanskrit (Skr.) words are mentioned in the article as well as Mongolian words written in Tibetan on the painting (Tt.)

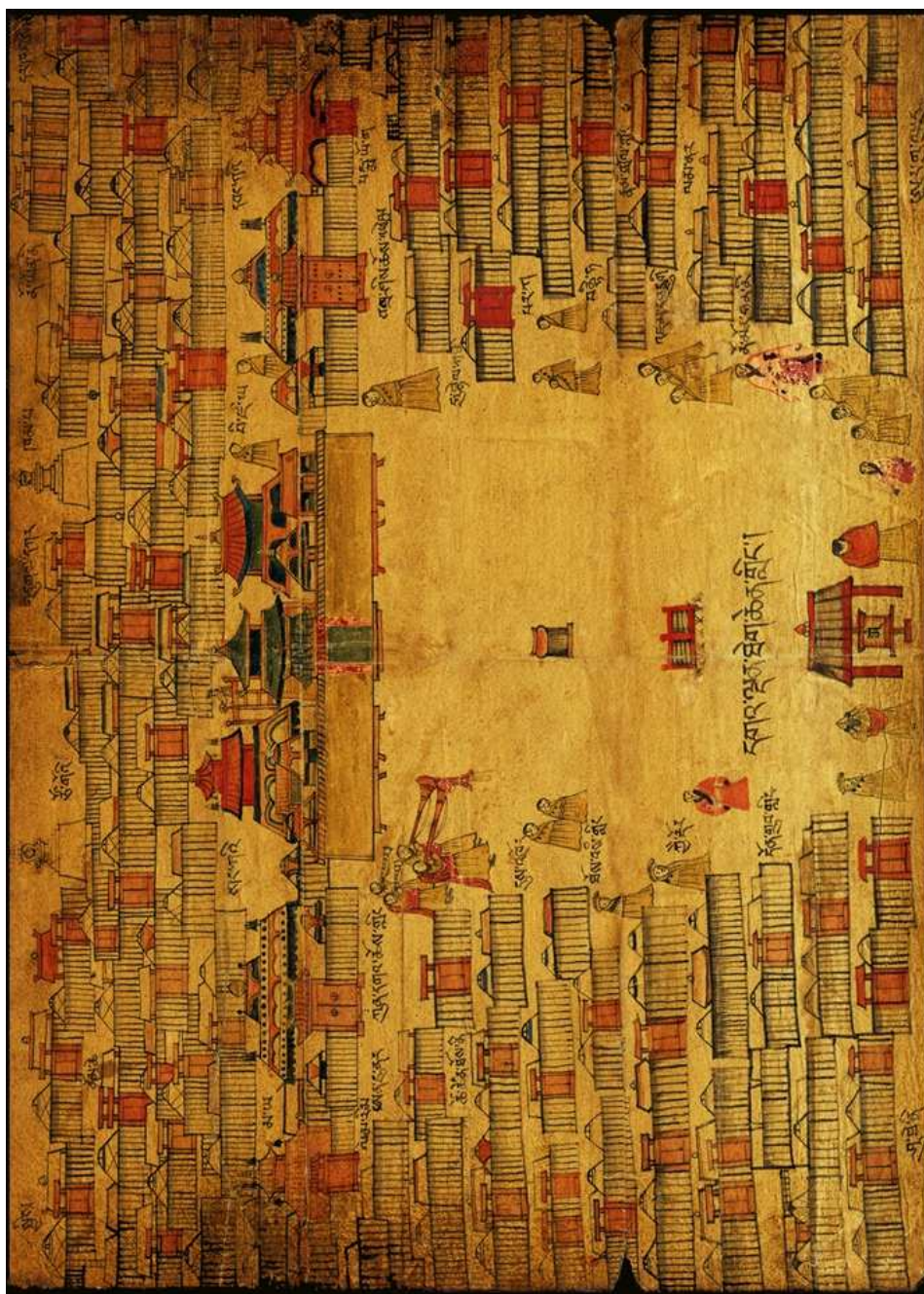


Figure 1: The map of Gandantegchenlin that is analyzed in this paper



Figure 2: The enlarged central part of the map of Gandantegchenlin displayed in Figure 1. It shows the central "Palace"

the map of Gandan via an Ebay auction on the Internet in November 2009. The auction started with a request of US\$ 9.99. After a little while, the bidding went up by a factor 100. Nevertheless, R.R.E. got it for a rather fair price. In a later section, the possible dating of the painting is explored by an analysis of the pigments that make up the paint used for colouring the painting. Raman spectroscopy turned out to be the method of choice for identifying the pigments. The first author, K.T., will elucidate the inscriptions of the painting and gives a historical background to the analysis.²

Development of Gandantegchenlin

Buddhism spread to the area of the Mongols in three waves. The third propagation took place in the 17th century, when the Teaching of the Tibetan Yellow Hat or Gelukpa tradition (T. *dge-lugs-pa*) became dominant in the present area of Mongolia. A most prominent figure of this propagation was Öndör gegeen Zanabazar (1635-1723), the First Bogd Jewtsündamba khutagt, who is well-known as an eminent polymath and a famous artist. The moving monastic camp (*khüree*), originally founded in 1639 as his residence (*örgöö*), developed to the biggest monastic centre in the present area of Mongolia, where his reincarnations resided until the passing away of the Eight Bogd (1870-1924).³ Zanabazar's residence (*Örgöö, Urga*) became known later as *Ikh khüree*, *Daa khüree*, *Niislel khüree* (from 1911), and *Bogdiin khüree* (today *Ulaanbaatar*). In 1778, after 28 re-locations the camp settled in the area of the valleys of the River Selbe, and the River Tuul, i.e. within the present *Ulaanbaatar* basin.⁴

Regarding the formation of Gandantegchenlin, temples started to be at *Dalkhiin denj* near the (*Daa*) *khüree* part in the beginning of the 19th century. In *Urga*, the first philosophical school, called *Tsanid* (T. *mtshan-nyid*) was founded by the Second Bogd Jewtsündamba khutagt (1724-1758) in 1756,⁵ when the camp was located in Inner-Mongolia, based on the philosophy of the Gomang faculty (*Goman datsan*, T. *sgo-mang grwa-tshang*) of the Tibetan Drepung monastery. After many movings, when the camp finally settled on the banks of the River Selbe, it developed to be a Manchu governmental, and a Chinese and later Russian trading centre. The secular activities began to interfere with the

² Krisztina Teleki's parts were written within the framework of the OTKA PD83465 Postdoctoral Research Fellowship of the Hungarian National Research Fund.

³ *Agwaanluwsanchoijjnyimadanzanwanchug*, T. *ngag-dbang blo-bzang chos-kyi nyi-ma bstan-'dzin dbang-phyug*.

⁴ For the places of *Urga* see Pürew 1999: 12. For details on *Urga*'s history and temples see Sereeter 1999, Teleki 2011.

⁵ *Luwsandambiidonme*, T. *blo-bzang bstan-pa'i sgron-me*. Lokesh Chandra 1964: 98r-99v

spiritual intents of the learned lamas in the *khüree*.⁶ Therefore, based on their requests the Fourth Bogd Jewtsündamba khutagt (1775-1813)⁷ established a large and a small temple for philosophical studies in 1809 together with the lamas' dwelling in a separate section of the city, on the nearby Dalkhiin denj hill, that later became known later by the name of Gandan.⁸ He also founded the *Dechingalaw* Temple (T. bde-chen bskal-pa) for the ceremonies of Kālacakra (Düinkhor, T. dus-'khor) in 1806, and re-named the Tantric school (*Agwa*, T. *sngags-pa*, *sngags-grwa*,) as *Badmayogo* (T. *pad-ma yo-ga*), which was originally founded by the Second Bogd in 1723.⁹ In 1809 he founded a second philosophical monastic school (*Choir*, T. *chos-grwa*) next to the previous one. The Fifth Bogd Jewtsündamba khutagt (1815-1841)¹⁰ renewed the two philosophical monastic schools in 1837 giving them the names *Dashchoimbel datsan* (T. *bkra-shis chos-'phel grwa-tshang*) for the first one and *Güngaachoilin datsan* (T. *kun-dga' chos-gling grwa-tshang*) for the second one.¹¹ He also moved his secluded palace (*örgöö*) to Gandan; and his residence and majestic temples were built there in 1838 in front of the monastic schools in a separate enclosure. Its majestic temple, *Gandantegchenlin* (T. *dga'-ldan theg chen gling*) and the palace of the Fifth Bogd were built there in 1838. This might be the time from which this site was called Gandantegchenlin or Gandan, and the *aimag's* became more-populated.¹² His two-storey winter palace, called *Didinpowran* (T. *bde-stong pho-brang*, *bde-stong bla-brang*, 'Palace of the Blissfull Emptiness') was built in 1838/1840. After the passing away of the Fifth Bogd in 1841, his relics were preserved in his palace in a stupa, and the building became known as the Relics Temple of the Fifth Bogd (*5-r Bogdiin shariliin süm*). This palace was the residence of his next incarnations for a while as the *khüree* moved from the banks of the River Selbe to the northwest of Gandan, to the direction of Tolgoit in 1839, and moved back and settled down finally on the banks of the River Selbe again in

⁶ Pozdneyev 1971: 76. Dashnyam 1999: the first temple in this area was called Yellow Temple (*Shar süm*) being a philosophical temple built in 1809.

⁷ Luwsantüwdenwanchugjigmedjamts, T. blo-bzang thub-bstan dbang-phyug 'jigs-med rgya-mtsho.

⁸ Pozdneyev 1971: 76. The name Gandan reminds one of the famous hill-site monastery Ganden (T. *dga'-ldan*) near to Lhasa, founded 1419 as a major center of the Gelugpa tradition.

⁹ Lokesh Chandra 1964: 101v-116v.

¹⁰ Luwsantsültimjigmeddambijaltsan, T. blo-bzang tshul-khrims 'jigs-med bstan-pa'i rgyal-mtshan.

¹¹ Lokesh Chandra 1964: 117r-120r, Lokesh Chandra 1977: 347. Güngaachoilin followed the views of Losalling faculty (T. *blo-gsal gling grwa-tshang*) of Drepung monastery.

¹² Pürew 2004: 20.

1855.¹³ Presumably the terms Züün khüree ('Eastern khüree') and Baruun khüree ('Western khüree') came to existence that time. Both the Sixth Bogd (1843-1848)¹⁴ and the Seventh Bogd (1849-1868 or 1850-1870)¹⁵ died young. The movings of the *khüree* had many reasons such as the appearing of scurvy (*chiig bam*) and other epidemics when residing too long at one place, and also superstitions, as the Sixth and the Seventh Bogds died young when the *khüree* had moved to the nearby Tolgoit.¹⁶ *Lamrim datsan* (T. *lam-rim grwa-tshang*) was also situated at Gandan. Contradictory data are available regarding its foundation: 1824, 1841, and 1844. It is well-known that *Badamyogo* was the 'Gürem datsan (T. *sku-rim*, religious service, healing ceremony) of *Dashchoimbel datsan*', and *Lamrim datsan* was the 'Gürem datsan of *Güngaachoinlin datsan*', as these were specialist temples where protective healing ceremonies were performed.

Later, the temple containing the relics of the Seventh Bogd (built in 1869), the Avalokiteśvara Temple (Migjid Janraiseg, T. mig 'byed spyang-ras gzigs), a third philosophical monastic school, *Idgaachoinzinlin datsan* (T. *yid-dga' chos-'dzin gling grwa-tshang*) (1911), and the relics temple of the Eight Bogd were also built at Gandan. In 1911 Gandan attained its ultimate splendour. These temples, however, are not shown on the painting to be analyzed as were built after the date of its drawing.

Monks, active in the *khüree* part and at Gandan, resided in *aimags* (T. *khamstshan*) that surrounded the centres formed by the palaces and temples. There is no specific evidence regarding the foundation of the first *aimags* at Dalkhiin denj. The *aimags* were residential units, where monks coming from the same territories of the rural *khoshuu* banners were living. When the districts became crowded in the *khüree* part, and when Gandan came to existence, districts with the same names as in the *khüree* part were formed at Gandan to admit more monks.¹⁷ Gandan had similar *aimags* as the *khüree* part the number of which reached 30 in 1903.¹⁸ In the *khüree* part all *aimags* had an own *aimag* temple, but *aimag* temples did not exist at Gandan. The lamas, who lived in the *aimags* used to go to their *aimag* temple in the *khüree* for ceremonies, and to one of the monastic schools where they studied. Novices used to chant every day in the main assembly hall in the *khüree* part, and adult monks were also divided up to any

¹³ Pürew 2004: 23-24.

¹⁴ Luwsanbaldanjaltsan or Luwsandambijaltsan, T. blo-bzang dpal-ldan rgyal-mtshan or blo-bzang bstan-pa'i rgyal-mtshan

¹⁵ Agwaanchojiwanchugprinleijamts, T. ngag-dbang chos-kyi dbang-phyug 'phrin-las rgya-mtsho

¹⁶ Pürewjaw 1961: 20-21.

¹⁷ Pürew 2004, 21

¹⁸ Sereeter 1999: 40

of the two, later three philosophical monastic schools. Whilst the number of monks in the philosophical schools reached about 3000-7000, in other *datsans* only about 50 or few hundred monks gathered. Residences of high-ranking lamas were also situated in the *aimags*.¹⁹ Old monks who still remember the old times claim that women were not allowed to enter Gandan, neither were laymen or merchants. These rules were in use until the 1930's.

In 1937-1938 the *datsans* of Gandan were destroyed except for the Avalokiteśvara Temple. The Avalokiteśvara statue was delivered to Russia. However, the buildings within the enclosure of the palace remained. Though they were used for different purposes during socialism, ceremonies started to be held again in 1944 by handful of monks under governmental control. In 1970 a Buddhist University was founded at Gandan to train new generations of monks. After 1990 many of the old monastic schools were rebuilt, and today Gandan has more than 500 monks, and attracts many devotees and tourists, becoming again the centre of Mongolian Buddhism and Buddhist studies.

Tibetan Inscriptions of the Painting in Figures 1 and 2

The painting has 34 Tibetan inscriptions that represent names of temples and *aimags*. Some of the names are original Tibetan words, as many of the Mongolian temples had Tibetan names, whilst others, especially the names of the *aimags* are Tibetan transliterations of Mongolian names. The 34 inscriptions are as follows:

Dga'-ldan theg-chen gling (*Gandantegchenlin* in Mongolian, 'Island of Joyful Mahāyāna', founded in 1838)²⁰ is written in the middle of the painting, which is the name of the monastic part represented on the painting. The enclosure with temples in the middle of the painting is the residence or palace built by the Fifth Bogd, mentioned above.

On the left side (as seen by the observer) of the central enclosure, two temple buildings are shown:

Kun dga' chos gling (*Günqaachoin datsan*, 'Island of Religious Rejoicing', initiated and established here in 1809, named in 1837) is the bigger one, and *Lam-rim* (*Lamrim datsan*, 'Gradual Path', 1824 or 1841 or 1844) is a smaller one on the left.

¹⁹ Balgan's painting hangs on the wall of Zanabazar Museum of Fine Arts in Ulaanbaatar.

²⁰ Dashnyam 1999: 251

On the right side of the central enclosure, two temple buildings are shown:

Bkra-shis chos' phel (*Dashchoimbel datsan*, 'Spreading the Auspiciousness Dharma', initiated in 1756, established at Gandan in 1809, named in 1837), is the bigger one, and

Padma yo-ga (*Badmayogo datsan*, 'Lotus Yoga', initiated in 1739, established at Gandan in 1806, and named by the 5th Bogd later) is a smaller one on the right.

27 *aimags* or districts with monks' *yurts* and courtyards surround these central temples in a \cap -shape. Starting from the Southwest going to the Northwest, the Northeast, and ending in the Southeast, the Tibetan inscriptions referring to the names of the districts are as follows:

Shu-the-ni (i.e. *Shüteenii aimag*, district 'of the Holy Object of Worship'; transliteration of the Mongolian *shüteen*, T. *rten*, 'support')

Don-grub gling (*Dondowlin aimag*, 'Island / Temple of Accomplishment')

Kyē-rdor (*Jadariin aimag*, Skr. *Hevajra*, name of a Tantric deity)

Thos-bsam gling (*Toisamlin aimag*, 'Island / Temple of Listening and Contemplation')

Dus-'khor (*Düinkhoriin aimag*, Skr. 'Kālacakra', 'the Wheel of Time', name of an astrologic system, a Tantra, and a Tantric deity)

Tshe-tshen thos-ni (*Tsetsen toinii aimag*, transliteration of *Tsetsen toinii*, district 'of the clever monk with prince origin'. *Tsetsen toin* was a Mongolian historical figure in the turn of the 17-18th centuries.)

An-du-nar (*Anduu nariin aimag*, 'People from Amdo', erroneously for Tibetan: *Amdo* with Mongolian *-nar* plural. This name refers to the fact that 50 Tibetans accompanied Öndör gegeen Zanabazar when returning home from Tibet in 1651.)

Ma-ya (*Mayaa* or *Makhamayaagiin aimag*, Skr. *Mahāmāyā*, T. 'sgyu-ma chen-mo, 'Great Illusion', name of a Tantric deity)

Spyi-sa (*Jasiin aimag*, 'Financial Unit', referring to an original financial function)

Nom-che (*Nomchiin aimag*, originated in Mongolian *nomch* 'Literate Person'. He was a disciplinarian at the time of the 2nd Bogd.)

Sang-ka'i (*Sangai aimag*, originated in Mongolian *san* 'Treasury', referring to an original function)

Tso-go'i (*Zoogoi(n) aimag*, originated in Mongolian *zoog* 'Catering', referring to an original function)

Gdugs-dkar (*Dugariin aimag*, Skr. *Sitātapatrā*, 'White Parasol', name of a deity)

Kham-pa (*Khambiin* or precisely *Mergen khambiin aimag*, erroneously for Tibetan *mkhan-po*, '(Wise) Abbot', named after *Mergen khamba* who was a Mongolian lama living in the 18th century.)

Bi-za-ya (*Biziyaagiin aimag*, Skr. Vijayā, T. *gtsug-tor rnam-rgyal-ma*, 'Victorious (with Chrest)', name of a deity)

No-yon-ni (*Noyonii* or *Khüükhen noyonii aimag*, originated in Mongolian *noyon* 'noble'. The name of this *aimag* refers to the 'Lady Noble', the consort of Zanabazar.)

Dar-khan e-mchi (*Darkhan emchiin aimag* founded for the Mongolian *Darkhan emch*, 'Doctor with privilege' in 1651)

Dbang-ka'i (*Wangai aimag*, originated in Chinese *wang* ('king, ruler'), referring to a Mongolian historical person living in the 18th century)

Er-hem (*Erkhem toinii aimag*, *Erkhem toin* 'Intelligent monk with prince origin' was a Mongolian monk living in the 18th century)

Hu-bhel-ka-ni (*Khuwilgaanii* or *Erdene khuwilgaanii aimag*, originated in Mongolian *khuwilgaan*, 'Precious' Reincarnation', T. *sprul-sku*. *Erdene khuwilgaan* was a Mongolian monk living in the 18th century.)

Par-ka (*Bargiin aimag*, originated in the name of a Mongolian ethnic group, called *Barga*)

Baṇḍi-ta (*Bandidiin aimag*, Skr. *paṇḍita*, 'great scholar', named after a *khuwilgaan* at the time of Zanabazar)

Rnam-grol gling (*Namdollin aimag*, 'Island / Temple of Complete Liberation')

*'Jam-dbyangs-su-gi'*²¹ (*Jamiyaansüngiin aimag*, *Süngiin aimag* (correctly T. *'jam-dbyangs gsung*, '*jam-dbyangs bsrung*, 'Protected by Mañjuśrī, or T. *chos-dbyings bsrung*, 'Protected by Dharmadhātu, the Ultimate sphere', or *chos-dbyings gsung*, 'Teaching of the Dharmadhātu')

Lam-nar (*Lam nariin aimag*, district of the 'Lamas', Tibetan *bla-ma* with Mongolian *-nar* plural)

No-mon khan-ni (*Nomon khanii* or *Mergen nomon khanii aimag*, *Nomon khan* was a Mongolian historical figure living in the 18th century)

'Ur-gu-lu-du (*Örlüüdiin aimag*, 'Generals', supposedly referring to the generals at Öndör geegen's wars)

The names of the *aimags* are not in connection with Gandan, as they just followed the division system of the (Züün) *khüree*. Seven *aimags* were founded in 1651 when Öndör geegen Zanabazar returned home from Tibet, whilst others developed later.²²

Temples and Districts Presented on the Painting

The painting clearly shows the arrangement of *Gandantegchenlin*. In the centre the enclosure of the Palace was painted with three temple buildings, three

²¹ This word cannot be made out on the painting.

²² For details of the *aimags* see Sereeter 1999, Teleki 2011.

yurt-palaces (*ger tugdam*) as well as a small building. The three temple buildings from the right are supposedly *Dechingalaw* Temple, the (Relics) Temple of the Fifth Bogd, and *Gandantegchenlin* Temple. Their roofs are decorated with gilded top decorations (*ganjir*). There is no evidency until which date *Dechingalaw* was situated at Gandan. Later it was situated in the centre of *Züün khüree* within the enclosure of the Yellow Palace. It is presented on another 19th century painting at Gandan, too.²³ After the passing away of the Seventh Bogd (1868 or 1870) a temple was built west of the Relics Temple of the Fifth Bogd in 1869 or 1870 to include his stupa.²⁴ It was very similar to that of the Fifth Bogd's relics temple, with a roof covered by green ceramic tiles, so the building which is presented on the painting is possibly not the relics temple, but *Dechingalaw*. *Gandantegchenlin Temple* is presented East of the Temple of the Fifth Bogd, but the *Didinpowran Temple* is somehow lost. There is a one-storey building in the southwestern corner of the enclosure, which might represent *Didinpowran*, but in reality it was and still is a two-storey building.

Behind the fenced-off palace, four monastic schools were situated. The painter presented them in the same line with the enclosure of the palace. The two in the West are the big *Güngaachoin* datsan (T. *kun dga' chos gling*) and the smaller *Lamrim* datsan (T. *lam-rim*), and the two in the East are the big *Dashchoimbel* datsan (T. *bkra-shis chos 'phel*) and the small *Badmayogo* datsan (T. *pad-ma yo-ga*). They are presented within separate courtyards, and the two big schools have *jas* (T. *spyi-sa*) treasury buildings in front of them.

There are benches in front of the palace, as well as prayer wheels and an incense vessel. A platform calling the lamas for ceremonies was situated between *Güngaachoin* and *Dashchoimbel* datsans, behind the palace.

The above-mentioned centre is surrounded by 27 quarters where monks lived. Starting from the Southwest these are *Shüteenii aimag* (Tt. *shu-the-ni*), *Dondowlin* (T. *don-grub gling*), *Jadar* (T. *kyē-rdor*), *Toisamlin* (T. *thos-bsam gling*), *Düinkhor* (T. *dus-'khor*), *Tsetsen toinii aimag* (Tt. *tshe-tshen thos-ni*), *Anduu nariin* (Tt. *an-du-nar*), *Mayaa* or *Makhamayaagiin aimag* (Tt. *ma-ya*), *Jasiin aimag* (T. *spyi-sa*), *Nomchiin aimag* (Tt. *nom-che*), *Sangai* (Tt. *sang-ka'i*), *Zoogoi(n) aimag* (Tt. *tso-go'i*), *Dugariin aimag* (T. *gdugs-dkar*), *Khambiin* or *Mergen khambiin aimag* (Tt. *kham-pa*), *Biziyaagiin aimag* (Tt. *bi-za-ya*), *Noyonii* or *Khüükhen noyonii aimag* (Tt. *no-yon-ni*), *Darkhan emchiin aimag* (Tt. *dar-khan e-mchi*), *Wangai aimag* (T. *dbang-ka'i*), *Erkhem toinii aimag* (Tt. *er-hem*), *Khuwilgaanii* or *Erdene khuwilgaanii aimag* (Tt. *hu-bhel-ka-ni*), *Bargiin aimag* (Tt. *par-ka*), *Bandidiin aimag* (Tt. *ban.tita*), *Namdollin aimag* (T. *rnam-grol gling*), *Jamiyaansüngiin aimag* or *Süngiin aimag* (Tt. *'jam dbyangs-sugi*), *Lam nariin aimag* (Tt. *lam-nar*), *Nomon khanii* or *Mergen nomon khanii aimag*

²³ Tsültem 1986: 155

²⁴ Sereeter 1999: 94

(Tt. *no-mon khan-ni*), *Örlüüdiin aimag* (Tt. *'ur-gu-lu-du*). Regarding the *aimags* only 27 of the final 30 *aimags* of Gandan are presented. *Dashdandarlin* (T. *bkra-shis bstan dar gling*), *Choinkhorlin* (T. *chos-'khor gling*), and *Ekh dagina aimags* are missing from the painting, which means that the painting was done before 1877 when *Choinkhorlin aimag* came to existence, followed by the two other *aimags*.²⁵

The painting shows a well-ordered arrangement of the buildings. Within the fenced-in courtyards of the *aimags*, usually one or two yurts and some buildings are presented. All the gates are facing to the South, and they were painted red to protect against evil spirits.²⁶ The choice of the colours on the painting corresponds to historical reality.

Two stupas are shown, one between *Jasiin aimag* and *Zoogoin aimag* and another one between *Dugariin aimag* and *Khambiin aimag*. The number of stupas at Gandan and their dates of erection are not known to the authors. Pozdnev claims that at the end of the 19th century 28 stupas were situated on the Western and Northern sides of Gandan.²⁷

Monks Presented on the Painting

The painting of Figure 1 shows 27 monks, curiously, a number equivalent to the number of the *aimags*. One monk is standing on the platform, called *Büreenii shat*, and beats a gong (*kharanga tsokhikh*) to give a sign (*dokhio ögökh*) to the monks to gather for a ceremony. Four monks play other musical instruments and are wearing red *orkhimj* scarfs. Two of them play flutes (*bishgüür*) and the other two play *ükhriin büree* trumpets, which are placed on a table. Three monks facing to the observer wear red garments with black edge. They might represent higher ranked monks or *tulkus* (T. *sprul-sku*) as their appearance differs from the others. Apart from the one standing on the platform four other monks wear yellow hats (*shashir*, T. *zhwa ser*). Several monks wear yellow *janch* mantles. The painting seems to show the gathering of monks for the morning ceremony. Normally, monks gather when they hear the sound of a cunch shell or a gong; flutes and *ükhriin büree* trumpets are usually not used for this purpose. In the morning, monks used to circumambulate the temples for worshipping, while turning the prayer wheels. On the painting two monks bow (*mörgöl*) in the South near the prayer wheel which is decorated by a Lancha OM syllable.²⁸ It is visible on several other paintings that at the entrance of Gandan a prayer wheel was standing. According to oral tradition, it

²⁵ Sereeter 1999: 34.

²⁶ Pozdnev 1971: 64

²⁷ Pozdnev 1971: 76.

²⁸ I would like to thank to Ts. Mönkh-Erdene teacher monk of Züün Khüree Dashchoilin Monastery, Ulaanbaatar to clarify this syllable. See also Mönkh-Erdene 2004.

was a typical *Dünchüür maan'* prayer wheel with the mantra “Om maṇi padme hūm.” It seems that the monks gather for a ceremony in the morning of a pleasant summer day. Normally, all monks were required to wear *janch* mantles and *shashir* hats, but at least the red *orkhimj* scarf. The different clothing of monks show the variety of monks gathered at Gandan. Few monks only are shown on the painting, as if they are on their way to a gathering; and some may still be inside their *aimags*. The painter was obviously also limited in space to draw many more monks.

Other Paintings of Gandantegchenlin Monastery

Other paintings presenting Gandan alone are not known to the authors. Normally, paintings present both the *khüree* and *Gandan*, or even other parts of the city. Several paintings and drawings are known from the 20th century (Jügder, Manibadar, National Library 341/96 and 19742), and Balgan painted *ikh khüree* as it was in 1880. An earlier painting was published by Tsültem,²⁹ which presumably shows Gandan while the *khüree* was situated in Tolgoit (1839-1855) after the passing away of the Fifth Bogd (1841). It includes Tibetan inscriptions similar to our painting, and the *khüree* part is surrounded by 27 *aimags*; but *aimags* are not shown at Gandan in that map. Another painting is preserved in the Badamkhand Museum of Art entitled “One day of Mongolia at the time of the Fifth Bogd”. It must have been painted in 1840 or 1841, as the White Palace, built in 1840, is shown, and the Fifth Bogd passed away in 1841, but further studies are required for a reliable dating. The buildings of the palace at Gandan are very similar to the buildings represented in the discussed painting. Comparison of these three contemporary paintings can result in a more complete picture regarding the development of Gandan in the middle or second half of the 19th century.

²⁹ Tsültem 1986: 155

Technical Analysis of the Drawing

The paper:

It is well possible that the typical 19th century yellowish-brown, relatively brittle paper stems from Siberia. It is visually apparent that the paper exhibits high lignin content. This is confirmed by the phloroglucinol-hydrochloric acid test.³⁰ The approximately 170 years old paper is indeed broken along the two folds. Otherwise, the sheet and its information content are still complete.

The pigments:

The most convenient method for the in-situ analysis of painting pigments turns out to be **Raman spectroscopy**.³¹ Raman spectroscopy relies on inelastic scattering of monochromatic light from a laser. The laser beam interacts with the molecular vibrations at the surface of the material to be investigated. The scattered light consists of frequencies shifted by the vibrational modes of the molecules, leading to a characteristic spectrum that directly identifies the chemical nature of the irradiated surface. The method is virtually non-destructive and is highly suitable for the study of precious historical artifacts. The measurement is usually done by a Raman microscope with an excellent spatial resolution in the order of micrometers. Also very detailed paintings can be analyzed in this manner.

The scattering characteristics differ from material to material, some times limiting the application of Raman measurements. In the present situation, usable micro-Raman spectra could be recorded for all the dominant pigments found in the map of Gandan monastery. The scattering also depends on the exciting laser frequency. The available set-up with a Bruker-Optics Senterra Raman microscope allows for three different laser frequencies: two diode lasers operating at frequencies of 532nm (green laser) and 785nm (red laser), and a helium-neon laser at 633 nm (bright-red laser).

A major handicap of Raman measurements is the simultaneous occurrence of fluorescence of the irradiated material. The fluorescence is often rather frequency-independent, leading to broad spectral ranges covered with strong optical emission that may completely cover the informative Raman lines. By properly choosing the exciting laser frequency, it is sometimes possible to minimize the undesirable fluorescence.

The green laser at 532 nm is usually quite universally applicable, however in this map, fluorescence is so strong that it renders the 532 nm laser virtually useless. The main "workhorse" is thus the red laser at 785 nm with a good

³⁰ Florian 1997: 36

³¹ Cariati 2000; Smith 2005; Ernst 2010; Ernst 2013

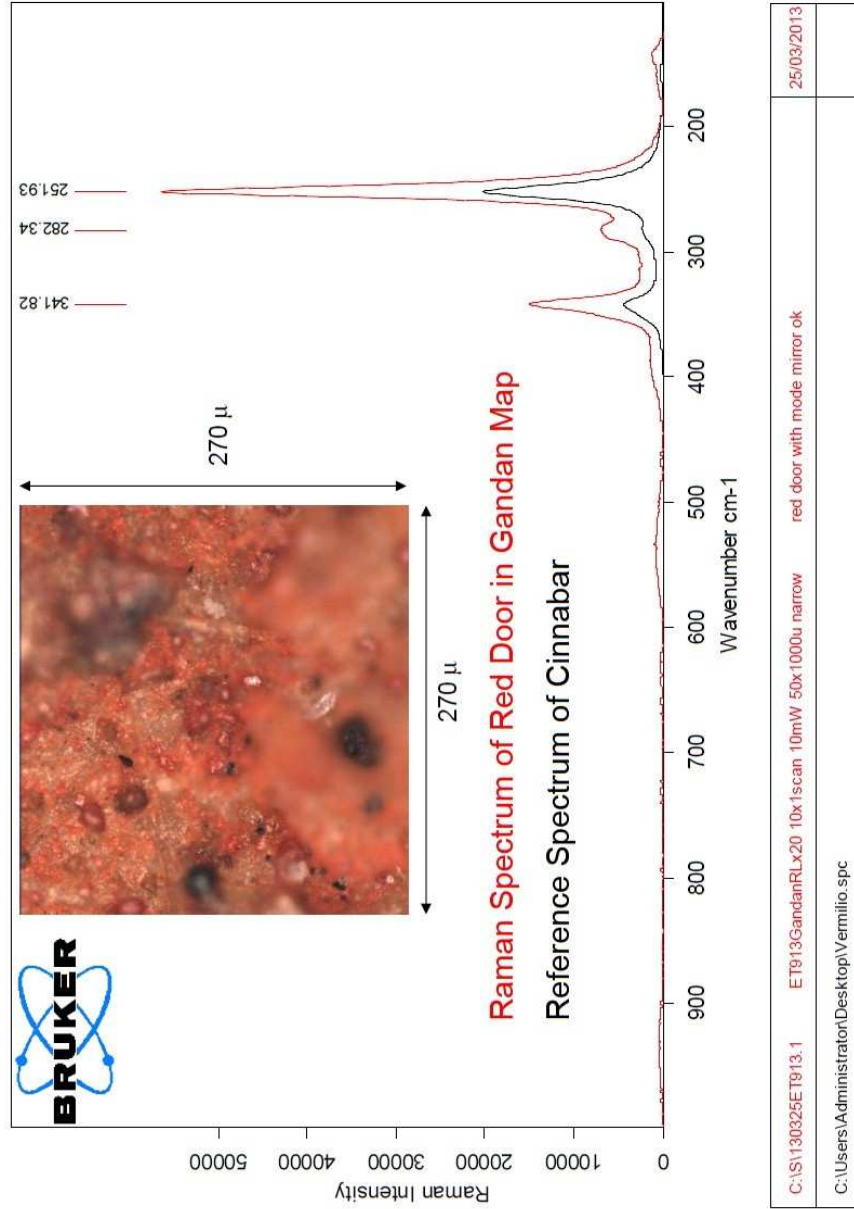


Figure 3: The Raman spectrum shown has been recorded for one of the red doors of a datsan. A microscopic image of the area within which the measurement has been made is also shown. The spectrum in red corresponds to the measurement, while the spectrum in black is a reference spectrum of pure cinnabar (HgS).

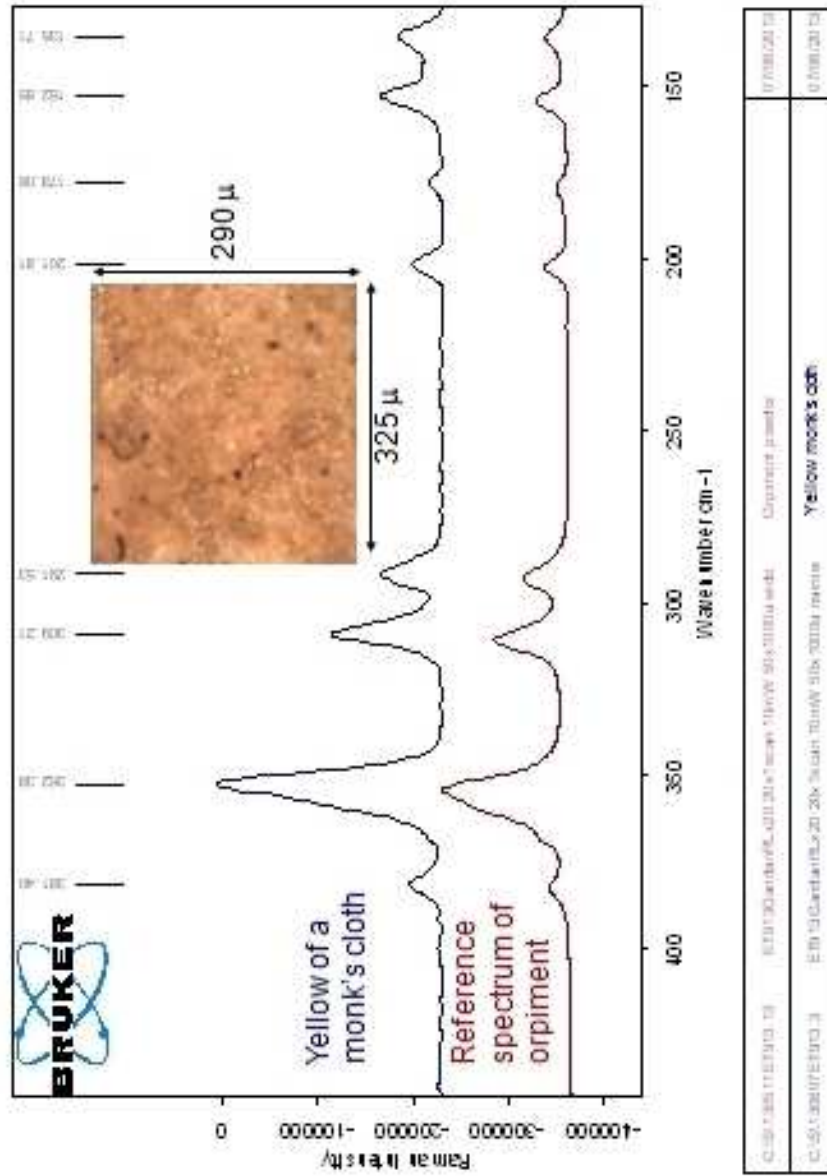


Figure 4: The Raman spectrum of the yellow cloth of a monk standing on the right side in front of the "Palace" in Figs. 1 and 2 is shown in black. A reference spectrum of pure orpiment (in red) is shown for comparison. The different spectral lines represent characteristic vibrational frequencies of the pigment. The magnified area of the yellow monk's cloth, from which the spectrum has been obtained, is represented as well.

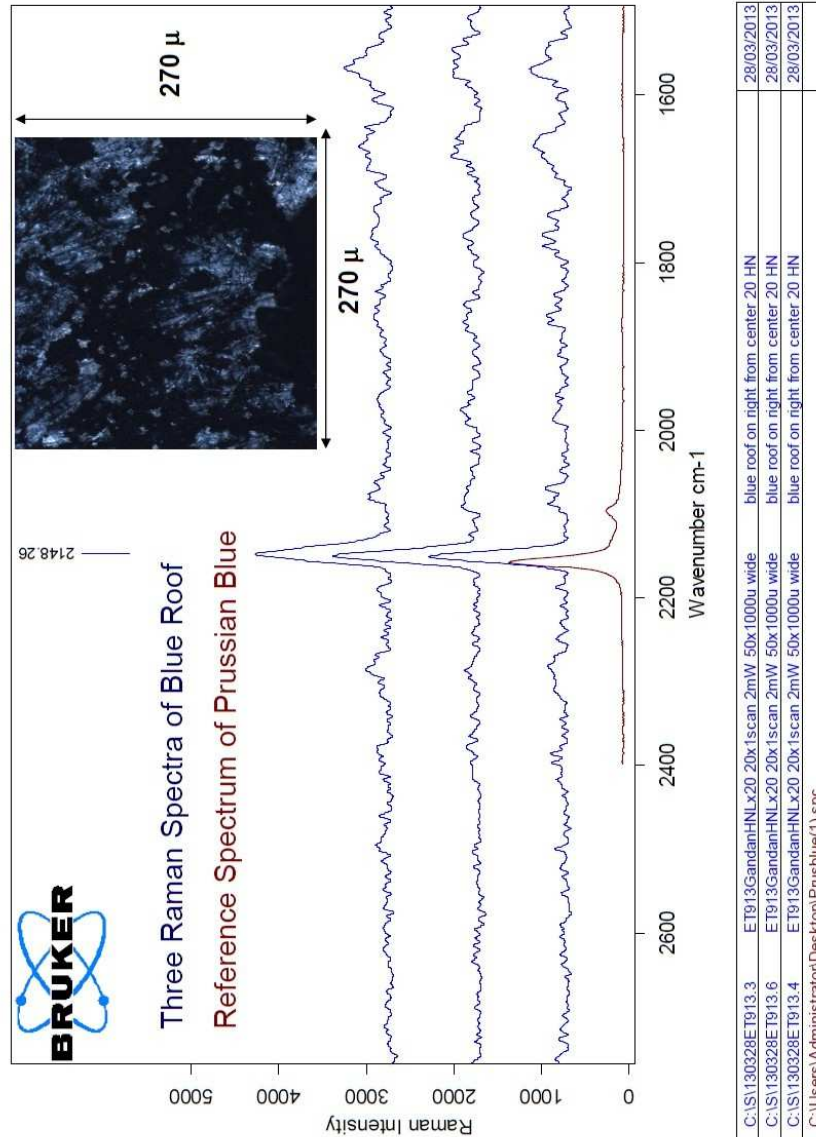


Figure 5: Three superimposed Raman spectra of one of the blue roofs within the central “Palace” are shown in blue together with a reference spectrum of Prussian blue, $Fe_7(CN)_{18}$ (in brown). Despite the simplicity of the (slightly displaced) spectrum, the identification of Prussian blue is undisputed. A correction of the sloping baseline, caused by the background spectrum, has been applied.

general response. Unexpectedly, the 633 nm He-Ne laser turned out to be quite useful for analyzing the blue pigment in this particular painting.

Black ink: The basic drawing has been done with carbon-black ink that can be identified by Raman spectroscopy. The rather unassuming spectrum displayed exhibits two characteristic broad peaks of carbon black at 1375 and 1580 cm^{-1} . The most convincing spectrum is recorded with the helium neon laser at a laser frequency of 633nm, while the spectra recorded with diode lasers are more difficult to interpret. Little specific information can be gained from the carbon black spectrum. Virtually all paintings in Asia were using similar inks.

Three pigments are prominently involved in the coloring of the drawing:

(r) A red pigment is used to colour the doors, some roofs, some pillars, some monks' dresses, and some musical instruments.

(y) A yellow pigment is applied to the monks' dresses and to some fronts of the buildings.

(b) A blue pigment marks some roofs in the central area.

(l) In addition, a yellowish lacquer has been applied to large areas and gives the painting some shine.

The lacquer (l) is of organic origin. It is difficult to identify it chemically because of its strong fluorescence that covers large parts of the Raman spectrum. In the moment, not much can be said about it, except that it is a nuisance that interferes with the analysis of the other pigments. While the three pigments r, y, and b give Raman signals of intensity 10 - 300, the fluorescence signal can easily mount to intensity 1'000'000. Obviously, this range of intensities causes problems and tends to cover weaker signals.

The **red pigment** (r) is easy to identify, it is cinnabar or mercury sulfide, HgS. It is the traditional red that has been used for almost 1000 years from the beginning of Tibetan/Mongolian painting art. It gives a strong and clear signal that can not be misinterpreted. It is not astonishing that it also occurs in this painting. A typical spectrum is shown in Figure 3. Only in very recent "modern" paintings other red pigments have been used.

The **yellow pigment** (y) is applied at several spots where its identification interferes with the strongly fluorescent yellowish lacquer. But there is a sufficient number of spots where the yellow pigment signal can be identified clearly as orpiment of arsenic sulfide As_4S_6 . Figure 4 shows the Raman spectrum of the cloth of a tall monk standing on the right side just below the central Palace. The observed spectrum is unique and does not cause problems of identification when the 785nm laser is being used. In addition, arsenic sulfide has two further modifications: realgar (As_4S_4) and pararealgar (As_4S_4). In many

paintings these other pigment modifications occur. They have been found in Mongolian paintings and in paintings from Buryatia, but in the present map, exclusively orpiment is present. Orpiment is also an ancient pigment that has been used from the beginning of Tibetan painting art.

The blue pigment (b) caused more problems. Originally, working with the red 785nm laser, several peaks were found in the range between 100 and 1300 cm^{-1} , but none of the peaks could be clearly associated with a known blue pigment. In particular, indigo that could have been used under the present circumstances. However, no indication of indigo was found in the blue roofs of the buildings in the center of the map. At last, the helium-neon laser at 633 nm was applied, and immediately a prominent peak was found at 2154 cm^{-1} . This solitary peak is characteristic for the synthetic pigment Prussian blue, $\text{Fe}_7(\text{CN})_{18}$. The very simple and characteristic spectrum is shown in Figure 4. It can hardly be misinterpreted. Prussian blue was synthesized for the first time in Berlin 1706. It was produced as early as 1778 in Gorodets, Siberia, and must certainly have been available in Mongolia before the middle of the 19th century.³²

The green pigment (g) of the main door in the upper center: It consists of a mixture of several pigments, among them most prominently Prussian blue and orpiment, giving the dirty green color.

With these three pigments, the map can safely be assigned as a Mongolian painting and dated in the middle of the 19th century. It can not be earlier because Prussian blue was then not yet available in Mongolia. It can not be later because then other competitive red, yellow, and also blue pigments became available.

Conclusions

The painter of the picture of Gandantegchenlin is unknown. He might have been a monk living at Gandan. The painting was presumably painted when or after the palace of the Fifth Bogd was completed in 1839-1840. If *Lamrim datsan* was built as late as in 1844, the painting must have been painted after 1844. As the Relics Temple of the Seventh Bogd is missing from the painting, it was surely executed before 1869. As this map has similarities with other paintings drawn between 1840 and 1855, the painting might indeed provide a glimpse of Gandan that time. The analysis of the painting pigments via Raman spectroscopy also indicates that the map was painted in the middle of the 19th century as Prussian blue was not available in Mongolia earlier, but later other

³² Berrie 1997: 191

competitive red, yellow, and blue pigments became available that have not been used for this map. The pigment analysis is thus not in contradiction with a date in the 1840ies or 1850ies. The painting offers quite a detailed and precise view of Gandantegchenlin and of the monasterial life in the middle of the 19th century at this important monastic site in Mongolia.

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