THE TOMB-CUTTERS' CUBITS AT JERUSALEM.

By W. M. Flinders Petrie.

The accompanying five plates are not intended for plans of the tombs there named, as many other details should be shown in a proper publication of these tombs for study. These outlines are only records of measurements, which were made with a view to examining the subject of the cubits; and hence the details of the forms and positions of the loculi, the relations of the chambers one to another, and the elevations of the tombs are necessarily omitted. The actual measurements were made in centimetres, and are, therefore, not exact to nearer than about $\frac{1}{4}$ inch.

It is not possible here to enter on the principles of the whole subject of meteorological study; and hence I shall not attempt to repeat, either here or in future, the statement of the methods and details, which can be seen in brief in the "Encyclopædia Britannica" (*Weights and Measures*). All that need be done here is to show how a definite and certain result can be attained from a mass of material such as is here published, and what the results are which may be here reached.

Firstly, we should begin without any preconceived theories, or any attempt to find certain known cubits in these dimensions, as there is enough material here for us to deal with it quite impartially by induction. Secondly, we may set aside all the minor dimensions of doorways, loculi, &c., as being too liable to be influenced by mere considerations of convenience. We should only deal here with whole dimensions of chambers. Thirdly, in case of dimensions evidently intended to be alike, as opposite sides of a chamber, or sides of a square chamber, the mean of the similar lengths will be stated. Fourthly, we must be ready to find that some chambers of a tomb may have been cut by a different cubit to that used in working later parts of the same tomb; in two cases such differences occur, and tombs VII and VIII are each of two periods, denoted by A and B here.

As probably many of these tombs were cut by workmen using the same cubit, we ought to find similar dimensions recurring in them. The first step is then to look for repetitions of one dimension. We soon see that rather over 110 and 220 inches are very common lengths. Denoting the tombs by the Roman numerals, we see in I, 225·6, 116·8 inches; II, 112·2; III, 115·6; IV, 113·2; VI, 115·8; VII B, 111·5; VIII B, 114·0; XI, 114·6; XIII, 222·6; XIV, 113·0; XXVIII, 113·6; XXXV, 114·4; XXXVIII, 113·2, 223·5; XL, 227·7. Here it is evident that we have a main dimension repeated continually. But we do not know how many cubits are contained in 113 inches. To find this we must look over the other dimensions of these same tombs for other recurring lengths. We

find one group in I, 88·4; II, 87·8; III, 88·1. Another, in XXXV, 131·3; XXXVIII, 132·6. Another, I, 161·8; XXXV, 160·9; XXXVIII, 157·3; XL, 158·7. Another, XI, 170·9; XL, 172·4, 172·5. We thus have lengths of about

88·1, 113·0, 132·0, 159·7, 171·9 and 226 inches,

all pretty certainly even numbers of the same cubit. And it is therefore seen that the multiples

4, 5, 6, 7, 7½ and 10 cubits

are the numbers in question, as we thus reach

22·0, 22·6, 22·0, 22·8, 22·9, 22·6 inches

for the cubit.

The next step is to search over all the other tombs (in which the 113-inch length does not occur), to see where the other multiples of this cubit recur. In this way we finally separate from all the others the following tombs, as being all cut in terms of the 22-inch cubit:—I, II, III, IV, VI, VII B, VIII B, XI, XII, XIII, XIV, XXI, XXIII, XXIV, XXV, XXVI, XXVII, XXVIII, XXIX, XXXV, XXXVI, XXXVIII, XXXIX, XL. And, adding together all the lengths in these tombs, and dividing them by the number of cubits, we reach an average of

22·61 ± ·03 inches

as the mean cubit. That is to say, the true value is as likely to be between 22·58 and 22·64 as to be beyond those limits. And this cubit was far the commonest, as it is used in more than half the tombs.

Taking now the residue of the tombs, we again search for recurring quantities, and note the following. In X, 122·1; XVII, 122·5; XXII, 125·6; XXXII, 124·3; XXXIX, 244·0.

Taking the other dimensions of these same tombs, we have altogether 82·1, 93·8, 124, 194·3, 206·3, 244·0, 515·8 inches; and these stand to one another in the ratio—

4, 4½, 6, 9, 10, 12, 25,

which are thus the numbers of cubits in these lengths. Seeing this result, we add also XV, 102·4, as being half of 206·31.

Adding together the dimensions of these tombs, and dividing by the number of cubits, we reach an average of

20·57 ± ·04 inches.

Taking next the "Tombs of the Kings," the dimensions of which do not recur elsewhere, we have lengths of

140·3, 158·9, 166·5, 178·4, 233·8, 296·6, 356·2, 463·2,

and these are in the ratios of

12 13½ 14 15 20 25 30 40.

Adding the dimensions, and dividing by these numbers, we find a foot of

11·77 ± ·04 inches.

We next see recurring dimensions in V, 191·5; and VIII A, 190·1: and in the same tombs V, 105·2; and VIII A, 103·8. The dimensions of these tombs are

95·0, 103·8, 190·1, 241·3, 285·4, 383·2
105·5, 191·5,

which are in the ratios of

8 9 16 20 24 32

whence the average is

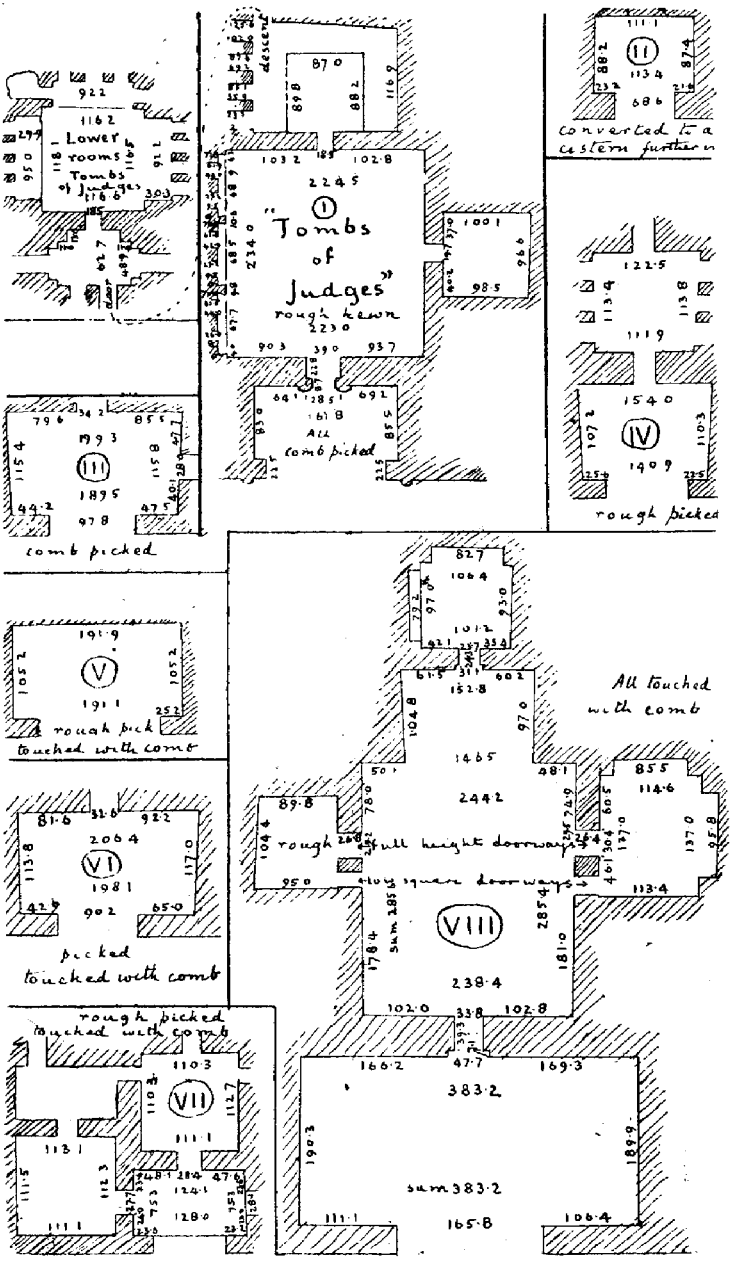
11·90 ± ·04 inches.

Of the remaining nine tombs there are but few dimensions. In IX, is 98·9; and in XXXI, 99·9; which may be the same. In XVIII is 152·4, and in XX is 152·8, probably the same. The first chamber of VII, called here VII A, is 75·3 and 126·0; the ratio suggests 3 and 5 cubits of **25·25 ± ·05.**

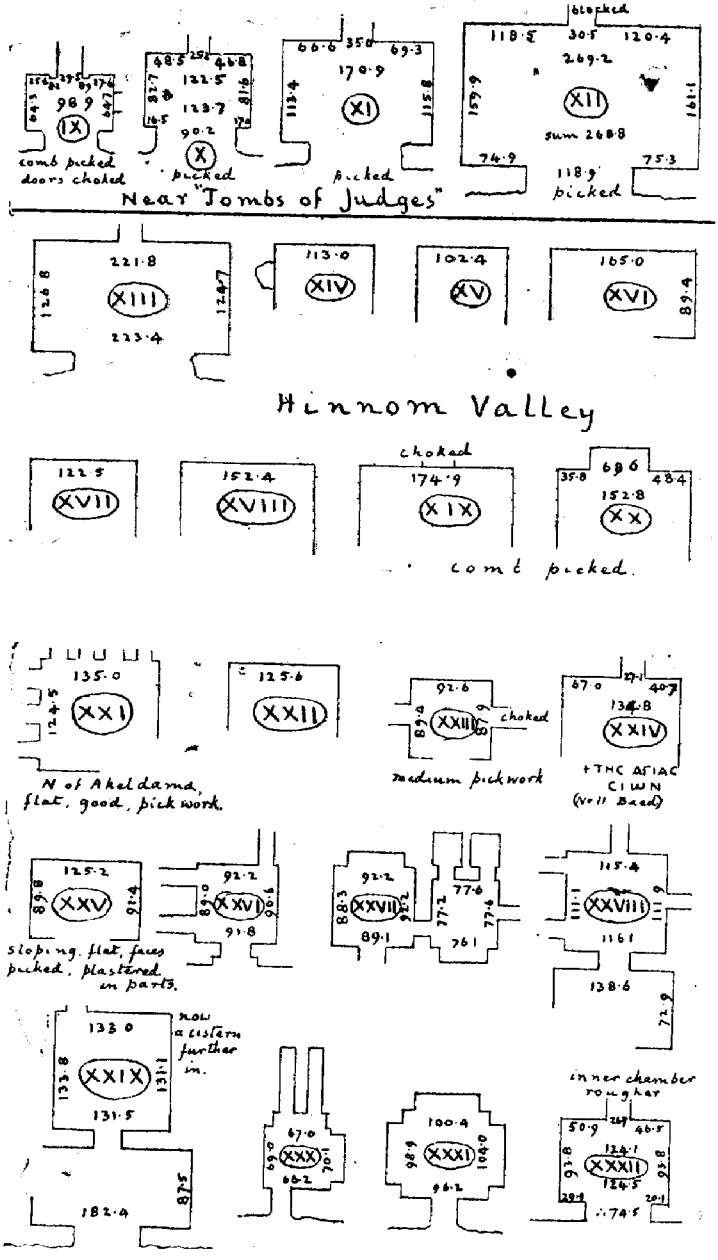
The few dimensions left are so scanty that no result can be safely drawn from them.

We will now compare the results with those already known. Twenty-four tombs were cut with a cubit of 22·6. This appears to be the Phœnician cubit: at Carthage, 22·3, perhaps in Sardinia as 22·1, in the Hauran as 22·2. But this new determination of it is of better value than any of the others, and nearer to its original home; and it should therefore be taken as the standard in future. Six tombs show 20·57 inches, which is the regular Egyptian cubit, varying from 20·5 to 20·7. The "Tombs of the Kings" were cut with a foot of 11·77 inches, which is pretty certainly the Roman foot of 11·6, or in the provinces, 11·7. And this agrees with their probably Roman age. Two other tombs may perhaps be on a rather longer form of the same. And only one chamber of one tomb would indicate the cubit of 25·2 inches, which there is some reason to regard as the old Jewish cubit. The broad result is that,—at least in the later ages such as the Greek and Roman times, to which these tombs mostly belong—the Egyptian and Phœnician measures predominated in use; and their amounts must be taken into account in any study of the literary statements that remain to us.

I.—TOMBS BY "TOMBS OF JUDGES."
1 : 100.

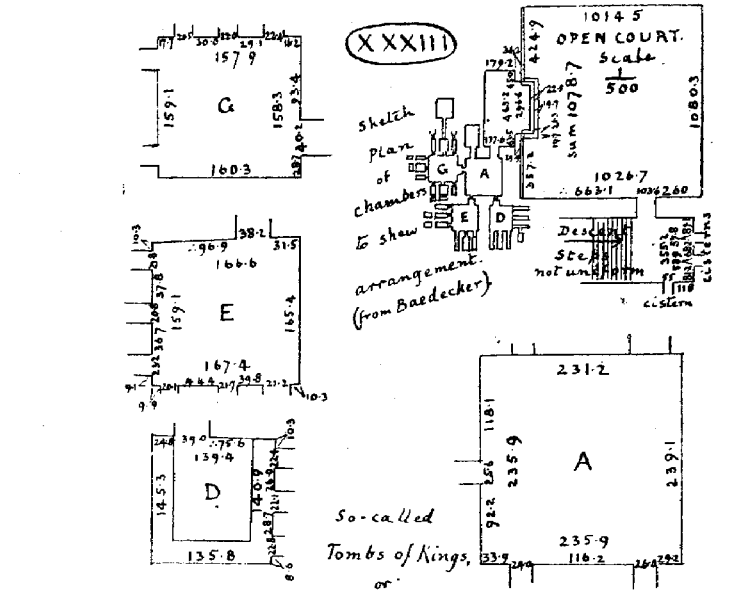


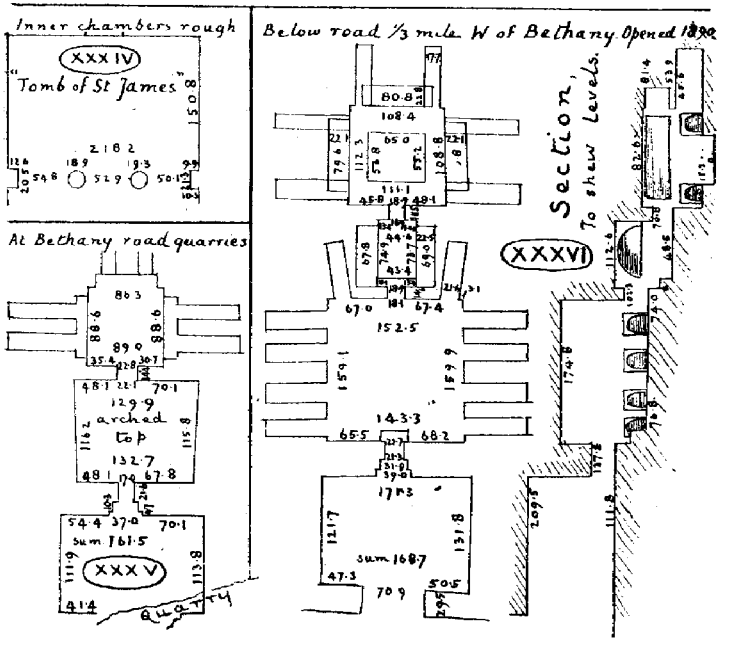
II.—Tombs in Valley of Hinnom.
1 : 100.



III.—Tombs North and East of Jerusalem.

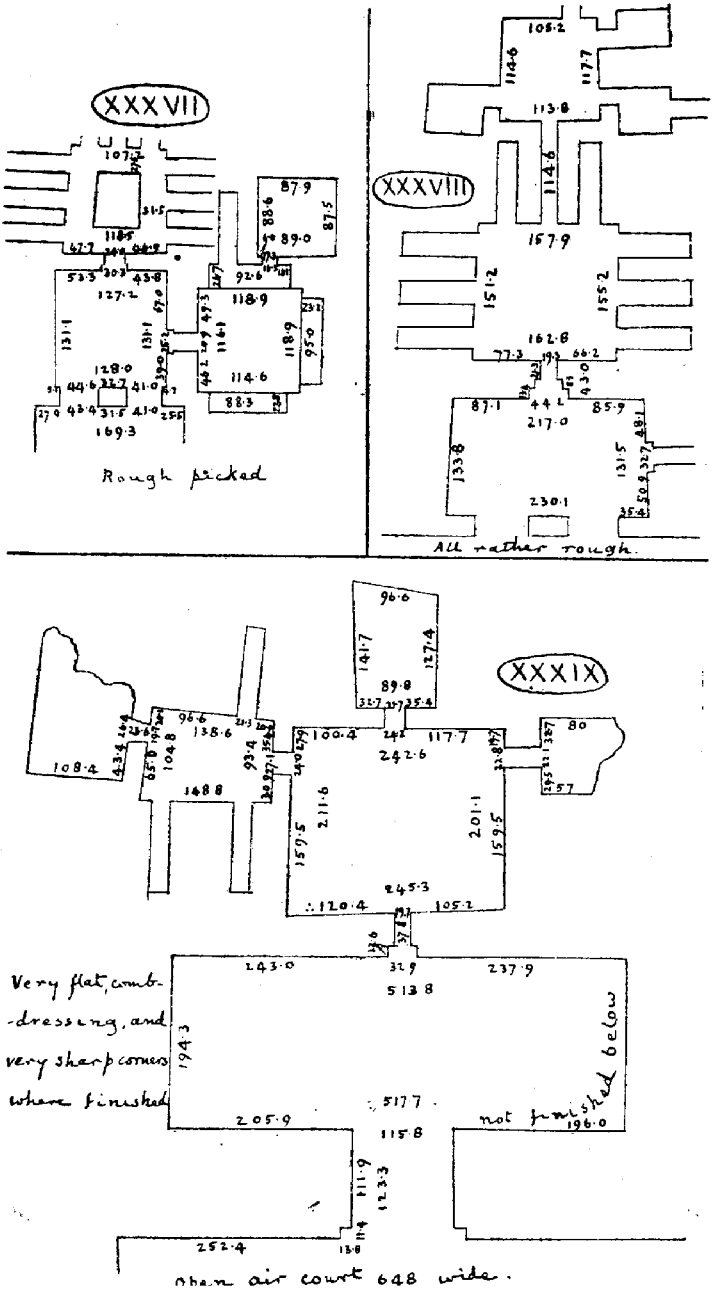
1 : 100.





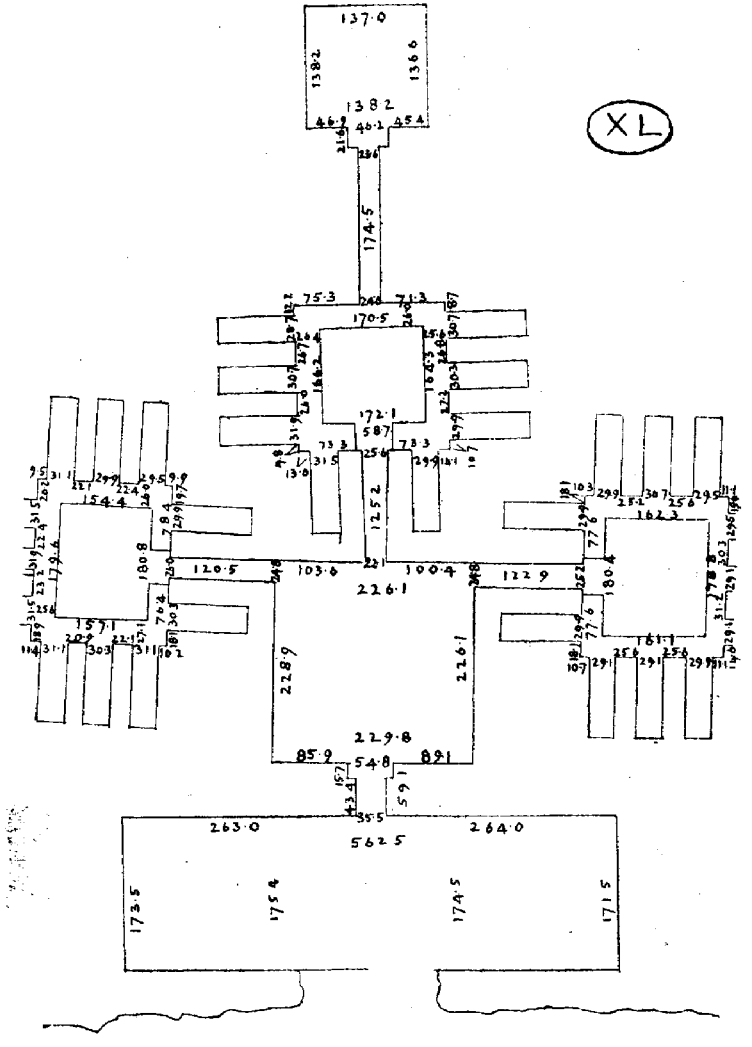
IV.—Tombs in Kedron Valley.

1 : 100.



V.—Tomb in Kedron Valley.

1 : 100.



In outer court, walls very flat, maximum curvature, $\frac{1}{4}$ inch. Dressed by close picking, with $\frac{3}{8}$-inch pick, touched with comb-pick. Corners sharply finished. Loculi, 90 long.