APPENDIX TWO

PALERMO STONE 'MEASUREMENTS'

The Palermo Stone records measurements year by year of something, we don't know what. Everyone has assumed without question that these measurements must be of the differing maximum annual heights of the Nile flood every year at Inundation. This is a reasonable assumption on the face of it, because we know that nilometers (vertical gauges) were used to measure the Nile heights for thousands of years in Egypt, and that the height of the water was absolutely crucial to agriculture, and could determine whether people might starve in very bad years. All of this is well known and undisputed. But I feel very uncomfortable with the assumption that the measurements recorded on the Palermo Stone really refer to the Nile at all. One of the reasons I find this assumption unconvincing is that the measurements are too precise, down to the very tiny value of one quarter of one 'finger'. Since a 'finger' has a value of 18.71 mm or 0.7366 of an inch, the Palermo Stone measurements are thus so precise that they record variations of as little as 4.6775 mm, or 0.18415 OF AN INCH. I cannot believe that measurements of the Nile height reached such precision, that the water surface would be stable enough to determine it, or that the gauges could possibly be so precise. Astronomical instruments, however, would have been that precise because of the obsession with calendars and the true length of the year (a subject I intend to discuss at length in the future). I therefore hold the opinion that what was really being measured was some astronomical quantity connected with calendrical computations. Whatever it was, it varied year by year and could be expressed as a linear measure. In order to try to figure out what this might be, I first analysed the numerical data in the form given below. Naturally I disregarded all data coming from 'Cairo fragments' because I believe them to be fakes. So I only took the data recorded on the Palermo Stone itself. I have produced a table in which it is possible to view the variations of the measures, many of them in substantial continuous stretches of years, expressed in both metric and English/American measures. Occasionally there is no variation. If the measurements relate to lunar motions, it should be noted that the moon's motions rise and dip five degrees above and below the ecliptic. If the Egyptians were observing these using a flat linear scale measurement and equating one angular degree with one royal cubit on their measuring instrument (ancient Egyptian knowledge of celestial degrees is something I will discuss on a future occasion, as there is no space for such a discussion here, but they did know their value and they did express them geodetically on the earth's surface as well, since they had a geographical spread of 'noon' stations used to measure shadows stretching across Egypt from east to west between Gaza and Siwa by which they measured the size of the earth and the value of a degree), then this would make sense, because there is no recorded variation exceeding ten royal cubits, so the measurements would all be within the variations of motion of the moon as observed from the same fixed point over the year. I envisage a vertical rule marked from zero to ten standing upright and with a central slit positioned towards the dead centre of a meridian observation shaft such as those at Abu Ruash or Zawiyet el-Aryan which I discussed in Chapter

3. Then as the moon culminated at the meridian on a certain date a number would be obtained, which would vary with time due to the fact that the moon's motions do not coincide with the solar year. These are my early thoughts. I have not had the opportunity to think this through at all, but rather than wait until I can formulate some hypothesis, I have decided to publish the analysis of the data and the table, so that anyone who is interested might try and work it out for himself or herself. I just have a feeling that something is going on here, and we need to figure out what it is.

Regarding assumptions, it is necessary to decide whether ordinary cubits or royal cubits are referred to in these measurements. An ordinary cubit contained 6 palms, and a royal cubit contained 7 palms. The data give the answer for us, because in Register Five, Box Number 4 gives a measure of 2 cubits 6 palms 2 and two-third fingers. Since this exceeds 6 palms and is less than 7 palms, thus being more than an ordinary cubit and less than a royal cubit, it proves that royal cubits were being used. We are thus safe in using royal cubit conversions, and are not in danger of our numbers being out by one seventh.

Regarding the modern equivalent of a royal cubit length, Petrie found at Giza that the royal cubit was 1.71818 feet, which is 523.7 mm. We thus use 524 mm as the conversion.

Please note that the numbers in parentheses at the beginning of each line (at the far left) give the box numbers in the rows, and that they are not always consecutive (i.e., Box 4 is missing from Register Two).

Assuming royal cubit of 524 mm:
Assuming palm of 75 mm:
Assuming finger of 19 mm:
Assuming span of 262 mm:

Register One: no measurements occur. (Predynastic period.)

Register Two: (Dynastic Period)

(3) [first year of Djer] 6 cubits	**3144 mm (10.315 feet)**
(5) 4 cubits, 1 palm	**2171 mm (7.123 feet)**
(6) 5 cubits, 5 palms, 1 finger	**2620 + 375 + 19 mm = 3014 mm (9.89 feet)**
(7) 5 cubits, 5 palms, 1 finger	**3014 mm (9.89 feet)**
(8) 5 cubits, 1 palm	**2620 + 75 = 2695 mm (8.84 feet)**
(9) 5 cubits	**2620 mm (8.60 feet)**
(10) 6 cubits, 1 palm	**3144 + 75 = 3219 (10.56 feet)**
(11) 4 cubits, 1 span	**2096 + 262 mm = 2358 mm (7.74 feet)**

(NEXT NOT CONSECUTIVE WITH ABOVE:)

Register Three:

(1) 3 cubits, 1 palm, 2 fingers	**1572 + 75 + 38 = 1872 mm (6.14 feet)**
(2) 4 cubits, 1 span	**2096 + 262 = 2358 mm (7.74 feet)**
(3) 8 cubits, 3 fingers	**4192 + 57 = 4249 mm (13.940 feet)**
(4) 3 cubits, 1 span (?)	**1572 + 262 = 1824 mm (*uncertain*) (5.98'?)**
(5) 5 cubits, 2 palms	**2620 + 150 = 2770 mm (9.09 feet)**

(6) 5 cubits, 1 palm, 2 fingers	**2620 + 75 + 38 = 2733 mm (8.97 feet)**
(7) 4 cubits, 2 palms (?)	**2096 + 150 = 2246 mm (*uncertain*) (7.37'?)**
(8) 2 cubits	**1048 mm (3.44 feet)**
(9) 5 cubits	**2620 mm (8.60 feet)**
(10)4 cubits 1 span (?)	**2096 + 262 = 2358 mm (*uncertain*) (7.74'?)**
(11)6 cubits, 1 palm, 2 fingers	**3144 + 75 + 38 = 3257 mm (10.69 feet)**
(12)2 cubits, 1 span (?)	**1048 + 262 = 1310 mm (*uncertain*) (4.30'?)**
(13)3 cubits, 5 palms, 2 fingers	**1572 + 375 + 38 = 1985 mm (6.51 feet)**

(NEXT NOT CONSECUTIVE WITH ABOVE:)

Register Four:

(2) 3 cubits, 4 palms, 2 fingers	**1572 + 300 + 38 = 1910 mm (6.27 feet)**
(3) 4 cubits, 2 fingers	**2096 + 38 = 2134 mm (7.00 feet)**
(4) 4 cubits, 1 palm, 2 fingers	**2096 + 75 + 38 = 2209 mm (7.25 feet)**
(5) 4 cubits, 4 palms	**2096 + 300 = 2396 mm (7.86 feet)**
(6) 3 cubits, 4 palms, 2 fingers	**1572 + 300 + 38 = 1910 mm (6.27 feet)**
(7) 4 cubits, 3 fingers	**2096 + 225 = 2321 mm (7.62 feet)**
(8) 4 cubits, 3 fingers	**2096 + 225 = 2321 mm (7.62 feet)**
(9) 1 cubit	**524 mm (1.719 feet)**
(10) 3 cubits, 4 palms, 3 fingers	**1572 + 300 + 225 = 2097 mm (6.88 feet)**
(11) 3 cubits, 5 palms, 2 fingers	**1572 + 375 + 38 = 1985 mm (6.51 feet)**
(12) 2 cubits, 2 fingers	**1048 + 38 = 1086 mm (3.56 feet)**
(13) 2 cubits, 2 fingers	**1048 + 38 = 1086 mm (3.56 feet)**
(14) 3 cubits	**1572 mm (5.16 feet)**

(NEXT NOT CONSECUTIVE WITH ABOVE:)

Register Five:

(1) 2 cubits, 4 palms, 1 _ fingers	**1048 + 300 + 28.5 = 1376.5 mm (4.52 feet)**
(2) 2 cubits, 3 palms, 1 finger	**1048 + 225 + 19 = 1292 mm (4.24 feet)**
(3) 3 2/3 cubits	**1572 + 345 = 1917 mm (6.29 feet)**
(4) 2 cubits, 6 palms, 2 _ fingers	**1048 + 450 + 47.5 = 1545.5 mm (5.07 feet)**
(5) 4 cubits, 2 palms, 2 2/3 fingers	**2096 + 150 + 50.5 = 2296.5 mm (7.53 feet)**
(6) 4 cubits, 2 palms	**2096 + 150 = 2246 mm (7.37 feet)**
(7) 2 months, 23 days	***calendrical, not linear***
(8) 4 cubits, 2 palms, 2 2/3 fingers	**2096 + 38 + 50.5 = 2184.5 mm (7.17 feet)**
(9) 4 cubits, 1 2/3 palms	**2096 + 28.5 = 2124.5 mm (6.97 feet)**
(10) 2 cubits, 3 palms, 2 _ fingers	**1048 + 225 + 52.25 = 1287.25 mm (4.22 feet)**
(11) 3 cubits, 3 palms, 2 fingers	**1572 + 225 + 38 = 1835 mm (6.02 feet)**

(12) 3 cubits 1572 mm (5.16 feet)

(NEXT NOT CONSECUTIVE WITH ABOVE:)

Register Six:

(2) 2 cubits, 2 fingers 1048 + 38 = 2921 mm (9.58 feet)

(3) 5 cubits, 1 palm, 1 finger 2620 + 75 + 19 = 2714 mm (8.90 feet)

(4) 2 cubits, 2 palms, 2 _ fingers 1048 + 38 + 52.25 = 1138.25 mm (3.73 feet)

***VERSO* SIDE OF STONE (NOT CONSECUTIVE WITH FOREGOING:)**

Register One:

(1) … months, 24 days *calendrical, not linear*

(2) 4 cubits, 3 palms, 2 _ fingers 2096 + 225 + 47.5 = 2368.5 mm (7.77 feet)

(NOT CONSECUTIVE WITH ABOVE:)

Register Two:

(2) 4 cubits, 2 _ fingers 2096 + 47.5 = 2143.5 mm (7.03 feet)

(NOT CONSECUTIVE WITH ABOVE:)

Register Three:

(1) 2 cubits, 2 _ fingers 1048 + 42.75 = 1052.75 mm (3.45')

(2) 3 cubits … 1572 + ?? = 1572+ mm (incomplete) (5.16' +)

(3) 3 + x cubits 1572 + ?? = 1572+ mm (incomplete) (5.16'+)

CUBIT = 6 palms = 24 fingers (450 mm)
ROYAL CUBIT = 7 palms = 28 fingers (524 mm)

STANDARD ROYAL CUBIT (at Giza) = 1.71818 feet (Petrie) (523.70 mm)
ROYAL CUBIT = 7 palms = 20.61 – 20.63 inches/ 523.5 – 524 mm

PALM = 4 fingers
SMALL SPAN (half an ordinary cubit) = 12 fingers (or 3 palms, _ cubit)
LARGE SPAN (half a royal cubit) = 14 fingers (i.e., 3 _ palms, _ royal cubit)

ROYAL CUBIT assumed as 524 mm
PALM assumed as 74.86 mm say 75 mm
FINGER assumed as 18.71 mm say 19 mm