North-South Alignment of Burma’s Old Walls

Than Tun*

From the reports of the Archaeological Survey of Burma and readings\(^1\) of aerial photographs made by U Aung Myint, Chief Conservator, Forest Department, Upper Burma, we come to know that quite a number of north-south trending walls of old Burma are not pointing straight to true north, i.e. geographic north. Geographers might know the reason and fortunately Dr Tin Htoo\(^2\), Head of the Geography Department, Arts and Science University, Mandalay, comes to our rescue. According to him, the deviation of magnetic north from true north varied with time and he gives us the following data as collected at two observation points — London (51°30’N) and Paris (48°52’N).

<table>
<thead>
<tr>
<th>Year</th>
<th>To the West</th>
<th>To the East</th>
<th>To the West</th>
<th>To the East</th>
</tr>
</thead>
<tbody>
<tr>
<td>1963</td>
<td>7°</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1940</td>
<td></td>
<td>9°</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1935</td>
<td>11°30’</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1900</td>
<td>17°</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1840</td>
<td></td>
<td>21°30’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1820</td>
<td></td>
<td>22°</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1800</td>
<td>24°</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1740</td>
<td></td>
<td></td>
<td>16°</td>
<td></td>
</tr>
<tr>
<td>1700</td>
<td>7°</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1680</td>
<td></td>
<td></td>
<td>8°</td>
<td></td>
</tr>
<tr>
<td>1665</td>
<td>No Deviation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1660</td>
<td>No Deviation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1640</td>
<td></td>
<td></td>
<td>4°</td>
<td></td>
</tr>
<tr>
<td>1580</td>
<td>11°</td>
<td></td>
<td>10°</td>
<td></td>
</tr>
<tr>
<td>1540</td>
<td></td>
<td>7°30’</td>
<td>6°</td>
<td></td>
</tr>
</tbody>
</table>

\(^*\) Professor of History, Arts and Science University, Mandalay

From the above data kindly furnished by Dr Tin Htoo, we notice that the change of declination of magnetic north is like the swing of a pendulum. From a trend-line where the alignments of the two norths coincide, the magnetic north swings east to the farthest extent of eleven degrees and comes back to the original position in a matter of 160 years and then it continues the swing towards the west to the farthest extent of twenty four degrees and comes back to the original position in a matter of 320 years. Thus one complete cycle of movements is made in the course of 160–320–480 years. We also notice that the deviations of magnetic north are larger at London than at Paris; and we may say that magnetic deviation increases with the distance from the equator. Perhaps we could present a rough idea of how deviation differs with latitudes as follows:

<table>
<thead>
<tr>
<th>Latitudes</th>
<th>Farthest Degrees to the West</th>
<th>Farthest Degrees to the East</th>
</tr>
</thead>
<tbody>
<tr>
<td>50°N</td>
<td>23°</td>
<td>10°30’</td>
</tr>
<tr>
<td>45°N</td>
<td>22°</td>
<td>10°</td>
</tr>
<tr>
<td>40°N</td>
<td>21°</td>
<td>9°30’</td>
</tr>
<tr>
<td>35°N</td>
<td>20°</td>
<td>9°</td>
</tr>
<tr>
<td>30°N</td>
<td>19°</td>
<td>8°30’</td>
</tr>
<tr>
<td>25°N</td>
<td>18°</td>
<td>8°</td>
</tr>
<tr>
<td>20°N</td>
<td>17°</td>
<td>7°30’</td>
</tr>
<tr>
<td>15°N</td>
<td>16°</td>
<td>7°</td>
</tr>
<tr>
<td>10°N</td>
<td>15°</td>
<td>6°30’</td>
</tr>
<tr>
<td>5°N</td>
<td>14°</td>
<td>6°</td>
</tr>
<tr>
<td>Equators</td>
<td>13°</td>
<td>5°30’</td>
</tr>
</tbody>
</table>

As most of the old places of Burma where there are fortifications or enclosure walls are located within the latitudes 15° and 25° north, deviations to the east would be within 7 and 8 degrees at the farthest and deviations to the west would be within 16 and 18 degrees at the farthest. Anything beyond these would be interpreted as the influence of terrain.

Using the cyclic nature of the changes in the deviation of magnetic north from true north at Paris through years, allow me to project the said cyclic trend into the past and into the future as follows:

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2) Without whose help this paper would have been impossible.

    Simon & Schuster; 1957: *The Planet Earth.*
    Encyclopaedia Americana; 1959: XVIII, p. 129.
The Cyclic Trend of Deviations (Conjectural)

<table>
<thead>
<tr>
<th>Extreme Deviation West</th>
<th>No Deviation</th>
<th>Extreme Deviation East</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. D. 1820</td>
<td>A. D. 1980</td>
<td>A. D. 1580</td>
</tr>
<tr>
<td>A. D. 1340</td>
<td>A. D. 1660</td>
<td>A. D. 1180</td>
</tr>
<tr>
<td>A. D. 860</td>
<td>A. D. 1500</td>
<td>A. D. 1020</td>
</tr>
<tr>
<td>A. D. 380</td>
<td>A. D. 700</td>
<td>A. D. 620</td>
</tr>
<tr>
<td>100 B. C.</td>
<td>A. D. 540</td>
<td>A. D. 220</td>
</tr>
<tr>
<td>260 B. C.</td>
<td>A. D. 60</td>
<td>A. D. 140</td>
</tr>
<tr>
<td>340 B. C.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>420 B. C.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>740 B. C.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From the readings made by U Aung Myint we derived the following lists. They show how some of the existing walls or scars of former walls are not aligned properly with true north. With the help of the projection made above, we might try to fix in approximate dates of when these walls were first constructed and we believe that none of them would go far too wrong.

Old Sites with North-South Trending Walls deviating towards the East

<table>
<thead>
<tr>
<th>Name of the Site</th>
<th>Degree of Deviation</th>
<th>Approximate Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tonbyaw (Tenasserim)</td>
<td>21°</td>
<td>Late 16th. Century</td>
</tr>
<tr>
<td>Wagaru (Moulmein)</td>
<td>15°</td>
<td>Late 16th. Century</td>
</tr>
<tr>
<td>Zalun (Tenasserim)</td>
<td>6°</td>
<td>Late 16th. Century</td>
</tr>
<tr>
<td>Old Kyangin</td>
<td>5°</td>
<td>Early 16th. Century</td>
</tr>
<tr>
<td>Kagadit (Thaton)</td>
<td>10°</td>
<td>Early 7th. Century</td>
</tr>
<tr>
<td>Makkhaya (Kyaukse)</td>
<td>11°</td>
<td>Early 7th. Century</td>
</tr>
<tr>
<td>Theyekhittaya (Prome)</td>
<td>17°</td>
<td>Mid 2nd. Century</td>
</tr>
</tbody>
</table>

Old Sites with North-South Trending Walls deviating towards the West

<table>
<thead>
<tr>
<th>Name of the Site</th>
<th>Degree of Deviation</th>
<th>Approximate Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hmaawbi (on the Salween)</td>
<td>13°</td>
<td>Late 14th. Century</td>
</tr>
<tr>
<td>Kale</td>
<td>20°</td>
<td>Mid 14th. Century</td>
</tr>
<tr>
<td>Lamaing (Moulmein)</td>
<td>17°</td>
<td>Mid 14th. Century</td>
</tr>
<tr>
<td>Site</td>
<td>Latitude</td>
<td>Date</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>----------</td>
<td>-----------------</td>
</tr>
<tr>
<td>Nandawya (Thazi)</td>
<td>13°</td>
<td>Early 14th. Century</td>
</tr>
<tr>
<td>Pinya (East Wall)</td>
<td>20°</td>
<td>Early 14th. Century</td>
</tr>
<tr>
<td>Pinya (West Wall)</td>
<td>13°</td>
<td>Early 14th. Century</td>
</tr>
<tr>
<td>Wedi (Myingyan)</td>
<td>13°</td>
<td>Early 14th. Century</td>
</tr>
<tr>
<td>Mahamuni (Arakan)</td>
<td>10°</td>
<td>Late 13th. Century</td>
</tr>
<tr>
<td>Maing Maw (Kyaukse)</td>
<td>10°</td>
<td>Late 13th. Century</td>
</tr>
<tr>
<td>Myedu (Shwebo)</td>
<td>10°</td>
<td>Late 13th. Century</td>
</tr>
<tr>
<td>Old Myaungmya</td>
<td>11°</td>
<td>Late 13th. Century</td>
</tr>
<tr>
<td>Pegu</td>
<td>13°</td>
<td>Late 13th. Century</td>
</tr>
<tr>
<td>Yindaw (Meikhtila)</td>
<td>10°</td>
<td>Mid 10th. Century</td>
</tr>
<tr>
<td>Old Tagaung</td>
<td>11°</td>
<td>Early 10th. Century</td>
</tr>
<tr>
<td>Yamethin</td>
<td>11°</td>
<td>Early 10th. Century</td>
</tr>
<tr>
<td>Old Pyinmana (Kyaukse)</td>
<td>30°</td>
<td>Late 9th. Century</td>
</tr>
<tr>
<td>Thegon (Prome)</td>
<td>15°</td>
<td>Late 9th. Century</td>
</tr>
<tr>
<td>Zothok (Thaton)</td>
<td>7°</td>
<td>Late 5th. Century</td>
</tr>
<tr>
<td>Donwun (Thaton)</td>
<td>13°</td>
<td>Late 4th. Century</td>
</tr>
<tr>
<td>Wethali (Arakan)</td>
<td>23°</td>
<td>Late 4th. Century</td>
</tr>
<tr>
<td>Thaton</td>
<td>13°</td>
<td>Mid 4th. Century</td>
</tr>
<tr>
<td>Hanlin (Shwebo)</td>
<td>13°</td>
<td>Mid 1st. Century B.C.</td>
</tr>
<tr>
<td>Peikthano (Taungdingyi)</td>
<td>13°</td>
<td>Late 2nd. Century B.C.</td>
</tr>
</tbody>
</table>