

G 2220, core type IV iii	. . . . .	62.0 × 20.4	1/3.03	1,264.8 sq. m.	
casing unfinished, designed					
to have measured	. . . . .	66.8 × 25.2	1/2.65	1,683.36 sq. m.	height 6.6 m.
G 5230, numm. mast. of unique					
form, type IX a	. . . . .	44.0 × 15.6	1/2.8	686 sq. m.	

These mastabas are obviously not built on either the small western or the large eastern norm, and no two of them have the same measurements.

The only remaining cemetery on a unified plan is that south of the First Pyramid, Cem. G I S. This consists of ten cores of massive masonry of type IV, apparently of the subtype i. I have the measurements of only one of these, G I S 1, which is approximately  $38 \times 18$  m., prop.  $1/2.1$ , area 664 sq. m. All the others in this row appear to be of about the same size. This size is about the same as the ordinary mastaba of type VI in the Eastern Field, which was based on the larger norm of the Eastern Cemetery.

In conclusion, the cores of the nucleus cemeteries, those presenting a uniform plan, were built in general on two different norms:

- (a) The smaller norm used for the majority of cores in the Western Field.
- (b) The larger norm used for the 12 original Cheops cores of the Eastern Field which, slightly increased in size, was used for the massive cores added to the Eastern Field and for the cores in the Cem. G I S.

The examination of the sizes of the core-mastaba has shown cores of one of these two normal sizes and a small number of cores of abnormal size in the nucleus cemeteries. It remains to compare the proportions of all these cores. In the cores of normal size there are a certain number of variations in the mean proportion of the norm, and these are caused by variation in the normal width of the core. The mean proportion is  $1/2.3$ , which prevails in Cems. G 1200, 2100, the Cem. en Échelon, and the twelve original Cheops cores of the Eastern Field. The cores in Cem. 4000 present a lesser mean proportion,  $1/2.05$ . The abnormal mastabas in the western nucleus cemeteries range from  $1/1.8$  to  $1/2.4$ . The massive cores of the Eastern Field range from  $1/2$  to  $1/3$ , and those of Cem. G I S are approximately  $1/2.1$ . These proportions, in particular those of the Cheops cores, follow closely the proportions of the older c.b. mastabas which were determined by the type of substructure covered by the mastaba. A much shorter superstructure would have been sufficient to contain the one-shaft substructure used by Cheops in his stone mastabas, and the adoption of the longer c.b. form clearly denotes the persistence of the old traditional form.

### b. Widths of the Streets and Avenues

The appearance which the Western Cemeteries present of having been laid out on a uniform plan depends, as I have said, largely on the use of mastaba-cores of a uniform and normal type. The necessary corollary is similarity in the widths of the streets and avenues in each cemetery. By avenue I designate the E-W streets which pass between the ends of the mastabas, and by streets the N-S passages between the lines of mastabas. I have pointed out above that the measurements for the mastabas are taken at the rock-surface, not on the *nfrw* base-line, and present, therefore, irregularities dependent on the slope of the ground and the errors of E-W measurements made by the masons. These inaccuracies are, of course, repeated inversely in the measurements of the streets and avenues.

In Cem. G 1200 the streets vary in width from south to north from 6.0 to 5.6 m., narrowing with the northward slope of the ground. In Cem. G 2100 streets 1-3 (counted from the west) measure in

width 6.4, 6.2, and 6.8 m. In Cem. G 4000 streets 1-7 (counted from the west) measure in width 6.8, 6.8, 6.5, 6.0, 6.9, 6.0, 7.0 m. The average width is 6.7 m. The Échelon Cemetery has streets more irregular in width because, as explained elsewhere, it was built in front of Cem. G 4000 and Cem. G 2100, which vary in their N-S orientation, and the Cem. en Échelon itself lies on two different levels produced by the great fault which crosses that cemetery from ESE to WNW. Street 8, which lies between the two older cemeteries and the Cem. en Échelon, has a width of 6 m. in front of Cem. G 4000 and a width of 4.6 m. in front of Cem. G 2100. Street 9 varies from 4.0 to 5.2 m. in the middle and to 4.8 on the north. Street 10 varies from 6.0 to 4.4 m. The original width of the streets in these cemeteries varies as follows:

Cem. 1200, approx. 6 m.

Cem. 2100, approx. 6.4 m.

Cem. 4000, approx. 6.7 m.

Cem. en Échelon, 5.0 m.

It appears that there is no great difference in the street width of the first three cemeteries, and a marked decrease in the street width of the fourth cemetery. It is to be observed that in general the lower the ground-level the more narrow the street, and this suggests that possibly all these cemeteries were built on the same *nfrw* base-line.

The avenues present greater variation:

In Cem. 1200, a width of about . . . . .	4.8 m.
In Cem. 2100, avenues of 6 mastabas on east, average width of	6.0-6.4 m.
In Cem. 4000, avenue 5 . . . . .	5.6 m.
"    4 . . . . .	6.7 m.
"    3 . . . . .	5.6 m.
"    2 . . . . .	5.8 m.
"    1 . . . . .	5.6 m.
Cem. en Échelon, spaces between ends of mastabas vary considerably . . . . .	6.1-4.9 m.

In the Eastern Field the mastabas had been for the most part cased and the width of the streets and avenues must be measured usually between the casings:

(1) Width of street G 7100:

(a) Between the casing of 7110+20 and that of 7210+20:

At north end 4.5 m., at south end 4.0 m.; the street narrows with the slope downwards of the ground from north to south.

(b) Between the casing of 7130+40 and the c.b. casing of 7230+40:

At north end 4.75 m., and at south end 3.5 m.; rock slopes to south.

(2) Width of street G 7200:

(a) Between the casing of 7210+20 and 7310+20:

At north end 4.5 m., at south end 4.0 m.; slope to south.

(b) Between the c.b. casing of 7230+40 and the core of 7330+40:

At north end 5.25 m., at south end 4.75 m.; slope to south.

(3) Street G 7300:

(a) Between the casings of 7310+20 and 7410+20:

At north end 2.75 m., at south end 2.25 m.; slope to south; street narrowed by unusual width of 7410+20, which has a facing and a casing.

- (b) Between the core 7330+40 and the casing of 7430+40:  
At north end 6.75 m., at south end 5.25 m.; slope to south.
- (c) Between the casing of 7350 and the core of 7450:  
At north end 4.5 m., at south end 2.5 m.; ground slopes to south.
- (4) Street 7400: bounded on the west by eastern row of twin-mastabas prolonged by 7450, and on the east by mastabas of the first and second additions to the nucleus cemetery (7510, 7530+40, 7550).
- (a) Between casing of 7410+20 and that of 7510:  
At north end 2.25 m., at south end 1.0 m.; the variation in the width of the street was caused by the divergent orientation of the back of 7510, which was built later than the nucleus cemetery, and by the thicker facing and casing of 7410+20.
- (b) Between the casing of 7430+40 and the mastabas east of it:  
At north end, between casing of 7430 and that of 7510, 4.5 m.  
At south end, between casing of 7440 and that of 7530, 5.5 m.
- (c) Between 7450 (core) and 7540 (casing) and 7550 (type VI a):  
At north end, between core of 7450 and casing of 7540, 7.0-7.5 m.  
On south, between core of 7450 and dressed surface of 7550 (type VI a), 7.5 m. (lines parallel).
- (5) Street 7500, beginning south of 7510 and running between lines 5 and 6 of the mastabas of the first and second additions:
- (a) Between the casings of 7530+40 and that of 7650:  
At north end of 7530, 3.25 m., and at south end of 7650, 2.75 m.; the mastabas are not exactly aligned and the rock slopes to south.
- (b) Between 7530+40 and 7550 on west, and 7660 on east (type VI a):  
At north end of 7660, between it and casing of 7540, 4.5 m.  
At north end of 7550, between it and 7660, 5.75 m.  
At south end of 7660, between it and 7550, 5.0 m.  
Variations caused by casings and by slope of ground to south (increased slope).
- (6) Street 7600, south of 7510, between mastabas of the first and second additions: 7650 and 7660 on west, and 7750 and 7760 on east:
- (a) Between the casing of 7650 and the backs of 7750 and 7760:  
At north end of 7650, between it and the north end of 7750, 6.0 m.  
Between 7650 and south end of 7750, 4.75 m.  
Between south end of 7650 and north end of 7760, 4.75 m.  
Between north end of 7660 and 7760, 6.0 m.  
Between south end of 7760 and 7660, 6.0 m.
- (7) Avenue 2: between the two E-W rows of twin-mastabas:
- (a) Between the casing of 7120 and that of 7130, 5.5 m.  
(b) Between the casing of 7220 and the c.b. casing of 7230, 4.75 m.  
(c) Between the casing of 7320 and the core of 7330, 7.5 m.  
(d) Between the casing of 7420 and that of 7430, 4.25 m.
- (8) Between the small pyramids:
- (a) Avenue 1, between G I-a and G I-b, 8.25 m.  
(b) Avenue 3, between G I-b and G I-c, 4.0 m.

- (g) Width of the avenue between 7510 on north, and the mastabas 7520, 7650, and 7750 on south:
- (a) Between casing of 7510 and core of 7520, 8.0 m.
  - (b) Between casing of 7510 and casing of 7650, 6.25 m.
  - (c) Between casing of 7510 and face of 7750 (type VI a), 5.75 m.

The measurements of the streets of the nucleus cemetery of eight twin-mastabas were obviously about 4.5 m. wide on the *nfrw*-level. The avenue appears to have been laid out to have a width of 5.5 m. between casings on the *nfrw*-level. These widths indicate the widths of street in the nucleus cemetery of twelve cores to have been 6.5 m. wide on the *nfrw*-level, while the avenues were about 7.5–8.0 m. wide. The measurements vary in the cased mastabas with variations in the thickness of the casings. At all stages in the construction of the cemetery the streets narrowed with the slope northwards of the rock and the mastabas widened. In general the rock-surface slopes south-eastwards. The widths of the streets in the old nucleus cemetery of cores are approximately the same as the widths of the streets in Cem. G 4000 of the Western Field, which average 6.7 m., but the avenues are wider than those in any of the three early nucleus cemeteries of the Western Field.

The spaces left between the eastern line of the finished mastabas and the mastabas added in the first addition to the nucleus cemetery show variations introduced by the slight change in the orientation of G 7510. The variations of the streets in the first and second additions show that these mastabas built later were built one or two at a time and were only aligned visually with each other and with the lines of the older nucleus cemetery.

#### 4. MARKS OF OWNERSHIP AND ASSIGNMENT OF THE MASTABA-CORES

The special evidence of assignment I take to be the slab-stela affixed to the eastern face of the mastaba-core by being set in a shallow emplacement cut in the retaining wall. A number of these are missing, but are proved to have existed by the presence of the necessary emplacement. Some fragments of stelae were found which may have been displaced from such niches. When the mastaba was completed with a c.b. chapel (type (1)), the western wall of the chapel was so built as to leave the slab-stela in a recess in the brick-work which marked the offering-place (symbolic door to the grave). In four cases (G 1201, 1223, 1225, and 4150) the mastaba-core had been enlarged by additional core-work and a casing of white limestone begun. In these a large false door cut in a single upright slab of white stone had been set in place for the offering-place of the proposed stone chapel (type (3)). Here the slab-stela was found intact in its recess behind the new false door. In G 1201 the slab-stela was protected from injury during the reconstruction by a plain covering-slab of limestone. Each of these slab-stelae differs slightly in design from the others, but all have common features—man or woman seated at a table of bread, ideographic list, short list, ‘cupboard list’ of offerings, titles, and name of owner. The execution of all these stelae is in very fine low relief, obviously the work of the royal craftsmen. As they were fixed to the original cores only, the conclusion seems assured that they were granted by the king who built the cores and presented on assignment of the core as marks of favour to the owners. The list of stelae or of empty recesses found by Professor Junker and myself is as follows:

	Core	Add	
(1) G 1201 . . .	II a	IV iii (3)	Prince Wepemnofret.
(2) G 1203 . . .	II a (1)	..	Kanofer; reserve head.
(3) G 1205 . . .	II a (1)	..	<i>rh-nšwt</i> Khuwfuw-nekht.
(4) G 1207 . . .	II a (1)	..	Nofer(t), <i>rh-t-nšwt</i> .

	Core	Add	
(5) G 1223 . . .	II a	IV iii (3)	Prince Ka-m-aha.
(6) G 1225 . . .	II a	IV iii (3)	Princess Nefert-Yabet.
(7) G 1227 . . .	II a (1)	..	Sethy-hekenet.
(8) G 1235 . . .	II a (1)	..	<i>rh-nšwt</i> Yeny.
Three mastabas in Cem. G 2100 had emplacements for slab-stelae:			
(9) G 2100 . . .	II a (1)		empty recess.
(10) G 2120 . . .	II a (1)+(2b)	..	empty recess; slab-stela of Seshat-sekhentiuw fits recess.
(11) G 2135 (Junker)	II a (1)	..	empty recess and fragments of slab-stela (name not preserved).
(12) G 4160 . . .	II b (2)	..	empty recess; reserve head.
(13) G 4150 . . .	II b (3)	IV iii (3)	Prince Yuwnuw.
(14) G 4260 . . .	II b (2)	..	empty recess.
(15) G 4340 . . .	IV i (2)	..	empty recess; reserve head.
(16) G 4250 . . .	II b (1)	..	empty recess.
(17) G 4360 . . .	IV i (1)	..	empty recess; Mery-hetepef, <i>s3b rd-mr</i> ; name written on offering-stone.
(18) G 4350 . . .	III i (1)	..	empty recess; reserve head.
(19) G 4460 . . .	IV i (1)	..	empty recess.
(20) G 4450 . . .	IV i (1)	..	weathered stela in place.
(21) G 4560 . . .	IV i (1)	..	weathered fragments of slab-stela; reserve head.
(22) G 4140 . . .	III i (2)	..	Princess Merytyetes; two reserve heads (man and wife).
(23) G 4840 . . .	IV i (2)	..	Princess Weneshet; fragment of slab-stela; mud reserve head.
(24) G 4860 . . .	II a	..	an official; fragments of slab-stela.

None of the rest of the cores in G 4000 had any evidence of a slab-stela, nor had any of those in the Échelon Cemetery. In G 7000 the evidence as to the presence of slab-stelae or recesses was destroyed by the reconstruction of the chapel recesses in the twelve original mastabas.

Thus eight slab-stelae were actually found in Cem. G 1200 (seven by ourselves and one by Mr. Ballard). These eight cores form an unbroken block. In Cem. G 4000 the cores which had slab-stelae also form one unbroken block at the western end of rows 6 (the first five), 5 (the first four), and 4 (the first and third); but farther along in G 4860 and finally in G 4840 (?). Possibly G 4660 also had such a stela (Junker says, 'Nicht nachweisbar').

The other marks of ownership are found on the walls of the chapels and in the false doors added during stage 4 of the construction of the mastabas, and must be treated later. The reserve heads come from the burial-chambers and must be dealt with under the heading of burials.

## 5. COMPOSITE CORES OF TWO TYPES OF CORE-WORK

The addition of core-work of another type to a mastaba-core is proof of the relative dates of those types of masonry. In every case this additional core-work was of massive masonry (type IV iii). In G 1201, 1223, and 1225 it was added to filled cores with stepped courses of small stone (type II a). In

mastabas G 4000 and 4250 it was added to the solid cores with stepped courses of small stones (type II b). In Cem. G 7000 additions of type IV iii (massive masonry) were added to the southern row of twelve original cores of type IV i (massive masonry). The connecting masonry in the two northern rows was also of type IV.

In every case these additions of massive masonry of type IV iii were cased or had an unfinished casing. The offering-chapel was of the interior type (3). This evidence seems to prove that the massive core-work of type IV iii was later than types II a, II b, and types IV i and IV ii. It is to be noted that cores of type IV i in Cem. G 7000 were altered in the process of casing to type IV ii.

## 6. THE RELATIVE POSITIONS OF THE BLOCKS OF CORES AND OF THE INDIVIDUAL CORES

### a. The Four Nucleus Cemeteries of the Western Field

As stated above, there are in the Western Field four cemeteries or blocks of cores and one isolated mastaba of great size—Cem. G 4000, Cem. G 2100, Cem. G 1200, Cem. en Échelon, and the mastaba G 2000.

Cem. G 4000 occupies the choicest position in the whole Western Field, on the highest ground and on good sound rock. It consists of forty-two mastaba-cores divided by streets and avenues of about the same uniform width. To the west stands one larger mastaba-core, that of Prince Hemyuwen and his wife, G 4000, type II b. In front of this lie three rows (6, 5, 4) of eight mastabas all of approximately the normal size, but not all of the same type of masonry. G 4160, 4150, 4260, and 4250 are of type II b, like G 4000, and it is obvious that this block of five mastabas of type II b was built first and began the unified plan the lines of which were afterwards prolonged by the other mastabas of these three rows, of which G 4350 and G 4140 were of type III i and the rest of type IV i. The two first lines, 4100 and 4200, were not continued southwards owing to the presence of the Schiaparelli quarry, but lines 3–7 were carried southwards by three more rows of mastabas, while the line 8 received only two such cores (unless the third has been destroyed). Thus the whole of the cemetery consisted of three rows of eight mastabas, two rows (3 and 2) of six mastabas each, and one row of five (or six) mastabas. All these added cores were of type IV i except the northern mastaba of line 8, which was again of type II a.

All these facts point to the construction of the cores from west to east and from north to south. When the evidence of the slab-stelae is added I conclude that rows 6 and 5 were built almost *pari passu* as far as line 6 (inclusive), first 4160, then 4150, and so on, with perhaps some aberrations in the regularity of the proceedings. Then row 4 was built from west to east as far as 4740, and was followed by G 4750 and 4760. These cores formed a solid block of 22. Rows 3, 2, and 1 and line 8 were added later, probably immediately after row 4 and line 7. Some of these cores are not so well constructed as the early cores, particularly in line 8. In line 8 the first core on the south (row 1) was never constructed and the last on the north (G 4860), obviously the last core in the cemetery, was of type II a, similar to the core of the Cem. en Échelon. In any case the assignment of the cores proceeded after the first four (or five) of type II b, along row 6 from west to east to 4860, and along row 5 from 4350. In row 4 only the first, third, and perhaps the last had slab-stelae.

Cem. G 2100, consisting of eleven cores, was built on lower ground which slopes slightly north and east. This group of cores lies north of lines 5–8 of Cem. G 4000, with its nucleus group about 35 m. away and not alined with the cores of Cem. G 4000. The cemetery itself is not entirely on a unified plan. It consists of a western group of five cores all constructed with a portcullis groove in the burial-

shaft, and these are the only shafts at Giza with portcullis groove. This western group lies in two N-S lines with two mastabas in the western line and three in the eastern. All the five had cores of abnormal size, and no two had the same measurements. It is obvious that the cores were constructed in one short period, but after the manner of a family cemetery. I incline to the opinion that the group was based on G 2100 and built in the following order: 2100, 2130, 2120, 2110, and 2210. Added to the western group on the east are six cores of normal size, in two N-S lines and three E-W rows. The two mastabas of the northern row have their south ends alined with the southern end of G 2130 of the western group, and the two mastabas of the middle row have their southern ends alined with the southern end of G 2120. The southern row of two mastabas (excavated by Junker) lie out to the south of the other two rows and fill the space between them and G 4000, rows 7 and 8. It is clear that these six eastern cores were constructed after the western family cemetery with portcullis grooves and first gave this cemetery the appearance of having been constructed on a unified plan. All the cores except that of G 2130 were of type II a, but 2130 had a core of type II b considerably altered in finishing the mastaba.

The mastabas were finished at different times. Two cores, 2100 and 2135 (Junker), were used as mastabas with slab-stela and c.b. chapel of type (1). G 2100 I take to be the first of the western group, while G 2135 is in the western row of the eastern group. The fact indicates that the eastern group, although later than the western, was still constructed in the reign of Cheops. The core 2130 was enlarged and finished with a smooth, sloping casing of fine white limestone with interior chapel of type (3 a) and with a burial-chamber of type 1 lined with white limestone. The owner was a prince Khent-ka (?). G 2120 was being finished with a white casing with exterior chapel when the work was interrupted, and the final chapel was of c.b. around a monolithic false door. The broken slab-stela of Prince Seshat-sekhentiuw fits the emplacement in the core wall of this mastaba. The burial-chamber was also of type 1 with white lining. The core 2210 had an addition of type IV iii with recess for interior chapel (never finished) and its burial-chamber was again of type 1 with unfinished lining. The fifth core of the western group was cased with fine white masonry with an exterior chapel of type (2) decorated with very fine reliefs, in the name of an official named Nofer. The burial-chamber of type 4 a (2) was unlined, but blocked with masonry and a portcullis stone. It may be noted further that around the south end of G 2100 was built the mastaba (type VII a) of 'Prince' Mer-ib and against the south end of his mastaba that of his daughter 'Princess' Nen-sezer-ka. It seems probable that the person who was buried in G 2100 A and possessed a slab-stela was the father or mother of Mer-ib and a son or daughter of Cheops. The western group thus included the tombs of two children of Cheops. The owner of the finished mastaba G 2110 was the *imy-r3 sš crw, imy-r3 pr hđ, imy-r3 sty đf3, imy-r3 sš hrt-c nšwt, hry ššt3 nšwt, imy-r3 hkr nšwt, imy-r3 pr ch3, wr mđ šmew, sb, nht hrw, hk3 ht, rh nšwt Nfr*. Nofer held a number of important offices, but probably his most influential office was that of chief of the king's letter scribes or royal secretary. The tomb was finished later than G 2130 and probably after the accession of Chephren. I take it that the work on the casing of G 2120 and G 2210 was interrupted by the death of Cheops and that at the time G 2130, G 2100, and G 2135 were finished and perhaps used.

The finishing of the remaining five mastabas of the eastern group proceeded roughly from west to east. G 2140 was altered by the introduction of a one-niched interior chapel of white limestone (type (3 a)) with decoration just begun. The shaft had a chamber of a low degenerate form of type 3 b. Then came G 2150 cased with z-masonry with interior white chapel of type (4) fully decorated, with estates bearing the name of Mycerinus and therefore of a time later than Mycerinus. The mastaba had two shafts, of which the man's shaft was of type 4 b (1) and the wife's of type 6 a (3). The owner was the *imy-r3 wpwt, mdw rhyt, wr is m prwy, šmr wcty, hrp ch K3-nfr*. His wife inside is named Shepseset-kauw.

Outside, Kanofer is represented with another woman, *rht nswt* Meresankh, perhaps his mother (possibly the same as the wife of Nofer, Meresankh). His son is Kaseza, identified with the owner of G 5340 (Lepsius G 37 and Junker). The next is the Junker mastaba G 2155, of 'Prince' Kani-nesuwt. The mastaba was enlarged around the old core and cased with white masonry with an interior chapel of type (4) and shaft of type 4 a (4). The other two cores, G 2160 and G 2170, were used unaltered probably with exterior c.b. chapels which have been destroyed. G 2160 had one shaft of type 4 a (2) (unfinished), and G 2170 had also one shaft of type 6 a (3).

Cem. G 1200 is over 175 m. west of Cem. G. 2100. The rock underneath is good, and while the highest part of the site is slightly lower than the rock at the mastaba G 4000, it is about 4 m. higher than the rock under G 2100-2130. It would appear that the situation of Cem. G 1200 was selected after that of Cem. G 4000, but it may have been selected earlier because of building operations in connexion with the First Pyramid itself. In any case the type of the cores and the types of additional core-work indicate that Cem. G 1200 was begun about the same time as G 4000, and the general use of slab-stelae in Cem. G 1200 proves it contemporary with G 4000. The cemetery is not alined with either of the other two early cemeteries nor with G 2000.

Cem. G 1200 consists of ten mastabas built in three rows on the same lines. G 1201, which is larger than the others, has its north end alined with the northern ends of the southern row, but extends south of their southern ends. Thus G 1201, the tomb of Prince Wepemnofret, heads a row of five mastabas. Three of the four smaller mastabas have slab-stelae (also) and are the tombs of two men and one woman called *rh-nswt* (or *rht-nswt*). The middle line is headed by a normal mastaba (with annex) with slab-stela bearing the name of Prince Ka-m-aha. It is set back west of G 1201 in line with the first small mastaba (G 1203), and west of it, in alinement, stand the mastabas of the Princess Nefert-yabet and the lady Sethy-hekenet. The northern row is headed by a nameless mastaba (no slab-stela), which afterwards had the mastaba of Ankh-haf built against its face in the place of the offering-chapel. Behind this lay only one mastaba, that of the *rh-nswt* *Yeni*. The most important of these mastabas are G 1201 and G 1223, heading the southern and the middle rows, and of these G 1201 is obviously that of the more important person. The third of the northern row is clearly the latest of the three. The cemetery appears to have been begun by G 1223, followed by G 1225, G 1203, and perhaps G 1205. Thereafter the other five mastabas on the north and west were built continuing the rows towards the west and adding a new row. All these mastabas are of type II a, and eight of the ten have slab-stelae.

About 50 m. north of the northern edge of Cem. G 4000 stands the great isolated mastaba, G 2000, opposite the Hemyuwen mastaba and line 1 of that cemetery. It is about 50 m. west of Cem. 2100 on an irregular rock-surface sloping northwards. It appears to cover a gully in the rock-surface.

From back of G 2100 to front of G 2000 . . . . .	50.0 m.
From back of G 2000 to front of G 1201 . . . . .	76.0 m.
From back of G 2000 to front of G 1223 . . . . .	99.6 m.
From back of G 2100 to front of G 1201 . . . . .	178.0 m.
From back of G 2100 to front of G 1223 . . . . .	201.6 m.
From south end of G 2000 to north end of G 4160 . . . . .	47.2 m.
From south end of G 2000 to Hemyuwen . . . . .	64.0 m.
From south end of G 2120 to north line of Cem. G 4000 . . . . .	35.2 m.
From south end of G 2135 to north line of Cem. G 4000 . . . . .	6.4 m.

These figures emphasize the isolation of G 2000. The type of that great mastaba, type III ii, is in origin certainly later than the earlier mastabas in Cem. G 1200, Cem. G 2100, and Cem. G 4000, which



are all either of type II a or II b. The uneven and bad character of the rock-surface under G 2000 proves that in selecting the site the builders had no choice because the better sites of Cem. G 4000 and Cem. G 1200 were already occupied. Remembering that the early mastabas in Cem. G 2100 are as early as the original five mastabas of Cem. G 4000, the conclusion seems certain that G 2000 was built after the founding of the three older nucleus cemeteries. This conclusion is strengthened by the fact that none of the nucleus cemeteries is in alinement with the great mastaba G 2000.

The fourth cemetery in the Western Field is the Cem. en Échelon which lies east of Cems. G 4000 and G 2100. The situation marks it as later than the other two. Some of the mastabas appear never to have been used and some were cased as late as Dyn. V. The terrain is broken by a fault in the rock, which crosses from SE to NW, with a lower level north of the fault and a slope towards the north (or NE). The mastabas are of the size which I call normal in the Western Field, but mostly with two burial-shafts instead of one. The inequalities in size and proportions are due partly to the unevenness of the terrain.

The cemetery consists of three N-S lines of about nine cores each, but two were either never built or have been destroyed to make way for G 5110. The cemetery is called an *échelon* cemetery because the mastabas of the second row are so sited as to leave the chapels of the first row opposite the open spaces between the cores. The third or eastern line is sited similarly with reference to the second (middle) line.

The cemetery is obviously built on a unified plan with mastaba-cores of type II a of the normal size. But the northern half of the cemetery (cores 7-9 of the three lines) is orientated parallel to the lines of Cem. 2100, while the southern part (cores 1-6 of the three lines) is orientated parallel to the lines of Cem. G 4000. Thus each of the three lines shows a jog where the two orientations meet. If the line west of the Échelon Cemetery is examined it will be seen that this also has a jog in the same place where the Cem. G 4000 meets the Cem. G 2100 (between G 4860 and G 2155) (Junker's VIII N and VIII NN).

In the western (first) line of the Échelon Cemetery the only core which follows the *échelon* principle and leaves the chapels to the west with a free outlook is G 4920. The mastaba G 4910 is 3 or 4 m. shorter than the normal size and was obviously crowded in south of G 4920, and shortened because of the lack of space. The last mastaba in line 8 of Cem. G 4000, G 4860, was also of type II a, and it looks as if G 4920 was the next core built after G 4860. In that case the spacing and sizes of Cem. 4000 would have thrown the rest of the line *en échelon* with the eighth line of Cem. G 4000, but the spacing between the ends of the cores was less, so that the chapels to the west were covered. When, progressing northwards, the workmen reached the jog in the line between Cem. G 4000 and Cem. G 2100, the cores to the north had to be set forward (to the east) to leave room for the chapels of the eastern line of Cem. G 2100, and the northern part of the line was brought parallel to the lines of that cemetery. I consider it probable that the second line was also built from the south, beginning with G 5010, which left the chapel of G 4910 open to the east and thus brought the *échelon* principle into operation in this cemetery along the whole line 10 (cf. G 7530+40). In the third (eastern) line, at the south end, one or two cores may have been destroyed to make place for G 5110 (Duwanera).<sup>1</sup> It seems probable, however, that this line was also begun from the south like lines 1 and 2. Each of these two lines also repeated the jog between the sixth and seventh rows which originated from the junction of line 8 of Cem. G 4000 and

<sup>1</sup> A wide construction causeway, used apparently to bring down stones from the quarry west of Cem. G 4000 to the mastaba G 5230, winds in and out through the Échelon Cemetery and actually crosses over the end of one of the cores

of the cemetery. The causeway was later than G 5110, which I date to the reign of Mycerinus, and it is certain that the Échelon Cemetery was earlier than G 5230 (Prince (?) Khnum-baf), whom I believe to have been a son of Duwanera.

the eastern line of Cem. G 2100. This jog in the lines of the Échelon Cemetery gives it the misleading appearance of having been constructed as two cemeteries, one in continuation of G 4000 and the other of G 2100, but this appearance is, as explained above, fallacious. The Échelon Cemetery is obviously one cemetery laid out after the other three, and merely adjusted to the divergent lines of the two adjacent cemeteries.

### b. The Nucleus Cemetery of the Eastern Field

The chronological order of the Cheops mastabas depends largely on the order of the cores in the Eastern Field, Cem. G 7000. It is to be observed that the ground-plan of this cemetery was not designed

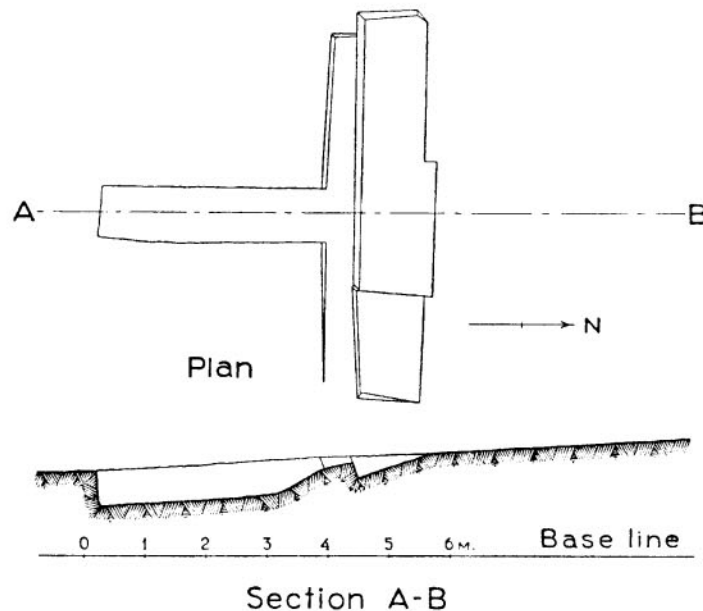


Fig. 18. Unfinished Pyramid

from the beginning of the construction of the pyramid of Cheops. There are in fact two changes in the plan of the cemetery easily observable. In the final plan the cemetery consisted of three small pyramids for the queens, and eight twin-mastabas in two rows (northern and southern) of four mastabas each. Examination showed that the northern row incorporated in the core of each mastaba two older independent cores with later connecting masonry, while the core of each mastaba of the southern row incorporated one similar older core increased by an additional block of massive masonry on the south. Thus the Eastern Cemetery began with twelve cores in three rows of four cores each (three E-W rows and four N-S lines). The three pyramids were in a N-S line with two northern pyramids alined, while the third (southern) pyramid was set back to the west about 3.55 m. The northern pyramid was set close up in the angle between the entrance corridor of the pyramid temple and the main body of that temple, and was probably so placed after the plan of the temple had been laid out on the ground and perhaps partially built. But east of this northern pyramid, 42 m. from the sloping burial-passage of the finished pyramid, was an unfinished cutting in the rock of similar size which proved that a small pyramid of the same size had been begun here (Fig. 18). The sloping passage in the rock, 0.85 m. wide, had been cut to a length of 3.75 m. and a depth of 0.54 m. At the northern end of the sloping passage an emplacement 6.35 m. wide had been prepared for the sloping courses of masonry which were to carry the sloping passage up and out to the projected face of the pyramid. In this emplacement the plaster showed that two courses of stone had already been set and afterwards removed on the abandonment of the site. This unfinished pyramid (see Fig. 18) is 12.7 m. south of the secret shaft of Hetep-heres I, the mother of

Cheops, and it is clear that the site was abandoned as a result of the excavation and use of her secret tomb. Now if that unfinished pyramid had been completed it would have covered the site of the core G 7110, and with its chapel would have prevented the construction of G 7210.

Measurements around the unfinished pyramid:

Pyramid G I-a	. . . . .	49.5 m. sq.
G I-b	. . . . .	49.0 m. sq.
G I-c	. . . . .	46.85 m. sq.
From axis of cutting to east face of G I-a	. . . . .	7.5 m.
From axis of cutting to middle of G I-a	. . . . .	32.25 m.
From axis of cutting to axis of pyramid passage G I-a	. . . . .	32.25 m.
Width of Queen's Street from casing G I-a to 7110	. . . . .	17.5 m.
From axis of cutting to casing G 7110	. . . . .	10.0 m.
to east casing G 7110	. . . . .	29.5 m.
to west face casing G 7210	. . . . .	33.5 m.
to east face of G 7210	. . . . .	53.5 m.
to west face of G 7310	. . . . .	58.0 m.
to east face of G 7310	. . . . .	77.0 m.

Assuming that the projected unfinished pyramid was of the same size as G I-a, then its eastern face would have fallen a little east of the middle of core G 7110, at a distance of 24.75 m. from the axis of the cutting. Assuming a street for the chapel of the same width as Queen's Street, the eastern side of this street would have fallen just inside the eastern face of G 7210, at 52.25 m. from the cutting. It is obvious that neither core G 7110 nor G 7210 could have been in place when the unfinished pyramid was laid out. Further, either the street for the pyramid chapel was planned for a greater width than that of Queen's Street (27.5), namely, the great width of 33.5 m. (which is highly improbable), or core G 7310 was also yet unbuilt. It seems therefore probable that none of the twelve original cores had been built at the time when this unfinished pyramid was abandoned. That leads to the conclusion that the twelve original cores were laid out on the evident unified plan after the siting of pyramid G I-a, and perhaps after its complete or partial construction:

From the back of G I-a to the front of G I . . . . . 61.0 m.

The clue to the date of the original twelve cores lies in the date of construction of G I-a (and G I-b). The siting of this pyramid was certainly made after the pyramid of Cheops in its final size was laid out together with the plan of the pyramid temple. The back of G I-a is 61 m. from the face of the pyramid G I. At the Third Pyramid it is obvious that the three small pyramids III-a, b, and c were being built at the time of the death of Mycerinus, that is, at the time Shepseskaf began the completion of his father's work. It hardly seems possible that Cheops could have left the pyramids of his queens until after the completion of his own tomb. He had certainly constructed the cores of the Western Cemetery, beginning early in his reign. On a block of stone in the south wall of the entrance corridor to the Cheops pyramid temple was a date which Rowe read as the year 13 (?). This would indicate that the construction of the temple had been begun at least by that year. It is nearly certain that the Cheops pyramid and funerary temples were finished in the twenty-three years of his reign. But it is impossible to be certain of the time required for the various stages, the construction of the stepped core, of the fine white casing, of the upper burial-chamber, and of the temple. Probably the length of time required to build a pyramid of the size of G I or even of G I-a has been over-estimated by archaeologists. The rate of

construction depends so largely on the number of men employed, the organization, and the methods of construction—factors of which we are profoundly ignorant. Certainly the core-work of the small pyramids (G I-a, &c.) and that of a mastaba-core could have been finished in a matter of one or two years for the pyramids, and about six months or a year for the mastabas. The construction of the Great Pyramid and temple, of the two small pyramids, and of the twelve original cores may have been proceeding simultaneously in the middle of the reign. From these vague indications I would set the construction of the two small pyramids G I-a and b at about the year 15. G I-a was begun first, followed closely by the beginning of G I-b. The twelve cores would have been begun before the two small pyramids were finished, or immediately after their completion. Thus I would set the construction of the twelve original cores at years 15-17.

The normal position chosen for the pyramids of queens is south of the pyramid of the king himself. At the Medum pyramid the queen's pyramid was on the south and another tomb was built on the north. The South Stone Pyramid at Dahshur had a single small pyramid on the south, as did that of Chephren, while the pyramid of Mycerinus had three small pyramids in an E-W line on the south. It seems, therefore, that the position of the three queens' pyramids of Cheops on the east of his pyramid requires some explanation. Professor Junker found a sloping passage south of the Cheops pyramid between Nos. 6 and 7 of the cores of that cemetery and nearer the pyramid. I would suggest that after beginning a small pyramid on this side the terrain was judged unsuitable owing to the proximity of the great quarry, and that for this reason the three queens' pyramids were placed east of the southern half of the king's pyramid. This explanation would confirm the date assigned to the building of these pyramids in that it was certainly after the exploitation of the northern part of the great quarry.

These twelve original cores, as far as can be seen, were never assigned, but were probably intended for the same persons who were afterwards buried in the twin-mastabas constructed later. The original cores measure on an average about  $35.62 \times 15.04$  m., area 534.58 sq. m., about double the size of the normal cores of the Western Field, and were obviously intended for great favourites. But this size of core was not sufficient for the desires of the king or those of his favourites, and the two northern cores of the four lines were joined up to form four very long twin-mastabas. The two old cores which were of type IV i were joined up with massive masonry of the same kind, and the whole was cased in fine white masonry with interior chapels (one for man and one for wife) of type (3). There had been no recess in the old cores for these chapels, and the faces of the old cores, where the chapel was to come, were broken out and reconstructed with interior recesses to take the chapels. That is, the interior chapel was first used at Giza in these twin-mastabas or shortly before their construction—at any rate after the construction of the original twelve cores. These new cores with recess were constructed, therefore, probably about the years 17-20 of Cheops. These long twin cores, measuring about  $79.8 \times 14.5$  m., area 1,156.0 sq. m., may have been put together immediately or a few years after the construction of the twelve original cores and were undoubtedly immediately cased. This would give us approximately the period Cheops 17-20 for the twin cores and the casing. The easternmost twin-mastaba core, G 7410-7420, was faced with small stones set in steps, core-type III before casing.

The construction of the four northern twin cores left one row of four of the original cores of type IV i on the south. These were enlarged by the addition of a block of massive masonry of type IV iii (with recess for chapel) on the south to form another four cores of lesser length than the four northern twin cores, but also intended for twin cores. This reconstruction was obviously later than that of the four northern twin cores, but probably followed immediately, about the years 17-20. The casing of these four was proceeding when Cheops died. The westernmost was finished; the casing of the next