

## c. The Sizes of Chambers of Type 3

The enormous size of the chamber of the mastaba G 2000 points it out for comparison with the unlined chambers of type 3 in the Eastern Field. It is probable that these chambers were originally planned as lined chambers, but owing to the death of Cheops and other circumstances were used unlined. It is therefore advisable to consider only the sizes of the rock-cut chambers. Taking the chambers of the four twin-mastabas of the north row, the order in size is as follows:

		Chamber type	Rock chamber		Remarks
			sq. m.	cu. m.	
(1) G 7220 A	2nd twin-mastaba: man	3 amx (stair)	41.43	122.64	2 rooms; gran. sarc.; Hordedef
(2) G 7410 B	4th twin-mastaba: wife	3 af	41.88	121.22	2 rooms; gran. sarc.; Meresankh II
(3) G 7420 A	4th twin-mastaba: man	3 cmx	32.49	120.21	husband of Meresankh II
(4) G 7320 A	3rd twin-mastaba: man's shaft	3 af	26.22	89.14	2 rooms (1 unfin.); sarc.; prince
(5) G 7120 A	1st twin-mastaba: man's shaft	3 cf+9	25.0	87.5	gran. sarc.; Prince Ka-wab; sloping passage added
(6) G 7210 B	2nd twin-mastaba: wife's shaft	3 af	25.18	85.61	wife of Prince Hordedef
(7) G 7110 B	1st twin-mastaba: wife's shaft	3 af	22.25	77.87	unfin.; Hetep-heres II
(8) G 7310 B	3rd twin-mastaba: wife's shaft	4 a (1)	27.23	58.27	gran. sarc.; wife of prince

The rock-cut chamber of G 2000 had a capacity of 204.67 cu. m., considerably larger than the greatest of these chambers. The rock-cut chamber of the large mastaba of Prince Hemyuwen (G 4000) of type 1 blx had an area of 33.15 sq. m. and a capacity of 135.92 cu. m., also a little larger than the largest of the chambers of the four north twin-mastabas of Cem. 7000. It is therefore obvious that the large sizes of the rock-cut chambers in the Eastern Field are in accordance with the largest lined chambers of the Western Field and indicate, as do other factors, the importance of the royal children for whom the twin-mastabas of the Eastern Field were intended. The largest chambers in the twin-mastabas have a capacity of 120–123 cu. m. and are three in number. The owners of these three were Prince Hordedef, Queen Meresankh II, and the husband of Queen Meresankh II. The last-named person, who became a king, was not buried in the chamber prepared for him, and it is obvious that the chamber was excavated before he became king. Four chambers range in size from 89 to 77 cu. m. and belonged to Prince Ka-wab, Prince Ra-bauwf(?), the wife of Prince Hordedef, and the wife of Ka-wab (Hetep-heres II). The smallest of the eight chambers, which contained, however, a red granite sarcophagus, was of type 4 and belonged to the wife of a prince (Ra-bauwf?). I would date the excavation of all these chambers, except the smallest, to the reign of Chephren.

The chambers of the shafts in the four south twin-mastabas vary considerably in type and size, and several have been altered greatly by later alterations in the Saite-Ptolemaic period. The date of the use of the individual shafts is uncertain, but probably all were finished and used after the reign of Cheops. Each mastaba contained two shafts in the north part only. I omit the eastern mastaba—

that of Prince Min-khaf—as that was undoubtedly finished in the reign of Chephren. The shafts in order of size are as follows:

			Chamber		Remarks
			type	Rock chamber	
			sq. m.	cu. m.	
(1) G 7130 B	5th twin-mastaba: man's shaft	4 a (1)	43.59	113.08	chief shaft, with 2 rooms
(2) G 7230 A	6th twin-mastaba: wife's shaft	3 al	21.6	64.8	second shaft
(3) G 7230 B	6th twin-mastaba: man's shaft	3 clx	18.92	61.49	chief shaft
(4) G 7330 B	7th twin-mastaba: man's shaft	3 bf	15.48	52.53	altered Ptol. cutting
(5) G 7330 A	7th twin-mastaba: wife's shaft	3 bf	7.2	13.68	second shaft unfin.

The sixth shaft is of the poor type 6:

(6) G 7130 A	5th twin-mastaba: unused?	6 b (2)	3.62	3.8	
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The large chamber in G 7130 B is in size a little larger than the mean size of the shafts in the north row. Four of the chambers of type 3 range from 50 to 64 cu. m. in capacity, large chambers, but not to be compared with those of the four north twin-mastabas. These include the chief shafts in 7230 and 7330, and the secondary shaft in 7230. The second shaft in 7330 is also of type 3 but of the capacity of only 13.68 cu. m., very small for the mastaba concerned. The chamber of type 6, in G 7130, is of unusually small size for a princess.

The next group of tombs, the capacities of which are to be considered, are those ascribed certainly to the reign of Chephren, which include the eighth twin-mastaba and the five massive cores first added to the Cem. G 7000. The large beautifully finished mastaba G 7510, probably the first of this group to be finished, had a lined chamber of type 2, and its rock-cut chamber had an estimated area of 21.36 sq. m. and a capacity of 74.76 cu. m. This size would group the chamber with the large early chambers but not with the very large chambers presented by the following mastabas. I give here the list of very large chambers of type 3:

		Chamber		Remarks	
		type	Rock chamber		
		sq. m.	cu. m.		
(1) G 7350 A	north shaft of 3	3 am	33.8	167.31	Hetep-heres II (?); reign of Shepseskaf (?)
(2) G 7430 A	8th twin-mastaba: chief shaft	3 am	42.0	136.42	2 rooms; gran. sarc.; Prince Min-khaf
(3) G 7650 C	southern of 3 shafts	3 afx	25.7	100.23	gran. sarc.; Merytyetes
(4) G 7450 A	north shaft	3 al	22.74	60.49	unfin. chief shaft
(5) G 7050 B	chief shaft	3 bm	17.95	38.59	reused in Ptol. period; Queen Nefert-kauw

The secondary shafts of type 3 in these mastabas are of lesser size than the chief shafts:

(6) G 7650 A	IV iv	chapel	3 amx	24.56	92.44	2nd shaft; Merytyetes
(7) G 7520 A	IV i		3 cm	24.56	88.41	rough-built stone sarc.

The remarkable sizes of the chambers of Queen Hetep-heres II (?) and Prince Min-khaf are to be compared with those of the chambers of type 3 in the eight nummulitic mastabas of the second addition, which include the tombs which I ascribe to the children of Prince Ka-wab and Hetep-heres II.

	Core type	Chamber type	Rock chamber	sq. m.	cu. m.	Remarks
(1) G 7760 B	VI a	chapel	3 al	40·71	122·84	2 rooms; gran. sarc.; 'Prince' Min-dedef
(2) G 7660 A	VI a	chapel	3 cl	27·28	105·85	wife of 'Prince' Ka-m-sekhem
(3) G 7660 B	VI a	chapel	3 afx	32·22	81·45	2 rooms; gran. sarc.; 'Prince' Ka-m-sekhem.
(4) G 7550 B	VI a	chapel	3 amx	24·32	80·82	'Prince' Duwa-ne-hor
(5) G 7810 B	VI a	chapel	3 bf	19·78	63·29	Prince Zaty; excavated by T. Boulos
(6) G 7820 B	VI a	chapel	3 af	16·4	47·56	Princess Nefert-kauw; excavated by T. Boulos
(7) G 7810 A	VI a	chapel	3 afx	18·13	46·32	wife of Prince Zaty; excavated by T. Boulos
(8) G 7750 A	VI a	chapel	3 bf	6·5	19·82	wife of . . .
(9) G 7760 A	VI a	chapel	3 bfx	8·75	15·31	wife of 'Prince' Min-dedef
(10) G 7750 B	VI a	chapel	3 am	6·86	12·35	'Prince' . . .; chief shaft

In these same mastabas are five chambers of type 4, and one of type 6:

(1) G 7070	VI a	chapel	4 b (4) x	18·88	38·59	w. lst. sarc.; Sneferuw-khaf
(2) G 7060 B	VI a	chapel	4 b (4) x	17·88	35·76	w. lst. sarc.; Prince Nefer-ma'at
(3) G 7530 A	IV iv	r.c. chapel	4 b (1): W	15·4	28·79	gran. sarc.; Queen Meresankh III
(4) G 7350 C	IV iii	chapel	4 b (1) unfin.	10·54	15·81	3rd shaft in mastaba on south
(5) G 7820 A	VI a	chapel	4 b (1)	6·88	12·04	husband of Princess Nefert-kauw; excavated by T. Boulos
(6) G 7550 A	VI a	chapel	6 b (2) unfin.	3·91	5·13	unused; wife of Duwa-ne-hor

The two largest of type 4 are the chambers of Prince Nefer-ma'at, son of Cheops, and his son Sneferuw-khaf. There was a period of probably 20–30 years separating the burials of father and son, although the similarities of the mastabas and the burial-chambers suggest that the interval between the finishing of the two chambers was not nearly so great. I would date the chambers to late in the reign of Chephren or early in the reign of Mycerinus. Both of these are chief shafts. The third in size, the tomb of Queen Meresankh III, is actually the only shaft in G 7530+40, prepared for Queen Hetep-heres II, as no burial-place was found in the mastaba. This chamber of type 4 is dated without much doubt to the first year of Shepseskaf, and its small size is undoubtedly due to the haste with which the tomb was prepared (about 274 days). In the early denuded northern end of this mastaba, a 2-m. shaft, G 7520 A (No. 7, above), was of type 3 with a capacity of 88·41 cu. m. It is possible that this large shaft was excavated before the mastaba G 7530+40 was reconstructed. The remaining chambers of smaller size were in secondary shafts. The smallest of these chambers, the second shaft in the mastaba of Duwa-ne-hor, is of type 6 and appears to have been unused. Two shafts were not provided with chambers, G 7650 B and G 7350 B, both of type 7 x.

#### d. Conclusions drawn from the Comparison of the Sizes of Mastaba Chambers

This examination of the sizes of the burial-chambers in the nucleus cemeteries at Giza reveals the following facts:

- (a) The earliest burial-chambers finished in the Western Field had approximately a mean size of 10.23 sq. m. and 26.79 cu. m.: this mean is given by the measurements of eighteen chambers in mastabas of normal size and one chamber in a mastaba larger than normal size (G 2130): the other lined chambers in cores of the same groups vary in general around this mean size, a few smaller and a few larger.
- (b) The first abnormally large chambers are two examples of those of type 1 in the same groups: one with a capacity of 89.78 cu. m. is in the large mastaba G 4000, and the other of 46.51 cu. m. is in the large mastaba G 1201; the examples of lined chambers of type 1, which exceed by marked figures the mean size of such chambers, appear to be later than the two very large chambers.
- (c) Three of the lined chambers of type 2 in the Western Field follow the mean size laid down for the lined chambers of type 1, and the five unlined chambers were designed to have lined chambers of this size; one of the lined chambers in row 4 of Cem. G 4000 is abnormally large, 46.88 cu. m., and this belonged to the Princess Merytyetes.
- (d) There are two other chambers of type 2 which appear to belong to about the same period as the nine in Cem. G 4000; one of these, the lined chamber of G 7510 with a capacity of 45.88 cu. m., is in the great mastaba G 7510, dated to the early part of the reign of Chephren; its size is about the same as the two largest chambers of this type in Cem. G 4000; the other chamber of type 2 (with lining marked off in red lines but never built) is the mastaba G 2000 in the Western Field, larger even than G 7510; this mastaba is the largest in the nucleus cemeteries at Giza and its rock-cut chamber is also the largest (204.67 cu. m.); its lined chamber, if it had been finished, would have been much larger than any other lined chamber (136.26 cu. m.).
- (e) The lined chambers of type 1 I ascribe to the reign of Cheops; the chambers of type 2, partly lined and partly left unlined (unfinished), certainly follow the lined chambers of type 1 (except for one or two late examples); the unfinished condition of many chambers and mastabas of this group I attribute to their being unfinished at the death of Cheops; some of them were probably finished or used in the reign of Chephren; it is in this group that we find the extraordinarily large chamber of the great mastaba G 2000.
- (f) The chambers of type 3 in the four north twin-mastabas were probably designed to be lined; those chambers which were excavated in the reign of Cheops or in that of Radedef ranged in size from about 120 to about 80 cu. m., of which the three largest approach in size the rock-cut chamber of Prince Hemyuwen (G 4000) in the Western Field. The chambers present two sizes, a larger of about 120 cu. m. and a smaller size of about 85 cu. m.; the two-room apartment, in which the second smaller room was a coffin-room, appears first in this group of the larger size.
- (g) The chambers in the 5th–7th twin-mastabas of the south row range irregularly from 113 cu. m. down to 13 cu. m., as was to be expected for shafts made by the owners at their own expense after the reign of Cheops.
- (h) The chambers dated certainly to the reign of Chephren present no normal size, and range from 136 cu. m. downwards.

- (i) The chambers made late in the reign of Chephren or later present the same irregularities in size, and one of them, G 7350 A (Queen Hetep-heres II), has the exceptional capacity of 167·31 cu. m.; obviously these chambers were made by the owners, and the largest chambers probably belong to those persons who had the greatest means.

In conclusion, when the nucleus cemeteries were begun by Cheops his department of public works adopted a normal size both for the mastaba-cores and for the lined burial-chambers. As might be expected in the execution of such a scheme, certain persons of the highest rank and greater favour obtained both mastaba and chamber larger than the normal size. Conversely, others were obliged to be content with smaller chambers and a few with smaller mastabas. When the new type 2 with ramp or stair was introduced, the same normal size of chamber with the same variations continued to occur. Type 3 was introduced fortuitously under circumstances which prevented the lining of the chambers, and was actually planned as a development of type 1 and perhaps type 2 also, but of larger than normal size. The shafts in the four north twin-mastabas were apparently designed as one-room apartments, probably with a maximum size of about 90 cu. m., but a number of them were enlarged, three with the addition of a second coffin-chamber in one of which the second chamber was left unfinished (Prince Hordedef, Meresankh II, Prince Rabauwf (?), unfinished). The western mastaba in the southern row of twin-mastabas also had a two-roomed chamber.

The chambers which are certainly dated to the reign of Chephren and last in the Eastern Field present great variations from chamber to chamber and range in size up to 167·31 cu. m. (7350), and were apparently mostly executed by the owner from private means. Three of the chambers had again two-room apartments of which one was unfinished. The sizes of the chambers correspond obviously to the position and wealth of the owner.

#### e. The Burial-chambers in the Pyramids of Queens at Giza

The burial-shafts of the three small pyramids of queens east of the First Pyramid present variations of a common type, a long sloping passage, a small anteroom (N-S turning room), a second sloping passage leading down from the anteroom to the burial-chamber, and a lined burial-chamber. They show minor variations in form and present the following sizes:

- (1) G I-a: chief queen; see Fig. 63.

Chamber: lined, 2·97 × 3·55 m. and 2·49 m. high; E-W room: area, 10·54 sq. m.; capacity, 26·24 cu. m.; rock chamber, 4·41 × 5·03 m. and 2·79 m. high; E-W room: area, 22·18 sq. m.; capacity, 61·88 cu. m.; entered from east from anteroom by sloping passage, opening in north end of east wall; sloping passage in rock, 1·4 × 3·15 m., with a height (at right angles to slope) of 0·95 m.; with north side lined with masonry, reducing the width to 1·0 m.; the length to the inside of the lined room, 3·9 m.

Anteroom (turning room): 4·25 × 1·75 m. and 3·1 m. high; area, 7·44 sq. m.; capacity, 23·06 cu. m.; entered in east end of north wall at roof-level from horizontal passage, and from the floor of this passage a ramp leads down to the floor of the anteroom (cf. type 2); in south end of east wall a turning recess for introducing the coffin into the lower sloping passage.

Horizontal passage leading from end of upper sloping passage to north wall of anteroom, 2·8 × 1·0 m., and height of 1·2 m.

Sloping passage from face of pyramid; horizontal length as preserved, 16·55 m.; width, 1·0 m.; height at right angles to slope, 1·2 m.

Total area of burial-chamber and anteroom, 17·89 sq. m.; total capacity of two rooms, 49·30 cu. m.

(2) G I-b: second queen; see Fig. 64.

Chamber: lined chamber,  $3.12 \times 3.88$  m. and 3.35 m. high; E-W chamber: area, 12.11 sq. m.; capacity, 40.57 cu. m.; rock chamber:  $5.38 \times 5.33$  m., and 3.93 m. high; nearly square chamber; area, 28.68 sq. m.; capacity, 112.71 cu. m.; entered from east from anteroom by sloping passage opening near the south end of east wall: sloping passage in rock,  $1.0 \times 2.85$  m.; and right-angled height of 1.15 m.; not lined; length to inside lined chamber, 3.65 m.: the sloping passage

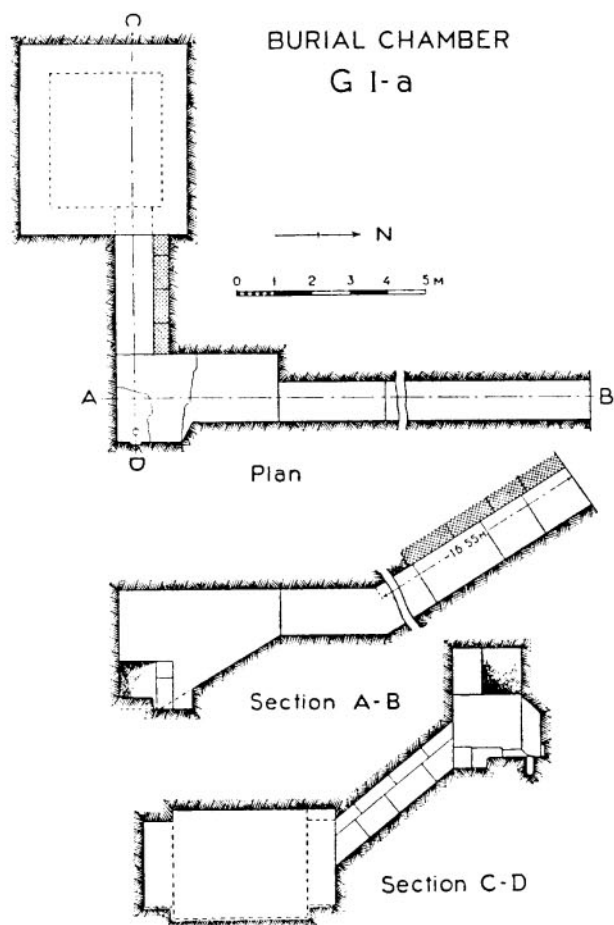


Fig. 63

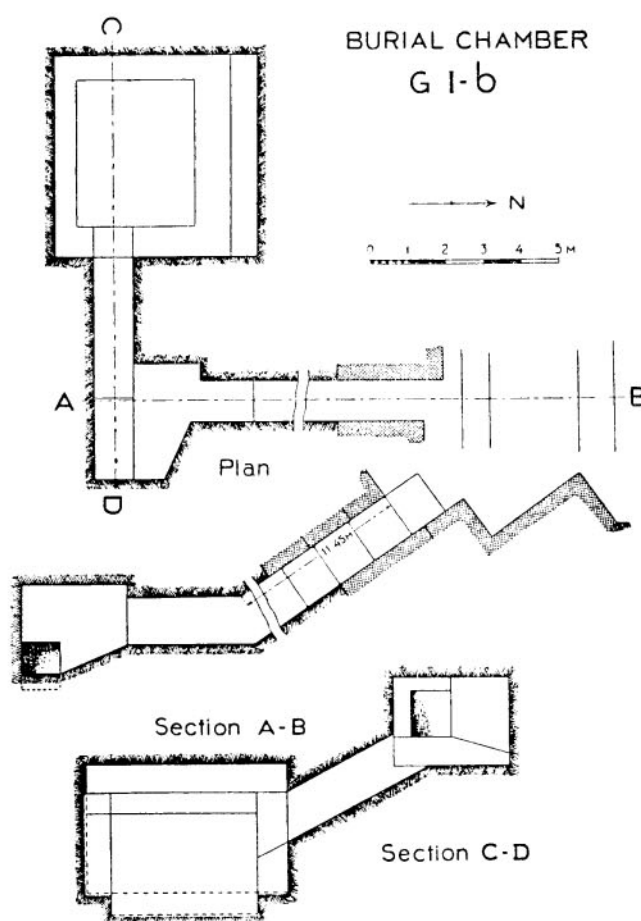


Fig. 64

opens in the floor of the anteroom at 0.92 m. east of the west wall of the anteroom, making a total horizontal length of 4.57 m.

Anteroom (turning room): NE corner not cut to a right angle,  $2.77 \times 3.05$  m. and 2.9 m. high; area, *c.* 8.45 sq. m.; capacity, *c.* 24.5 cu. m.; entered in east end of north wall by horizontal corridor opening at floor-level.

Horizontal passage: connecting the sloping passage with the anteroom;  $3.3 \times 1.05$  m. and 1.25 m. high.

Ramp: descending from floor of horizontal passage to floor of anteroom; takes the whole E-W width of the anteroom;  $1.75 \times 3.05$  m. and vertical height of 0.77 m.

Upper sloping passage: horizontal length from face of pyramid, 15.95 m.; width, 1.05 m.; right-angled height, 1.2 m.

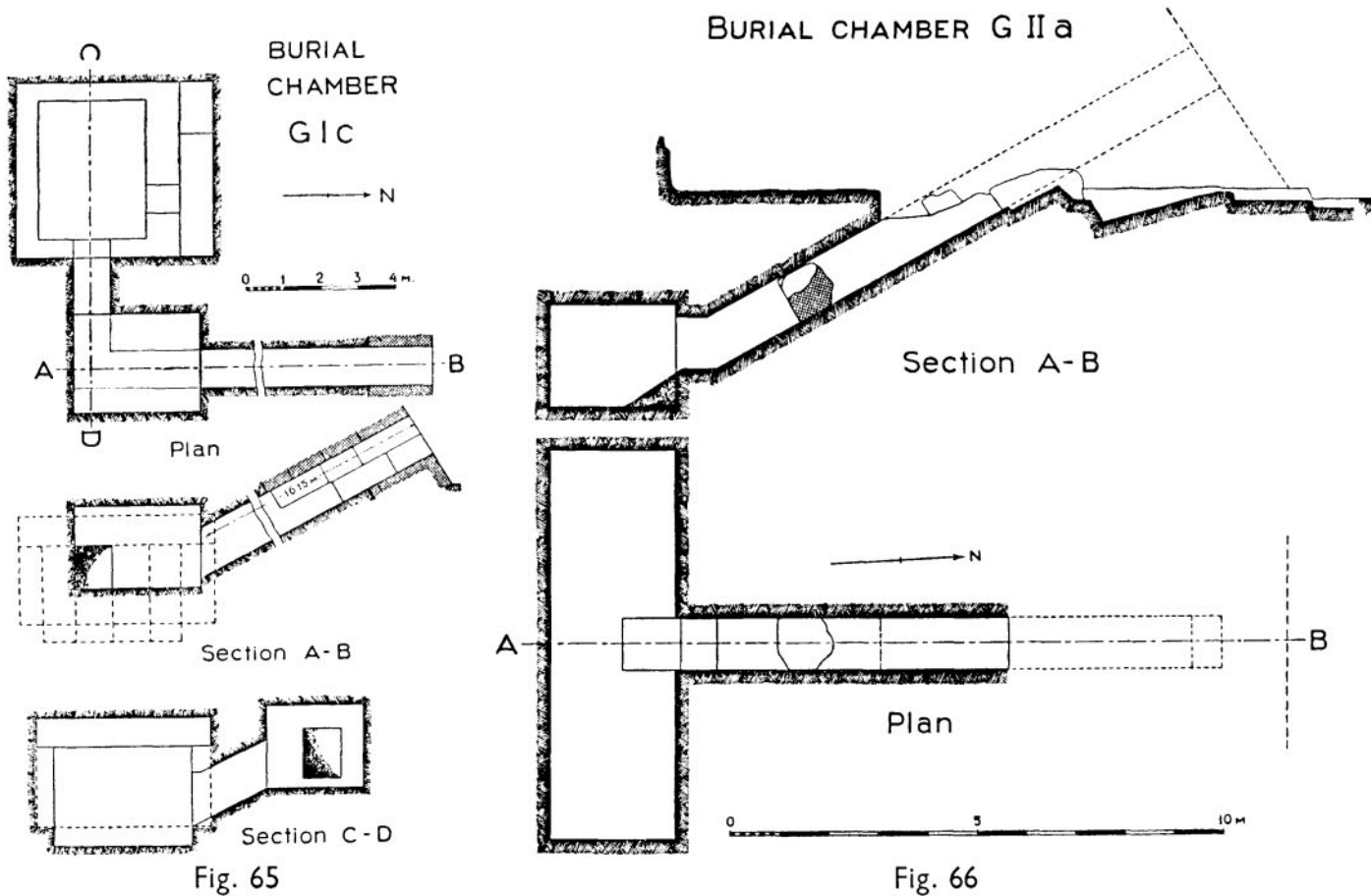
Total area of burial-chamber and anteroom, 20.56 sq. m.; total capacity of same, 65.07 cu. m.

(3) G I-c: pyramid of Queen Henutsen; see Fig. 65.

Chamber: lined chamber,  $2.89 \times 3.73$  m., and 2.9 m. high; E-W chamber: area, 10.78 sq. m.; capacity, 31.26 cu. m.; rock chamber:  $5.28 \times 4.67$  m., and 3.39 m. high; N-S chamber altered

to E-W in lining; area, 24.66 sq. m.; capacity, 83.61 cu. m.; entered from east by sloping passage opening in middle of east wall of lined chamber; rock-cut passage,  $0.95 \times 1.5$  m., with height at right angles of 1.15 m.; length to inside of lined chamber, 2.0 m. not lined.

Anteroom (turning room):  $3.35 \times 2.6$  m. and 2.2 m. high; area, 8.71 sq. m.; capacity, 19.16 cu. m.; entered by upper sloping passage 0.25 m. above floor of the anteroom, east of the middle of the north wall; this anteroom (after the introduction of the coffin) was converted into an L-shaped



corridor by casing built in the NW corner and along the east side: this L-shaped passage had a width 1.0 m. in the N-S arm and 0.95 in the E-W arm.

Upper sloping passage: horizontal length as preserved, 15.15 m.; width, 1.0 m.; right-angled height, 1.15 m.

Total area of burial-chamber and anteroom, 19.49 sq. m.; total capacity of same, 50.42 cu. m.

The chamber in the small pyramid G II-a is of very different form. The chamber is a long narrow E-W room with the sloping passage entering near the middle of the north side and is provided with a small ramp leading down from the floor of the passage to the floor of the chamber (as type 2). The measurements of the unlined chambers are as follows:

(4) G II-a: queen buried with sealings of Chephren; see Hölscher, *Das Grabdenkmal des Königs Chephren*, p. 64, Pl. XIII.

Chamber: rock-cut,  $2.5 \times 6.8$  m., and 2.05 m. high; E-W room: area, 17.00 sq. m.; capacity, 34.85 cu. m.; entered by short horizontal passage in middle of north wall; opening half-way between floor and roof; rock-cut ramp inside the chamber descending from floor of passage to floor of chamber (cf. shaft type 2).

Horizontal passage between sloping passage and ramp in chamber: length, 0.8 m.; width 1.0 m.; height, 1.0 m.

Sloping passage: destroyed above rock-surface; horizontal length to face of pyramid, 11.0 m.

The chambers of the three small pyramids south of G III vary in form and size. G III-a presents a general resemblance to G II-a, but lacks the ramp inside the chamber:

(5) G III-a: eastern pyramid: Queen Kha-merer-nebty II (?); see Fig. 67.

Chamber: unlined, 3.17 × 7.72 m., and 2.61 m. high; E-W room: area, 24.47 sq. m.; capacity, 63.86 cu. m.; entered by horizontal corridor, east of middle of north wall, opening at floor-level.

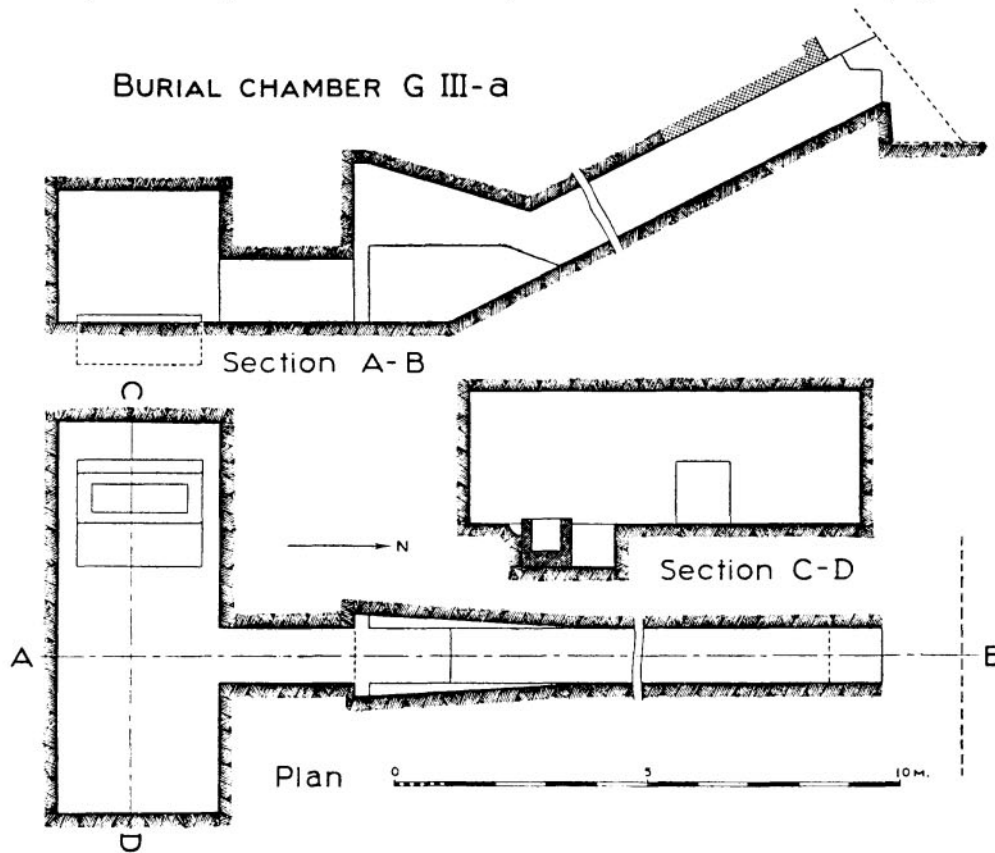


Fig. 67

Coffin-pit: near west end, 2.45 × 1.85 m., and 0.85 m. deep.

Granite coffin: in west side of coffin-pit; 2.45 × 0.99 m., and 0.95 m. high; cavity, 1.88 × 0.54 m., and 0.63 m. deep; flat lid fitted in the same manner as the granite coffin of Chephren; the coffin was probably packed with masonry built in the eastern side of the coffin-pit.

Horizontal passage; connecting portcullis corridor with the burial-chamber: 2.70 m. long, 1.06 m. wide, and 1.24 m. high; floor on a level with the floor of the portcullis corridor.

Portcullis corridor: entered at north end by sloping passage and the slope of the upper passage was continued by a ramp in the floor for 2.15 m., after which the floor ran horizontal to the horizontal corridor; in the upper part the width of the sloping passage and the horizontal passage was widened and heightened to contain the trap slabs (portcullis slabs) before they were dropped (see the drawing).

Sloping passage: horizontal length from portcullis corridor as far as preserved, 13.10 m.

The other chambers in G III-b and c present variations of the type with anteroom (turning room) found in G I-a, b, c, but have a larger anteroom and a N-S burial-chamber. G III-b had a lined burial-chamber, and G III-c was never finished.



## (6) G III-b: second queen; see Fig. 68.

Chamber: lined chamber,  $5.84 \times 2.66$  m., and 3.15 m. high; area, 15.53 sq. m.; capacity, 48.92 cu. m.; rock chamber:  $7.05 \times 3.9$  m. and 3.75 m. high; area, 27.49 sq. m.; capacity, 103.08 cu. m.; entered by sloping passage from east from anteroom opening at floor-level in north end of east wall of chamber; length 1.95 m., width 0.90 m.; height at right angles of 1.05 m.; with one granite portcullis slab; against the west wall of chamber, near the middle, stood a granite sarcophagus.

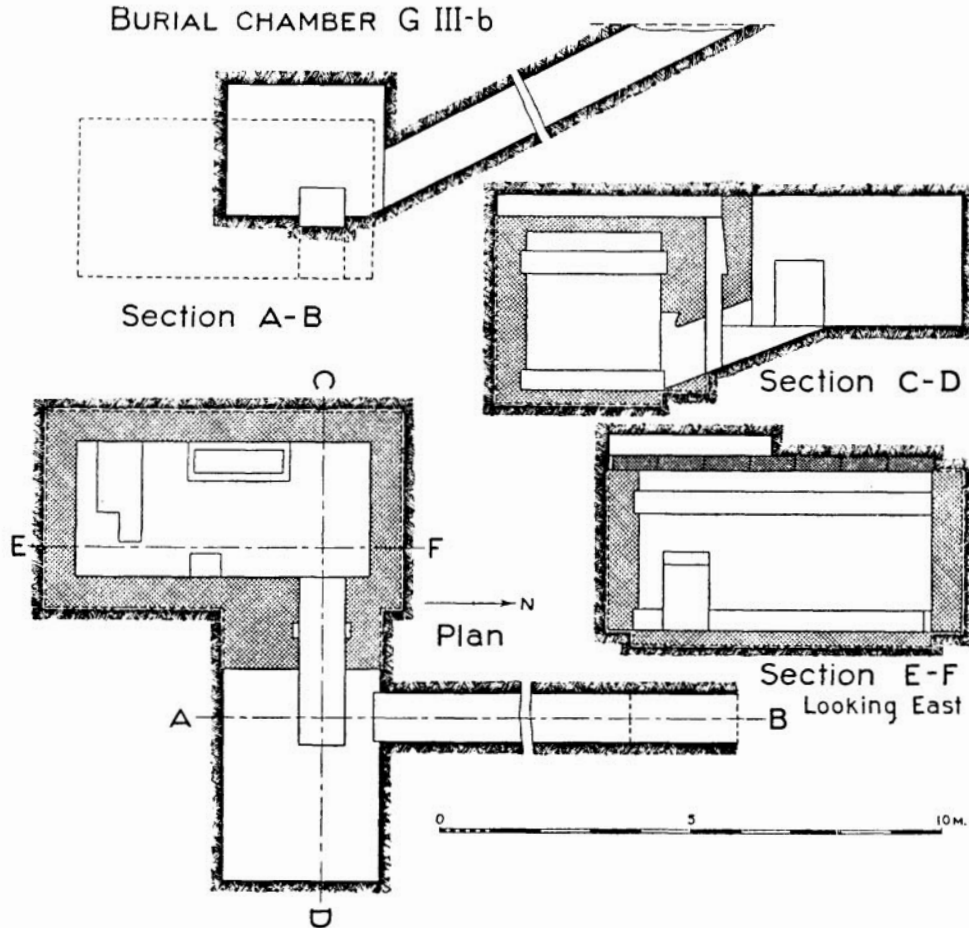


Fig. 68

Granite sarcophagus:  $2.03 \times 0.79$  m. and 0.79 m. high; cavity,  $1.78 \times 0.46$  m. and 0.6 m. deep; flat lid, 0.26 m. thick; fitted as granite coffin G III-a.

Anteroom (turning room):  $3.12 \times 4.19$  m., and 2.61 m. high; area, 13.07 sq. m.; capacity, 34.11 cu. m.; entered by sloping passage in north wall near its west end, just above floor-level of anteroom; sized with white plaster.

Sloping passage: horizontal length from north wall of anteroom to the opening in surface of the rock, 9.90 m.

Total area, of chamber and anteroom, 28.60 sq. m.; total capacity of same, 83.03 cu. m.

## (7) G III-c: pyramid of queen; see Fig. 69.

Chamber: rock-cut and unfinished; northern half not excavated to the designed floor-level,  $7.92 \times 3.45$  m.; height as designed, 2.89 m.; N-S room: area, 27.32 sq. m.; capacity as designed, 78.95 cu. m.; unfinished; entered from east from anteroom by horizontal passage, length 2.10 m., width 1.0 m., and 1.20 m. high, level with floor of anteroom: enters burial chamber near south

end of east wall, slightly above floor-level: this indicated that the chamber was designed to be lined and paved.

Anteroom (turning room):  $4.16 \times 2.61$  m., and 2.28 m. high; area, 10.86 sq. m.; capacity, 24.76 cu. m.; entered by sloping passage near east end of north wall, opening about in middle of height of wall. Sloping passage: opens in rock north of north face of pyramid, which was unfinished; horizontal length from anteroom to rock opening, 15.54 m.

Total area of burial-chamber and anteroom, 38.18 sq. m.; capacity of same rooms, 103.6 cu. m.

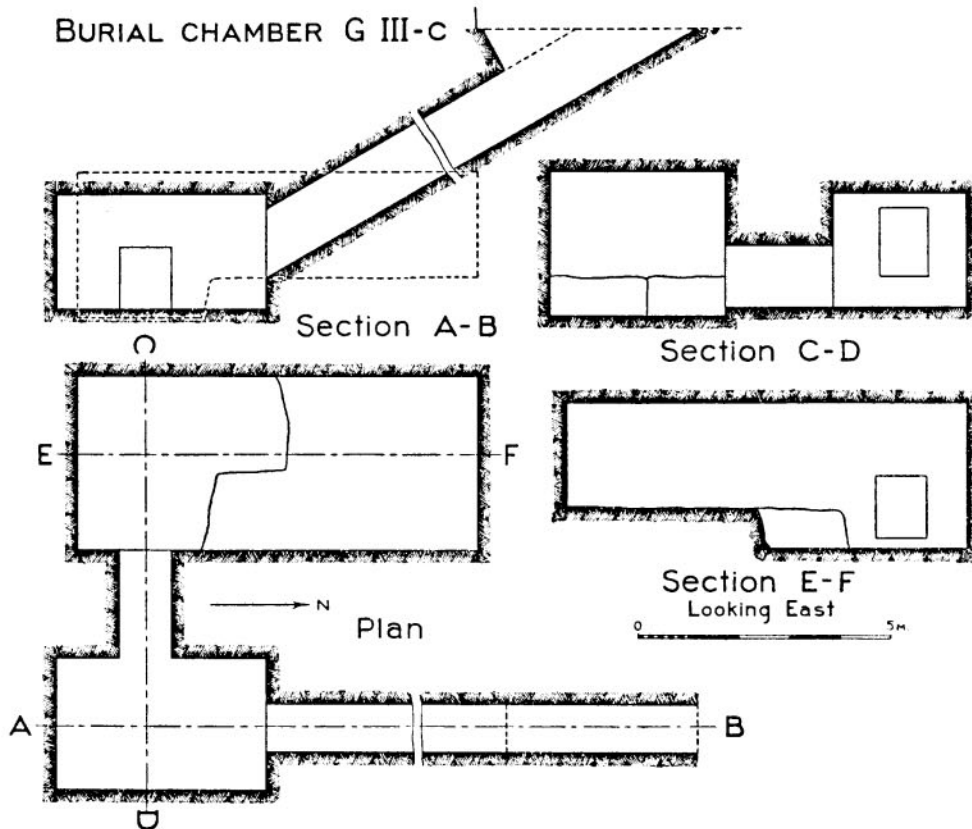


Fig. 69

All these seven chambers were undoubtedly made by the public works department of the king, three probably by Cheops, one certainly by Chephren, and three by Mycerinus, the last two finished perhaps by Shepseskaf. The method of constructing these pyramid chambers is shown clearly by the unfinished pyramid east of G I-a and by the visible structure around the opening of the shafts in all three. The facts show that the workmen began by cutting the sloping passage in the rock and constructing at the same time the sloping passage which finally ran out to the northern face of the pyramid. This formed a nucleus structure over and around which the core-work of the pyramid was afterwards constructed. I take it that the underground chambers and passage were excavated continuously from the beginning and were probably finished as soon as or before the completing of the pyramid itself. The only finished lined chamber at the Third Pyramid is that in G III-b, and the pyramid was never cased and had an unfinished stone temple completed in fact as a c.b. temple. The chamber in G III-c was never completely excavated and the pyramid was also uncased and had a c.b. chapel. Thus it may be concluded that most pyramid chambers were made by the king who built the pyramid and were finished about the same time as the pyramid, but that cases occur in which both pyramid and chamber were only partially finished on the death of the king. In these cases the finishing of the chamber and the pyramid was left to the decision of the succeeding king.

The three small pyramids G I-a, b, and c were clearly constructed in order from north to south by Cheops. It is to be noted that the burial-chamber of the first, G I-a, is a lined chamber of 10.54 sq. m. and 26.24 cu. m., a size which corresponds to the mean size of the mastaba-chambers of type 1. The second chamber, in G I-b, presents an area only about one-fifth larger than the normal size, but, by reason of the height of the room, a capacity 54.61 % larger than the mean normal size (12.11 sq. m. and 40.57 cu. m.). The chamber in G I-c has a floor area of normal size (10.78 sq. m.) and the capacity 31.26 cu. m., which is within the range of the variations of chambers of type 1 in the Western Field. The sizes connect these three chambers with the nineteen chambers of type 1 which gave the mean size of such chambers and with the ordinary larger variations from the normal size. The first chamber is of the normal height of mastaba-chambers of mean size, but the second and third are of greater height, and in this particular are to be associated with the early chambers of type 3. The rock-cut capacity of the first chamber, 61.88 cu. m., connects it with the chambers of type 1, as does also the size of the lined chamber. The second and third chambers in their rock-cut sizes are connected with the chambers of type 3 in the four north twin-mastabas, being 112.71 cu. m. and 83.61 cu. m. It seems reasonable to conclude that the three pyramid chambers form a connexion between the early chambers of type 1 in the Western Field and the chambers of type 3 in the four north twin-mastabas of the Eastern Field. All three pyramid substructures are of the same form (turning room and burial-chamber), presenting only minor variations, and were no doubt carried out by the same workmen in a practically continuous operation. It is to be noted that the anterooms were actually turning rooms for lowering the sarcophagus from the end of the sloping passage to a lower horizontal level, and for turning it at right angles to enter the lower sloping passage. While the burial-chamber of G I-a has the normal size of the mastaba-chambers of type 1, the turning room has a sloping ramp (same angle as sloping passage) which fills the northern part of the room and facilitated the descent of the sarcophagus. In other words, this burial-apartment presents the essential feature of the mastaba-chambers of type 2. In the burial-apartment of G I-b, the device is altered in that the ramp descending from the floor of the upper passage to the floor of the anteroom occupies the whole width of the anteroom. In G I-c the sloping passage enters the turning chamber near the floor and after the descent of the sarcophagus the turning room was converted into a plain horizontal passage connecting the upper and lower passage by means of well-dressed masonry. The relation between mastaba-chambers of type 2 and the burial-apartment of G I-a is, I believe, significant. The burial-apartment of the pyramid G I-a I would place about the years 15-17 of Cheops. It is plausible to assume that mastaba-chambers of type 2 were introduced after the making of this pyramid. If that conclusion be correct, then type 2 may well have been made in the later part of the reign of Cheops. I would as a matter of fact interpret the unfinished condition of the chamber linings and the mastaba casings in the mastabas of the 4th row and 7th line in Cem. 4000 to be due to the interruption caused by the death of Cheops. It may be taken as certain that all three of these pyramid substructures had contained a stone sarcophagus, either of white limestone or of granite, probably of limestone. All three had been re-used as communal burial-chambers in the Ptolemaic-Roman period, and it was no doubt during this re-use that the stone sarcophagi were broken up.

The chamber of the small pyramid G II-a presents a very different form to that of the three pyramids of Cheops. There is no anteroom and the sloping passage, ending with a short horizontal section, enters the long E-W chamber near the middle of the north wall. This form follows the form of the substructure of the pyramid of Radedef. G II-a has a very short and steep sloping ramp connecting the floor of the passage with the floor of the chamber. This feature resembles the old mastaba-type 2, but in a degenerate or rudimentary form which would place this chamber later than the well-developed type 2

of Cem. 4000. It is possible that there may have been an intention to line the chamber, but the width of the rock chamber, 2.5 m., would not have permitted the chamber as excavated ever to have been lined. The size of the rather low rock-cut chamber (2.05 m. high) shows a floor area of 17.0 sq. m. and a capacity of 34.85 cu. m., and this size is rather small in comparison with the chambers of type 3 in Cem. G 7000.

The first chamber, G III-a, south of the Third Pyramid, presents an elaboration of the form of G II-a. At the end of the sloping passage is a high portcullis room which in turn is connected with the burial-chamber by a horizontal passage entering at floor-level. The burial-chamber is a long E-W room 2.61 m. high with a floor area of 24.47 sq. m. and a capacity of 63.86 cu. m. In a coffin-pit in the floor at the west end is a granite sarcophagus. The room is noticeably larger than that of G II-a and was, I believe, intended for the chief queen of Mycerinus, whom I identify as Queen Kha-merer-nebti II (daughter of Chephren).

All the chambers down to this point have been E-W chambers, but the second and third chambers at the Third Pyramid are N-S chambers. Both revert to the form used in the three chambers at the First Pyramid, but with slight modifications. The second chamber, G III-b, has a larger E-W ante-room and is lined. The lined chamber is 15.53 sq. m. and 48.92 cu. m., while the rock-cut chamber is 27.49 sq. m. and 103.08 cu. m. This chamber must have been finished after that of G III-a. I surmise that it is the tomb of that queen of Mycerinus who was the mother of Shepseskaf, and that the chamber was actually finished by him. It is certain that he constructed the c.b. chapel of this pyramid. This fact would explain the large size and the lining of the burial-chamber.

The third and last chamber at the Third Pyramid is of a form similar to that of G I-b with its N-S chamber and its large anteroom. The anteroom is, however, a N-S room, and the passage between anteroom and burial-room is horizontal. Probably the burial-room was intended to be lined, but never having been completely excavated had been used in this state. Its c.b. chapel I ascribe to Shepseskaf. I believe, therefore, that this chamber was being excavated by Shepseskaf when the work ceased. The rock-cut burial-chamber if it had been finished would have had an area of 27.32 sq. m. and a capacity of 78.95 cu. m., nearly as large as G III-b. The last four pyramid chambers, G II-a, G III-a, b, and c, in their rock-cut sizes range from 34.85 cu. m. to 103.08 cu. m. While this range corresponds to that of the medium-sized mastaba-chambers in Cem. 7000 it is considerably less than the largest chambers of that cemetery. Six of these mastaba-chambers range from 167.31 cu. m. to 120.21 cu. m., of which four are in twin-mastabas, and the largest of all in the mastaba of Queen Hetep-heres II (?) (G 7350).

#### f. The Sizes of the Burial-chambers of Kings of Dyn. IV

Finally, the sizes of all burial-chambers are to be compared with the chambers of the pyramids of the kings of Dyn. IV:

- (1) Dahshur North Stone Pyramid: Sneferuw: type RT V: three rooms, anteroom, hall, built on emplacement in rock: burial-chamber built in core of pyramid: all rooms roofed with stone corbels:

	Area m.	Area sq. m.	Height to roof m.	Capacity to roof cu. m.	Height incl. roof m.	Capacity incl. roof cu. m.
Anteroom .	8.24 × 3.63	29.91	3.56	106.48	12.3	237.19
Hall . . .	8.32 × 3.63	30.2	3.56	107.51	12.3	239.49
Burial-room .	4.15 × 8.32	34.53	3.67	126.72	14.66	316.29
Total .		94.62		340.71		792.96
Total, hall and burial-room		64.71		234.23		555.77

(2) G I: lower rock-cut apartment unfinished.

(3) G I: second chamber; limestone with pent roof:

Area	Area	Height	Capacity	Height	Capacity
m.	sq. m.	to roof	to roof	incl. roof	incl. roof
		m.	cu. m.	m.	cu. m.
5·18 × 5·71	29·58	4·49	132·81	6·16	157·51

(4) G I: upper chamber; granite with flat roof:

5·21 × 10·44	54·39	5·82	316·55	..	..
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excluding portcullis room and grand gallery.

(5) Abu Roash: Radedef: open pit and trench cut in rock; type RT V; passage enters room near middle:

R. pit . . .	9·75 × 23·0	224·25	10 (?)	2,242·5 (?)	..	..
Room . . .	4·57 × 12·19	55·71	..	..	..	..

(6) G II: lower chamber: Chephren; rock-cut, with pent roof:

3·1 × 10·39	32·21	1·83	58·94	2·56	70·60
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(7) G II: Chephren: main chamber; rock-cut, with built pent roof:

4·93 × 14·07	69·36	5·87	409·14	6·83	442·43
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(8) G III: Mycerinus: first chamber: absorbed in second chamber and its passage filled solid with masonry set in plaster.

(9) G III: Mycerinus: final apartment: cut in rock: with N-S sarcophagus-room lined and roofed with granite: large hall with coffin-recess (alcove) and built sarcophagus-chamber, made later on west and lower down:

Hall . . .	3·83 × 10·51	40·25	4·82	194·0	..	..
Alcove . . .	3·83 × 3·27	12·52	3·5	43·82	..	..
Sarc.-room . . .	6·4 × 2·61	16·7	2·66	44·42	3·42	50·77
		69·47	..	282·24	..	288·59
Anteroom . . .	3·66 × 3·17	11·60	2·13	24·61	..	..
Magazines . . .		22·51	..	37·01	..	..
Sum total of all rooms		103·58	..	343·86	..	350·21

(10) Mastabat-el-Faraon: Shepseskaf (Jéquier, *Le Mastabat Faraoun*, p. 3, Pl. III); two connected E-W rooms, a hall entered by sloping passage, and burial-chamber west of hall both with built pent roof; type RT V; opening to SE a corridor with five lateral magazines (cf. G III):

Anteroom . . .	2·57 × 1·87	4·8	2·03	9·74	..	9·74
Hall . . .	3·1 × 7·12	22·07	3·43	75·70	4·83	91·15
Burial-room . . .	2·26 × 7·8	17·63	3·43	60·47	4·83	72·81
Total: 3 rooms		44·5	..	145·91	..	173·7

In comparing these chambers, I take the main rooms only, excluding the anteroom, the portcullis room, and the rock-cut magazines. Further, it is to be noted that many chambers are roofed with stone corbels or with leaning slabs (pent roof), and I take in these cases the capacity from floor to the lower edge of roof.

SUMMARY TABLE: showing sizes of king's burial-apartments:

King's name	Area	Capacity		Incl. anteroom		Total capacity
		to roof cu. m.	incl. roof cu. m.	area m.	capacity cu. m.	incl. roof cu. m.
Sneferuw . . .	64·71	234·23	555·77	94·62	340·71	792·96
Cheops (2): 1 room .	29·58	132·81	157·51	..	..	157·51
Cheops (3): 1 room .	54·39	316·55	316·55	..	..	316·55
Radedef: 1 room .	55·71	?	?	?	?	?
Chephren (1): 1 room.	32·21	58·94	70·6	..	..	70·6
Chephren (2): 1 room.	69·36	409·14	442·43	..	..	442·43
Mycerinus (2): 3 rooms	69·47	282·24	288·59	103·58	350·20	350·2
Shepseskaf: 2 rooms .	39·7	136·17	163·96	44·5	145·91	173·7

The plans of all three of the Giza pyramids had been altered during construction so that the First Pyramid presents three sizes while the Second and Third Pyramids present two sizes each. In each case the burial-apartment was increased in size with each increase in the size of the pyramid. At the First Pyramid, the first apartment, rock-cut, was left unfinished, but the third increased in size over the second, from 29·58 sq. m. to 54·39 sq. m. and from 132·81 cu. m. to 316·55 cu. m. At the Second Pyramid the increase was from 32·21 sq. m. to 69·36 sq. m. and from 58·94 cu. m. to 409·14 cu. m. At the Third Pyramid the first chamber cannot be measured exactly, but the second was obviously considerably larger. These increases are in general accord with the fact that the largest mastabas contain as a rule the largest burial-chambers. The burial-apartments, if we exclude anterooms, &c., consist of two rooms (hall and sarcophagus-chamber) in the pyramid of Sneferuw, one burial-chamber in the final form of G I and G II, three rooms in G III, and two rooms in the Mastabat el-Faraon. Taking the floor areas of these apartments, there is little variation from Sneferuw to Mycerinus, and only a small decrease in the tomb of Shepseskaf, ranging from 54·39 sq. m. for Cheops to 69·47 sq. m. for Mycerinus. Shepseskaf has 39·7 sq. m. The differences in the heights of the chambers produce greater variation in capacities, increasing from 234·23 cu. m. for Sneferuw to 409·14 cu. m. for Chephren; from that point the capacity decreases to 282·24 cu. m. for Mycerinus and 136·17 cu. m. for Shepseskaf.

The actual burial-chamber is an E-W room in all these royal burial-apartments except in G III. There the lined and roofed burial-chamber was clearly an addition to the original plan, which provided a burial-alcove (coffin-recess) in the western end of the great E-W hall. It is to be remembered that the burial-chambers in the queens' pyramids at Giza were E-W rooms except for the last two, G III-b and c. These two had N-S burial-rooms like the final form of G III itself.

The form of burial-apartments of the queens' pyramids at the First Pyramid is not found in the apartments of the kings. Its peculiarity is that there are two rooms, an anteroom and a burial-chamber. The anteroom serves to change the direction of the sloping passage so that the lower passage runs down from east to west and enters the E-W burial-chamber from the east. Nevertheless, the use of a N-S anteroom in older pyramids is well established and the anteroom in these small pyramids facilitated the turning of the sarcophagus in its descent from the N-S sloping passage into the E-W chamber. This form was changed after the reversion to the open-pit and trench type in the burial-apartment of Radedef at Abu Roash. The following burial-apartments of queens at Giza, G II-a and G III-a, cut in the rock, have a long E-W room with the sloping passage entering near the middle (or just east of

the middle). In the last two queens' pyramids, G III-b and c, the anteroom was again used with a N-S burial-chamber, following the example set by G III itself.

The use of a separate chamber for the burial (sarcophagus) is found in the North Stone Pyramid at Dahshur and was obviously designed for the first apartment, cut in the rock, of the Cheops pyramid. The apparent two-room form of substructures of the small pyramids at the First Pyramid is not actually a two-room apartment, as the anteroom was designed for turning the sarcophagus in its descent. The main chamber is the burial-chamber. The apartments made for Radedef and Chephren were also one-room apartments except for the use of portcullis rooms. The first distinctly two-room apartment was the final form of burial-apartment of the Third Pyramid. Nevertheless, it is clear that the separate burial-chamber had already been introduced in the large royal mastabas of the Eastern Field in seven separate shafts. Two of these two-room apartments had not been completed. The persons for whom such apartments were made or designed were Prince Hordedef (G 7220 A), Queen Meresankh II (G 7410 B), Prince Khufuw-khaf (G 7130 B), Prince Min-khaf (G 7430 A), the wife of Prince Min-khaf (G 7430 B), 'Prince' Min-dedef (G 7760), and 'Prince' Ka-m-sekhem (G 7660). I ascribe five of these chambers to a period previous to the reign of Mycerinus and the other two, designed for grandsons of Cheops, to the latter part of the reign of Chephren or to the early part of the reign of Mycerinus. The burial-shafts of Queen Hetep-heres II (?) (G 7350 A) and Queen Meresankh III (G 7530 A), which were made in the reign of Shepseskaf, had one-room apartments. It appears that the use of a separate burial-room is an old feature which reappears by the arbitrary choice of owners and was adopted for part of the family of Cheops, including his grandson, Mycerinus. Later the separate burial-chamber appears in a number of the sloping-passage tombs of type 9, either behind or under the main chamber.

### 3. SUMMARY OF SHAFT TYPES IN THE FIRST FOUR NUCLEUS CEMETERIES

In order to compare the distribution of the shaft types among the four nucleus cemeteries, G 4000, G 2100, G 1200, and G 7000, the following table has been prepared:

In Cemetery	Number of shafts of type								Total
	1	2	3	4	5	6	7 x		
G 4000 (22 early)	12	9	1	..	..	..	..	..	22 shafts (first 22)
G 4000 (9 foll.)	..	..	2	4	1	1	1	1	9 shafts (later)
G 4000 (row 1-2)	..	..	..	5	2	4	0	0	11 shafts in 11 mastabas
Total G 4000	12	9	3	9	3	5	1	1	42 shafts in 42 mastabas
G 2100 (5 first)	4	..	..	1	..	..	..	..	5 shafts in 5 mastabas
G 2100 (6 later)	1	..	1	3	0	1	..	..	6 chief shafts
Total G 2100	5	..	1	4	0	1	..	..	11 shafts
G 1200 (all)	10	..	..	..	..	..	..	..	10 shafts in 10 mastabas
G 1200 (annex)	..	..	2	..	1	1	..	..	4 chief shafts
Total G 1200	10	..	2	..	1	1	..	..	14 shafts
G 2000	..	1	..	..	..	..	..	..	1 shaft
G 7000 (5 fin.)	..	..	7	2	..	1	..	..	10 in 5 2-shaft mastabas
G 7000 b	..	..	4	..	..	..	..	..	4 in 2 2-shaft mastabas
G 7000 (7 Chephren)	..	1	7	3	..	..	3	..	14 shafts in 7 mastabas
G 7000 (mastaba VI)	..	..	10	3	..	1	..	..	14 shafts in 8 mastabas
Total G 7000	..	1	28	8	..	2	3	3	42 shafts

## SUM TOTALS:

	Number of shafts of type							7 x	
	1	2	3	4	5	6	7		
Cem. G 4000 . . .	12	9	3	6	6	5	1	42 shafts in 42 mastabas	
Cem. G 2100 . . .	5	..	1	4	..	1	..	11 shafts in 11 mastabas	
Cem. G 1200 . . .	10	..	2	..	1	1	..	14 shafts in 14 mastabas	
G 2000 . . .	..	1	..	..	..	..	..	1 shaft	
Total Western Field .	27	10	6	10	7	7	1	68 shafts: 64 in 64 nucleus mastabas, and 4 annexes	
Eastern Field . . .	..	1	28	8	..	2	3	42 shafts: 22 mastabas, 8 twin, 14 2-shafts	
Sum total . . .	27	11	34	18	7	9	4	110 shafts: 86 mastabas + 4 annexes	

## SUMMARY TABLE: sizes of chambers of different types:

Chamber	Number of shafts in order of capacity in cu. m.					Total
	100+	50-99	20-49	10-19	0-9	
Type 1:						
1: G 4000 . . .	..	1	10	1	..	12 chambers
1: G 2100 . . .	..	..	5	..	..	5 chambers
1: G 1200 . . .	..	..	8	2	..	10 chambers
Total type 1 . . .	..	1	23	3	..	27 chambers
Type 2:						
2: G 4000 . . .	..	2	7	..	..	9 chambers
2: G 2000 . . .	1	..	..	..	..	1 chamber
2: G 7510 . . .	..	..	1	..	..	1 chamber
Total type 2 . . .	1	2	8	..	..	11 chambers
Type 3:						
3: G 4000 . . .	..	..	2	1	..	3 chambers
3: G 2100 . . .	..	..	..	..	1	1 chamber
3: G 1200 annex .	..	..	..	..	2	2 chambers
Total Western Field	..	..	2	1	3	6 chambers
3: G 7000 . . .	8	14	3	4	..	29 chambers
Total type 3 . . .	8	14	5	5	3	35 chambers
Type 4:						
4: G 4000 later . . .	..	..	2	3	1	6 chambers
4: G 2100 later . . .	..	..	3	1	..	4 chambers
Total Western Field	..	..	5	4	1	10 chambers
4: G 7000 . . .	1	1	5	3	1	11 chambers
Total type 4 . . .	1	1	10	7	2	21 chambers
Type 5:						
5: G 4000 later . . .	..	..	..	1	5	6 chambers
5: G 2100 . . .	..	..	..	..	..	..
5: G 2100 annex .	..	..	..	..	1	1 chamber
Total Western Field	..	..	..	1	6	7 chambers

Cem. G 7000: none of type 5 in the early mastabas in Dyn. IV.



## SUM TOTALS:

	Number of shafts of type							7 x	
	1	2	3	4	5	6	7		
Cem. G 4000 . . .	12	9	3	6	6	5	1	42 shafts in 42 mastabas	
Cem. G 2100 . . .	5	..	1	4	..	1	..	11 shafts in 11 mastabas	
Cem. G 1200 . . .	10	..	2	..	1	1	..	14 shafts in 14 mastabas	
G 2000 . . .	..	1	..	..	..	..	..	1 shaft	
Total Western Field .	27	10	6	10	7	7	1	68 shafts: 64 in 64 nucleus mastabas, and 4 annexes	
Eastern Field . . .	..	1	28	8	..	2	3	42 shafts: 22 mastabas, 8 twin, 14 2-shafts	
Sum total . . .	27	11	34	18	7	9	4	110 shafts: 86 mastabas + 4 annexes	

## SUMMARY TABLE: sizes of chambers of different types:

Chamber	Number of shafts in order of capacity in cu. m.					Total
	100+	50-99	20-49	10-19	0-9	
Type 1:						
1: G 4000 . . .	..	1	10	1	..	12 chambers
1: G 2100 . . .	..	..	5	..	..	5 chambers
1: G 1200 . . .	..	..	8	2	..	10 chambers
Total type 1 . . .	..	1	23	3	..	27 chambers
Type 2:						
2: G 4000 . . .	..	2	7	..	..	9 chambers
2: G 2000 . . .	1	..	..	..	..	1 chamber
2: G 7510 . . .	..	..	1	..	..	1 chamber
Total type 2 . . .	1	2	8	..	..	11 chambers
Type 3:						
3: G 4000 . . .	..	..	2	1	..	3 chambers
3: G 2100 . . .	..	..	..	..	1	1 chamber
3: G 1200 annex .	..	..	..	..	2	2 chambers
Total Western Field	..	..	2	1	3	6 chambers
3: G 7000 . . .	8	14	3	4	..	29 chambers
Total type 3 . . .	8	14	5	5	3	35 chambers
Type 4:						
4: G 4000 later . . .	..	..	2	3	1	6 chambers
4: G 2100 later . . .	..	..	3	1	..	4 chambers
Total Western Field	..	..	5	4	1	10 chambers
4: G 7000 . . .	1	1	5	3	1	11 chambers
Total type 4 . . .	1	1	10	7	2	21 chambers
Type 5:						
5: G 4000 later . . .	..	..	..	1	5	6 chambers
5: G 2100 . . .	..	..	..	..	..	..
5: G 2100 annex .	..	..	..	..	1	1 chamber
Total Western Field	..	..	..	1	6	7 chambers

Cem. G 7000: none of type 5 in the early mastabas in Dyn. IV.

