after, one from the reign of Mycerinus, and the third from the early part of the reign of Shepseskaf. This type was obviously suggested by the wooden or stone canopic chests set on the floor.

The occurrence of canopic receptacles in the burial-chambers of different types may be summarized as follows:

SUMMARY TABLE: distribution of canopic receptacles in different shaft types:

		Types of canopic receptacles					
		Floor	Recess		Built	Total	Without
Shaft type	Shafts	pit	SE	SW	chest	receptacles	receptacles
Type 1: lined chambers	27	21	..	..	..	21	6
Type 2: lined and unlined	11	4	..	..	..	4	7
Type 3: unlined chambers	42	15	3	1	1	20	22
Type 4: degenerate chambers	34	5	4	3	2	14	20
Type 5: with narrow door-jambs	10	..	..	..	..	..	10
Type 6: without jambs	23	..	..	..	..	..	23
Total	147	45	7	4	3	59	88

This second table presents the same facts as the first, but in a different arrangement.

Of the 38 chambers of types 1 and 2, which were lined or intended to be lined, 25 have canopic pits in the SE corner and 13 have no canopic receptacle. Of these 13 chambers without receptacles, 2 were in the initial 5 mastabas of Cem. G 2100, 3 were in the last 5 mastabas of Cem. G 1200, 1 was in the first 8 mastabas added to Cem. G 4000, 5 of type 2 were in the second addition of 9 to Cem. G 4000, and the other 2 were in the two great mastabas, G 2000 and G 7510, both with chambers of type 2. Six of the chambers of type 2 were unfinished, in that, although the lining had been designed, it was never built.

Shaft type 3 (unlined) begins in the Eastern Field with 7 large chambers. In these were introduced two new types of canopic receptacle, the recess in the east end of the south wall and the built canopic chest. Two chambers had the canopic pit in the SE corner, 3 had a canopic recess in the east end of the south wall, 1 had a built canopic chest, and 1, unfinished and unused, had no canopic receptacle. Thereafter type 3 became the favourite type for large chambers made for the members of the royal family and was frequent down to Neferirkara of Dyn. V. In the four nucleus cemeteries, in the additions to them in the Cem. en Échelon and in G I S, we have recorded in the table above 42 shafts of type 3, of which 15 had canopic pits, 3 SE recesses, 1 SW recess, and 1 built chest, with a total of 20 canopic receptacles. The remaining chambers of type 3 (22 in number) had no receptacles. The proportion of canopic receptacles in chambers of type 3 had decreased considerably over the proportion in chambers of types 1 and 2.

Shaft type 4 is an obviously cheaper form of type 3. In one of the early chambers of this type, G 7130 B, the chamber with two rooms and a granite sarcophagus was obviously designed as type 3, but the roof was not cut to its designed height and the large chamber appears now as type 4. One other chamber of type 4 occurred in G 7310 B of the four northern twin-mastabas. Later in the reign of Chephren type 4 increased in use. In the mastabas mentioned under the preceding paragraph referring to type 3 we have 34 chambers of type 4. Of these, 5 had canopic pits, 4 had SE recesses, 3 had SW recesses, and 2 had built canopic chests, total of 14 canopic receptacles. Thus 20 had no receptacles. These chambers range well into Dyn. V, and show a further decrease in the use of canopic receptacles. In these same mastabas we have recorded 10 of type 5 and 23 of type 6. Both these types

present further degenerations of type 4 in form and size, and no chamber of these types in the mastabas under discussion had any canopic receptacle.

The total number of rock-cut chambers included above is 147 (100%), ranging in time from Cheops to Neferirkara. Of these, 59 (or 40·14%) had canopic receptacles. Of these 59 receptacles 45 (30·61%) had canopic pits in the SE corner, 11 (7·48%) had canopic recesses partly in the SE and partly in the SW corner, and 3 (2·04%) had a built canopic chest. The favoured form of receptacle is the rock-cut pit in the SE corner, used exclusively in the early chambers of types 1 and 2 and decreasing with the decreased use of canopic receptacles in the latter part of Dyn. IV and in the early Dyn. V. It is to be noted that many large chambers of important persons (including members of the royal family) have no receptacles. I suggest that some or most of these had wooden canopic chests placed on the floor of the chamber in the SE corner. It is also to be noted that some of the recesses were large enough to receive a wooden or stone canopic chest. The 147 chambers used here, it is to be remembered, do not include about 35 shafts partly in the Cem. en Échelon and partly in Cem. G I S, but it is improbable that the additions of these chambers would affect vitally the facts here outlined.

b. Coffin-pits

In a small proportion of the chambers of all types and periods a pit was sunk in the rock along one of the walls (usually the west wall) with its axis N–S. These pits present two clearly distinguished types, the open pit and the roofed pit. In Dyns. V and VI the roofed pit is seen fully developed as a 'burial pit', a substitute for a coffin. The open pit appears in the latter part of the reign of Cheops and continues in use during the remainder of the period covered by the Giza Necropolis. It is usually wider than the 'burial pit', and as examples have been found which actually contained coffins, the open pit has been designated a 'coffin-pit'. The earliest coffin-pit appears to be that in G 7120 A, the burial-place of Prince Ka-wab. In this the great red granite sarcophagus was found firmly fixed and protruding only about 0·15 m. above the floor of the chamber. The object of the coffin-pit was to prevent the coffin being overturned on the floor of the chamber, an operation which would have removed the lid almost automatically. The list of coffin-pits in the six nucleus cemeteries is given below. The list of coffin- and burial pits in the later mastabas will be given in its proper place.

The list of the coffin pits is as follows:

(1) G 7120 A: Prince Ka-wab; granite coffin tightly fitting in coffin-pit; coffin 225×100 cm., and 90 cm. high; coffin-pit, 240×120 cm., and 75 cm. deep.

(2) G 7430 A: Prince Min-khaf; granite coffin in Cairo Museum, 208×111 cm., and 80·5 cm. high; coffin-pit, 295×130 cm., and 72 cm. deep; the pit is now very broken, especially on the east, apparently by the removal of the coffin.

(3) G 7430 B: no coffin found; coffin-pit, 232×98 cm., and 86 cm. deep; no coffin is known which might be assigned.

(4) G 7810 A: no coffin found; coffin-pit, 2·5×1·15 cm., and 0·5 cm. deep.

(5) G 7690 B: no coffin found; coffin-pit, 216×95 cm., and 105 cm. deep.

(6) G 4430 A: sealing of Chephren; no coffin was found; coffin-pit, 230×100 cm., and 15 cm. deep.

(7) G 4940 B: Seshem-nofer; no coffin found; coffin-pit, 277×120 cm., and 50 cm. deep.

(8) G 5030 B: no name in chapel; no coffin found; rough coffin-pit, 240×83 cm., and 65 cm. deep.

(9) G 5080 A: wife of Seshem-nofer; no coffin found, but 2 coffins in pit B; coffin-pit, 265×125 cm., and 75 cm. deep.

(10) G 5190 B: sealing of Mycerinus; no coffin found; coffin-pit, 230×85 cm., and 50 cm. deep.
(11) G 5180 B: no coffin found; coffin-pit, 225×88 cm., and 35 cm. deep.

In addition to these coffin-pits in mastabas, three other examples may be mentioned, one in the Second Pyramid containing the sarcophagus of Chephren, one in the Third Pyramid (empty), and the other in G III-a (containing a granite sarcophagus).

The small number of tombs with coffin-pits proved that this device was only occasionally and arbitrarily used. The use extends from the end of the reign of Cheops to the end of Dyn. IV, and indeed occurs sporadically thereafter. There are two cases, G 7120 A and G 7430 A, in which the coffin-pit had certainly contained a granite sarcophagus, but it is probable that most of the other pits had contained wooden coffins.

In connexion with the coffin-pit and the position of the coffin, it is to be remembered that a few early granite sarcophagi were set in a separate room (see, above, the two-room burial-chambers of type 3). In addition to these ways of dealing with the sarcophagus, there were in the later mastabas a few examples in which the sarcophagus was set in a recess in the west wall of the chamber. The coffin-recess actually occurs in substructures of type IV of Dyns. II and III and at Medum in the beginning of Dyn. IV. At Giza the earliest example is that in G 7130 B (Prince Khufuw-khaf) in a two-roomed chamber of type 4, and the recess (alcove) contained a smashed red granite coffin. Another early example is in G 4750 (Junker, tomb of Akhi). It is to be noted that the great chamber of the Third Pyramid was first designed with an alcove in the west end containing a coffin-pit. This alcove had a doorway with pilaster-jambs, drum, and architrave. It was abandoned unused, and a separate sarcophagus room was excavated and lined with granite. In the secondary mastabas of the Western Field isolated examples of coffin-recesses (alcoves) occur in Dyns. V and VI. The chamber of Senezem-ib-Yenti (G 2370 B) of type 9 is among the large chambers with a coffin-recess (alcove).

c. The 'Window' between Shaft and Chamber

It has been noticed that in some cases there was a passage cut through the rock wall above the entrance passage from the shaft to the north wall of the chamber. This opening has been termed a 'window', and several explanations have been offered of its function. The cases are as follows:

(1) G 1233 A: 'window', horizontal rock-cut opening, 105 cm. high and 108 cm. wide; same width and length as passage; opens at roof-level; probably blocked on inside by chamber lining; see Fig. 70.
(2) G 1235 A: the entrance passage from shaft to chamber was originally cut to a height of 178 cm., with the roof only a little below roof of chamber; during the construction of the lining, the entrance passage was constructed in the lower part of the original cutting by inserting roofing-slabs at a height 105 cm. above the floor of the passage; between these roofing-slabs and the roof of the original passage was a space (window) 50 cm. high, but this was blocked on the inside by the lining of the chamber; see Fig. 71.
(3) G 2210 A: 'window' similar to G 1233; 200×95–70 cm.; height, 85–65 cm.; was blocked outside by masonry, but not by the lining on the inside as this was unfinished; see Fig. 72.
(4) G I S 9 B: reported by Professor Junker, but without details; chamber unlined.
(5) G 7320 A: 'window' similar to G 1233 A, opening in chamber only half the width; passage not straight but inclined to the east; 75 cm. high and 90 cm. wide (with opening in chamber 50 cm. wide); unlined chamber; see Fig. 73.

It is obvious from the first three examples that those 'windows' were blocked with masonry on the inside by the lining of the tomb and on the outside by the rougher masonry, and had therefore some function connected with the excavation of the chamber. I have mentioned above the difficulty presented by the cutting of chambers with passage entering the chamber low down in the north wall. The three first examples noted above would have permitted the cutting of the chamber with downward strokes as in the case of the chambers with high drops between passage and floor. In the case of G 1235 it would appear as if the original intention had been to make a chamber of type 1 br with high drop and

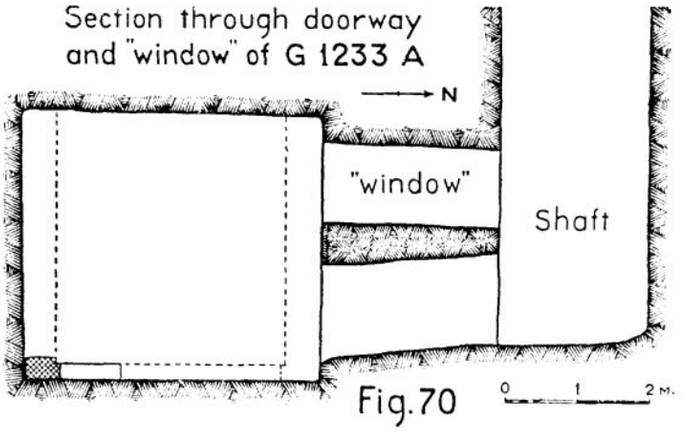

Fig.70

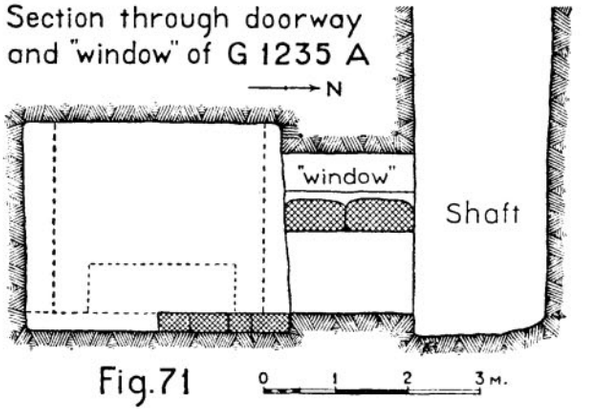

Fig.71

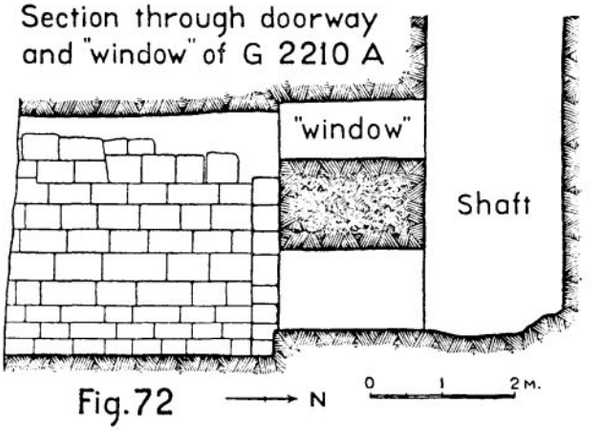

Fig.72

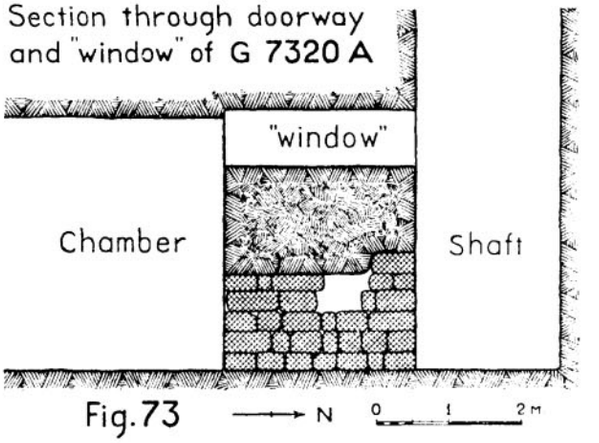

Fig.73

that this was converted later into a chamber of type 1 bl with low drop by cutting the passage and roofing it artificially. Whether the other cases also represented the beginning of an attempt to cut chambers of high-drop types or not is difficult to determine. It is equally possible that in the other cases the window was cut to facilitate the cutting of the chamber and the passage lower down to give convenient entry to the coffin. The examples at Giza constitute only about 3·4% of the total number of the recorded shafts (147) dealt with above. Thus the 'window' distributed in time from the reign of Cheops to that of Mycerinus does not represent a common practice and is, I believe, certainly to be interpreted as a device to facilitate the cutting of the chamber.

d. The Turning Recess in the North Wall of the Shaft

In a number of more important tombs which contained large stone sarcophagi the north wall of the descending shaft contained a large recess used to facilitate the turning of the coffin at the bottom of the shaft in order to move it into the entrance passage and so into the burial-chamber. Three other devices are also observable, (1) the cutting away of the roof of a horizontal passage at the outer end

to enlarge the height of the opening of the horizontal passage, (2) the use of the sloping passage, and (3) the cutting of a very high horizontal passage. In a few cases in which the coffin was small, the 2-m. shaft was large enough to permit the turning of the coffin and even its lowering in a horizontal position. In general the coffin appears to have been lowered down with the open side of the box towards the south. When it reached the bottom of the shaft, the lower end was swung inwards to the mouth of the passage and the upper end lowered northwards, until the box rested in a horizontal position when the passage was horizontal, and in a sloping position when the passage was sloping. The box was lowered empty and the lid lowered by a separate operation.

Each of the two parts of the coffin, handled separately, was lowered by means of ropes passed around great beams laid across the mouth of the shaft. In the tomb of Hetep-heres I these beams were set in shallow emplacements cut in the rock around the opening. The heavy ropes were passed around the box vertically and horizontally, forming a sort of bale, and probably the bearing surfaces of the rope against the coffin were padded (as we found advisable in lifting these same coffins to the surface). In the preliminary lowering, the ropes (2–4, knotted at the end of the box) probably bore on one edge of the pit-mouth until the coffin hung suspended in the pit with its bottom side against, or close to, the north wall of the shaft. If a medial beam was used, the shift from the bearing on the edge to the bearing on the beam was probably made at this point by taking two (?) of the ropes over to the south of the pit, and when these were firmly held, the other two were passed under the beam and brought back over it to the north. The ropes must have been very stout (probably 2 inches or more in diameter). The number of men required is difficult to calculate exactly, but certainly 100 men (25 to each of 4 ropes) could have lowered the heaviest of the coffins with no great exertion. The lowering of the lid, much less heavy than the box, would have been a comparatively easy operation. The lowering of the body in a wooden coffin, which fitted inside the stone coffin, took place at the burial, and in these 2-m. pits such a coffin could have been lowered horizontally.

After the coffin had been turned at the bottom of the shaft it was right side up, with its long axis N–S, and lay either horizontally or in a sloping position parallel to the floor of the entrance passage. The free space between the sides of the coffin and the sides of the passage was usually about 10 cm. or more, while that between the top of the box and the roof of the passage was greater (sometimes over a metre). There was room enough for ropes to pass around the coffin and to be manned by a small gang inside the large chamber, but probably the greater part of the work was done by leverage. For this purpose it was necessary to raise the coffin by placing under it pieces of wood or of stone or stone balls (spherical hammer-stones), so that the ends of the wooden levers could be inserted under the edge of the coffin and the friction decreased. In removing the coffins we placed them on wooden platforms with the battens on the upper side and placed short iron cylinders (rollers) under the platform so that the whole coffin could be easily moved by pushing, pulling, and leverage. It took from one to three working days to get the coffin moved out with one end projecting into the shaft. In this position it was roped and the rope passed around a multiple pulley suspended on a great wooden tripod above the pit, and by this pulley it was brought to the surface with its lower end clear of the mouth of the pit. The lower end was then swung to one side or the other as convenient until the coffin again rested horizontally on the ground. The whole operation took from three to five days and required about twenty men. We often laid down a track of two wooden beams from chamber to shaft to facilitate the action of the rollers.

The introduction of the coffin in ancient times was certainly easier than its extraction. When the passage was sloping the descent of the coffin would have been greatly facilitated and could have been done without the assistance of balls or rollers until the coffin had reached the horizontal floor of the

chamber. When the passage was horizontal the introduction of the coffin would hardly have been effected without placing something under the coffin to permit the use of levers. Rounded hammer-stones were found throughout the cemetery in the debris of the shafts and other debris, but definite evidence of their use is very rare:

(1) G 7000 X: the secret tomb of Hetep-heres I; the alabaster coffin had been moved into the chamber and stood on the east side with its northern end about 60 cm. from the doorway; it had stood on boards and under the boards was a hammer-stone.

(2) G I S 1 (Junker): a stone ball was found under the coffin, which was in its usual position along the west wall of the chamber.

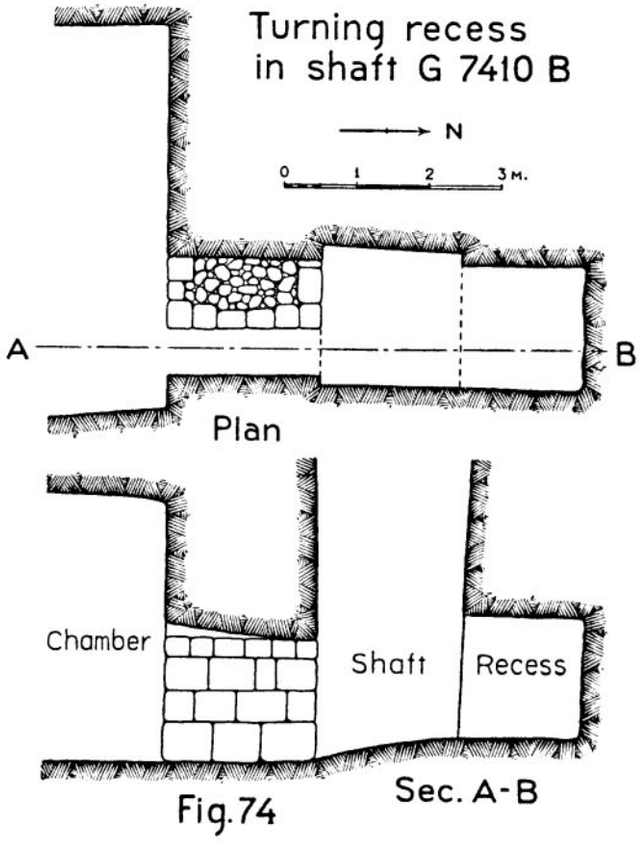

Fig. 74

The list of shafts with turning recess in the north wall is as follows:

(1) G 7120 A: recess, 185 cm. wide, 135 cm. high, and 105 cm. deep; horizontal roof: coffin-pit; lid recess, 230 × 50 cm. high and 60 cm. deep.

Coffin, red granite, 225 × 100 cm., and 90 cm. high.

(2) G 7310 B: recess, 175 cm. wide, 205 cm. high, and 100 cm. deep; horizontal roof: passage same height as room, 207 cm. on shaft side, and 210 cm. on chamber side.

Broken red granite coffin, 238 × 120 cm., and 106 cm. high.

(3) G 7410 B: recess, 165 cm. wide, 160 cm. high (level with passage), and 160 cm. deep; horizontal roof: passage 157 cm. high outside, 187 cm. inside.

Coffin, red granite, 225 × 95 cm., and 84 cm. high; see Fig. 74.

(4) G 7420 A: sloping passage; recess, 210 cm. wide, 250 cm. high, and 170 cm. deep; the roof slopes upwards towards north and the floor entering at 18 cm. above floor of passage has, at a depth of 135 cm., a step rising 65 cm.; this peculiar form was adapted to turning a sarcophagus into the sloping passage; no trace of sarcophagus was found in the chamber,

which appears to have been unused; sloping passage, 185 cm. high on outside and 175 cm. on inside.

(5) G 7130 B: turning recess in north wall of shaft at bottom, 205 cm. wide (E–W), 180 cm. deep (N–S), and 285 cm. high with roof sloping slightly upwards to north; passage horizontal floor, 205 × 112 cm. and 235–247 cm. high (with roof sloping slightly downwards from shaft to chamber).

Granite sarcophagus, 225 × 86 cm., and 92 cm. high.

(6) G 7430 A: unlined chamber; horizontal passage with roof cut away at northern end; recess, 160 cm. wide, 175 cm. high, and 160 cm. deep; roof horizontal.

Coffin-pit on west side of chamber, 295 × 130 cm., and 72 cm. deep; lid recess in west wall at floor-level, 247 cm. long, 63 cm. high, and 36 cm. deep; this indicates a lid less than 247 cm. long, a box not over 85 cm. high.

Red granite coffin of Min-khaf, 208 × 111 cm., and 80·5 cm. high.

(7) G 7650 C: turning recess in north wall of shaft begun but left incomplete, 75 cm. wide, 55 cm. high, and 10 cm. deep; passage with sloping roof, with opening on pit side, 225 cm. high (to bottom of shaft), and 265 cm. to horizontal floor of passage.

Red granite sarcophagus, 235 × 103 cm., and 88 cm. high.

(8) G 7550 B: recess, 145 cm. wide, 165 cm. high, and 110 cm. deep; horizontal roof; at opening, floor of recess level with floor of shaft, and at 55 cm. from shaft, a step up 100 cm. high; floor of shaft and passage sloping downwards; opening of passage in shaft 195 cm., and inside 215 cm.; canopic pit, no coffin-pit.

(9) G 7760 B: recess, 145 cm. wide, 150 cm. high, and 78 cm. deep; horizontal roof; floor 75 cm. above floor of passage; horizontal passage, 167 cm. high on pit side and 178 cm. on room side.

Red granite sarcophagus, Min-dedef: 216 × 92·5 cm., and 81·5 cm. high.

(10) G I S 2 B (Junker): recess; granite sarcophagus, Ka-m-nofret.

(11) G I S 6 A (Junker): recess in north wall of shaft; granite sarcophagus.

(12) G 4750 A (Junker): recess, 270 cm. wide, 150 cm. high, and 160 cm. deep; roof horizontal; floor at floor-level; no canopic pit, no coffin-pit; height of horizontal passage, 150 cm.

White limestone sarcophagus, fragments, 220 × 105 cm., and 75 cm. (?) high.

(13) G 5110 A: recess, 105 cm. wide, 85 cm. high, and 74 cm. deep; horizontal passage at floor-level, with minimum width of 129 cm. high on pit side; canopic pit in SE corner; no coffin-pit.

Red granite coffin with flat lid, 1·86 × 0·85 m.; 0·95 m. high without lid; thickness of lid 0·21 m.; Prince Duwanera.

Of the 13 shafts with turning recess in the north wall, 10 contained granite sarcophagi, 1 a limestone sarcophagus, and 2 no trace of a coffin (G 7420 A, the husband of Queen Meresankh II, and G 7550 B, Prince Duwa-ne-hor). These stone sarcophagi were all of large size, and with one exception of heavy granite. Nine of the shafts with turning recess are in the Eastern Field dated from the last years of Cheops to the end of the reign of Chephren. Two are in the Cem. G I S, dated to the reign of Mycerinus, and 1 in Cem. G 4000 (G 4750, with limestone coffin), probably dated later than Cheops. One other in the Western Field, G 5110, is dated to Mycerinus.

The 13 shafts with turning recess were obviously intended for the use of stone sarcophagi, but a number of stone sarcophagi were found in shafts which had no turning recess. In all these cases the sarcophagus was either so small that it could be introduced through the 2-m. shaft into the passage

without difficulty, or the passage from shaft to chamber was of such a form and size as to permit the turning operation without cutting a recess in the north wall of the shaft. Among the 44 early mastabas of the Western Field 22 presented definite evidence that they had once contained white limestone sarcophagi distributed in the three nucleus cemeteries as set forth in Chapter X. None of these seems to have presented any difficulty in introducing the coffin into the chamber. The one shaft, G 4750, which had a turning recess and a limestone coffin was one of the latest of these early mastabas and was probably used after the reign of Cheops. In the Eastern Field one of the shafts in the twin-mastabas, G 7210 B, also had a plain limestone sarcophagus of this same type, and the height of the passage was clearly sufficient to permit the turning without cutting a recess. Six other shafts without turning recess also contained limestone coffins, G 7060 B, G 7070 B, G 7560 B, G I S 7 B, G I S 8 A, G 4710 A, and G 5080 B. The latter chamber contained two coffins (one of granite and one of limestone). There are seven granite sarcophagi in shafts which had no turning recess, G 7220 A, G 7660 B, G 2150, G 5080 B, G I S 3 A, and G I S 8 B. As far as measurements are available (4 out of 7), the coffin could have been easily introduced without the use of a turning recess. In G 5080, in which the height of the horizontal passage is unusually low (110 cm.), we actually removed the granite coffin from the chamber and turned it up the shaft without any difficulty.

There are a number of large chambers in important mastabas which were found empty but might have been expected to contain stone coffins. They had shafts and passages of such size and form as would have admitted a large stone coffin without a turning recess. These chambers are of importance because of the known existence of several granite coffins excavated at Giza without any record of their exact provenience. I have noted eleven such chambers, G 7320 A, G 7230 B, G 7330 B, G 7430 B, G 7510 B, G 7050 B, G 7750 B, G 7690 A and B, G 5080 A, and G 5230 A. With the two empty chambers with turning recess (G 7420 A and G 7550 B) the total of empty chambers is brought to thirteen. Against these thirteen chambers we have three granite sarcophagi in the Cairo Museum:

(1) Cairo 36 (No. 48, 853): red granite panelled coffin, assigned by me to G 5230.
(2) Cairo 42: Prince Horbaf; of such size that it could have been introduced only in G 7420 of the 13 shafts known to me.
(3) Cairo 44: Khufuw-ankh; red granite panelled; cannot be assigned to any of the chambers known to me.

By considering the names on the two inscribed coffins and the condition in which we found the chambers, the list of thirteen chambers may be reduced to five, but no definite assignment can be reached for either of these two coffins. They may have been from shafts not excavated by us or perhaps not yet excavated during the systematic clearing of the necropolis.

e. The Blocking of the Doorways of the Burial-chambers

After the burial, in all tombs, the entrance to the burial-chamber was closed as securely as the means of the owner permitted. The blocking of the chambers of type 1 was the most elaborate and presented the form from which all the cheaper and later types of blocking were developed. I take up, therefore, first the masonry and portcullis blocking (designated blocking type I) which was used in chambers of shaft type 1 and thereafter the other types of blocking developed from type I.

(1) *Masonry Blocking and Portcullis Slab: Blocking Type I*

In a certain number of the early shafts at Giza the blocking of the entrance to the chamber was distinguished by the use of a very large slab set against the doorway outside and called a 'portcullis'

slab. It was let down from above as the last act in the blocking of the chamber previous to the filling of the shaft. The portcullis slab as a blocking for the burial-chamber has a long history in Egypt extending from Dyn. I to the reign of Cheops (see Reisner, *Tomb Development*, p. 185). In the substructures of types I–IV found in c.b. mastabas, the blocking of the doorway behind the portcullis slab was of well-laid c.b. of a thickness corresponding to the length of the passage or doorway. In Dyns. I–III the portcullis slab rested as a rule in grooves, one on each side of the stairway outside the doorway (portcullis grooves). The portcullis slab, with or without grooves, I designate type I. As the earliest blocking inside the doorway was of c.b., I designate the portcullis slab with interior blocking of c.b. as blocking type I a. It was only with the introduction of the stone mastaba that the doorway behind the portcullis slab began to be blocked with dressed blocks of stone set in sulphate of lime. This was the blocking used in the earlier shafts at Giza and is designated blocking type I b.

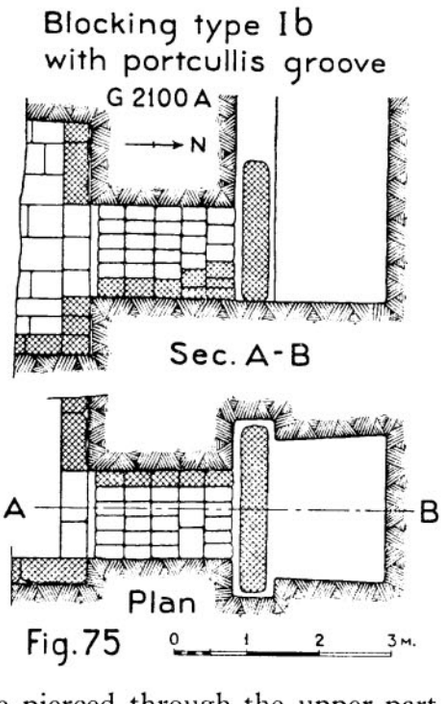

Fig. 75

The entrance to all the burial-chambers of types 1 and 2 in the Western Field opened from 2-m. shafts. Whether they were horizontal or sloping, the whole length of this connecting passage was packed solid with small limestone blocks laid in plaster of Paris (sulphate of lime). In a few cases this packing consisted of a wall at the inner end of the passage and another at the other end (shaft side), while the space between had been filled with small stones and plaster or rubbish. This blocking of dressed stones is called b blocking, or b (filled). The blocking in all the shafts had been penetrated by plunderers and more or less destroyed. These broken blockings or traces of them were found in the great majority of cases, and such a blocking may be assumed for all the large chambers opening from 2-m. shafts in which evidence of portcullis slabs was observed.

The portcullis slab stood upright against the masonry blocking and covered the rock-surface beside and above it. A number were pierced through the upper part with two or three holes obviously for the attachment of the ropes used in lowering the slabs. In five tombs in Cem. G 2100 the shaft had a rectangular groove at the southern end of the eastern and western sides down which the portcullis slab was lowered. The list of tombs with portcullis grooves is as follows:

(1) G 2100 A: grooves 55 cm. wide, depth 25 cm.; in masonry and rock; portcullis slab, 250 cm. wide, 160 cm. high, and 50 cm. thick; doorway, 123 cm. wide and 126 cm. high; see Fig. 75.

(2) G 2110: grooves 50 cm. wide, depth 35 cm.; in masonry and on the west in rock; portcullis slab, 225 cm. wide (?), 230 cm. high (?), and 40 cm. thick; doorway, 185 cm. wide and 205 cm. high; half masonry blocking preserved.

(3) G 2120: grooves on east, 60 × 25 cm.; on west, 50 × 20 cm.; in masonry only; portcullis slab, 155 cm. wide, 165 cm. high, and 32 cm. thick; doorway, 120 cm. wide and 120 cm. high.

(4) G 2130: grooves on east (at top), 47 × 22 cm., (at bottom) 40 × 25 cm.; on west at top, 50 × 25 cm., and at bottom 40 × 30 cm.; in masonry and rock; portcullis slab broken up; doorway, 110 cm. wide and 125 cm. high.

(5) G 2210: grooves, 43 cm. wide on east and 46 cm. wide on west, depth on east 35 cm. and on the west 38 cm.; in masonry and descending 7·9 m. in rock (total depth of shaft in rock, 21·7 m.); no slab was found; doorway with penetrated blocking, 115 cm. wide and 110 cm. high.

These five tombs are from a block in the western end of Cem. 2100 and are designated the five initial cores of that cemetery. I have concluded elsewhere that the initial mastabas of the three nucleus cemeteries in the west were executed by three different groups of workmen, and the fact that all the mastabas with portcullis groove are in one cemetery is a confirmation of that conclusion. The portcullis groove was introduced in the stairway tombs of Dyn. I and occurred also in the deep stairway tombs of Dyns. II and III (see *Tomb Development*, p. 185). The portcullis groove was also used at Medum in tombs in the reign of Sneferuw and Cheops.

It will be noted by the measurements of the portcullis slabs in the above tombs that the use of portcullis grooves required a slab of enormous width, the lowering of which must have presented great difficulties. The door openings in most cases were only half the width of the slab, and it was obvious that the opening could be covered quite as effectively by a stone of much less size. In fact the plunderers usually broke off the upper east corner of the slab in order to reach the blocking of the doorway and thus the wide slab presented no greater difficulty than one of more narrow form. Probably as a result of these considerations, the grooving of the shaft was abandoned and a portcullis slab of lesser width used in Cems. G 1200 and G 4000. In the thirty-seven shafts with lined chambers, the proportion of measurable slabs found was not large, probably because they had been broken up by those who stripped the chambers of their linings in order to gain room for their operations. I assume that the great majority of all the large, high burial-chambers were closed on the outside with portcullis slabs. The following list of measured slabs will give an idea of their size and form:

(6) G 4000: north shaft; portcullis slab; 180 cm. wide, 300 cm. high, and 70 cm. thick; 3 rope-holes through upper part of slab.
(7) G 4250: portcullis slab; 140 cm. wide, 170 cm. high, 45 cm. thick; 3 rope-holes through upper part of slab.
(8) G 4350: portcullis slab; 165 cm. wide by 160 cm. high and 45 cm. thick; 2 rope-holes.
(9) G 4360: portcullis slab; 135 cm. wide by 160 cm. high and 30 cm. thick; 2 rope-holes.
(10) G 4460: portcullis slab; . . . cm. wide by 170 cm. high and 50 cm. thick; 2 rope-holes.
(11) G 4450: portcullis slab; 158 cm. wide by 170 cm. high and 38 cm. thick; 3 rope-holes.
(12) G 4560: portcullis slab; 160 cm. wide by 157 cm. high and 40 cm. thick; 2 rope-holes.
(13) G 4550: portcullis slab; 165 cm. wide by 220 cm. high and 42 cm. thick; 2 rope-holes.
(14) G 4340: portcullis slab; 150 cm. wide by 200 cm. high and 37 cm. thick.
(15) G 4440: portcullis slab; 140 cm. wide by 140 cm. high and 35 cm. thick; 2 rope-holes; see Fig. 76.
(16) G 4540: portcullis slab; 143 cm. wide by 165 cm. high and . . . cm. thick; 1 rope-hole, perhaps 1 broken away.
(17) G 4430: portcullis slab; 125 cm. wide by 150 cm. high and 45 cm. thick.

The facts lead to the conclusion that all the thirty-seven early chambers in Cems. G 4000 (22), G 2100 (5), and G 1200 (10) were blocked with portcullis slab and interior blocking of type I b. The evidence for the blocking of the great chambers of type 3 in the Eastern Cemetery was very meagre, but is sufficient to make plausible the conclusion that those in the five finished twin-mastabas were blocked in the same way. Two of the shafts in annexes, G 1223–annex and G 1225–annex, both of type 3 and later than the main mastabas, were also blocked with portcullis slabs and interior blocking of masonry.

The portcullis slab continued to be used in rare cases to the end of Dyn. IV, but the interior blocking

behind the slab in these later examples was of c.b. (that is, blocking type I a), obviously a cheaper form. Blockings of type I a were recorded in the following shafts:

(1) G 1233–annex: type 6 b (1); probably Chephren; see Fig. 77.
(2) G 1325 A: type 5 b (1); late Dyn. IV.
(3) G 1206 A: type 5 a (1); probably Chephren or Mycerinus.
(4) G 3090 C: type 5 c (4); Dyn. V.
(5) G 3000 D: type 5 c (5); early Dyn. V; small slab.

These five occur in a cemetery of 277 mastabas (830 shafts) in the Western Cemetery and later than

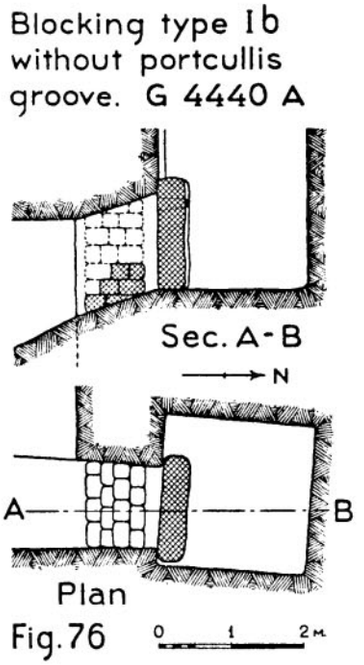

Fig. 76

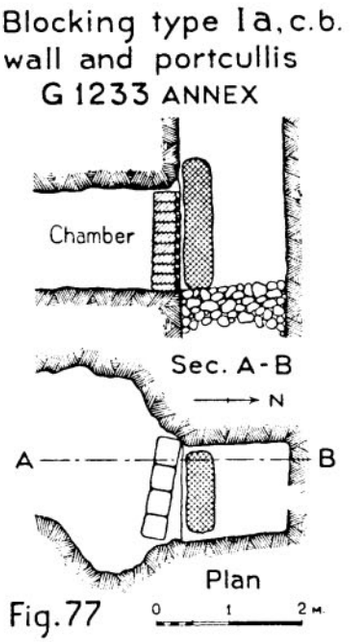

Fig. 77

the nucleus cemetery G 1200. The last two slabs, which may be dated to Dyn. V, are quite small and probably represented a different type of blocking.

It is clear that the use of the portcullis slab became less frequent in the latter part of Dyn. IV. The cause lies in the decreasing means of the community served by the necropolis. The blocking with portcullis slab cost a good deal in labour and provided an ineffective bar to the entry of thieves. The use of the portcullis slab practically ceases in Dyn. V at Giza. On the other hand, the use of burial-places of type 9 in the latter part of Dyn. V and in Dyn. VI was accompanied by a different type of blocking, which may be called 'pyramid blocking', which was much more costly and apparently more secure than any other type of blocking. The characteristic feature of shaft type 9 is a long, sloping passage by which the burial-chamber was entered. This passage was filled throughout its length with long blocks of stone ('plug-stones'). Unfortunately most of the passages were lined and roofed with slabs and the space over the plug-stones was easily penetrated. Every example which we found of type 9 with built passages had been thus penetrated, leaving the plug-stones in place.

(2) *Blockings Developed from Type I: Blockings Types II–VI*

The purpose of the blocking of the entrance to the chamber was to secure the burial against violation, to prevent the filling of the shaft from entering the chamber, and also no doubt to keep rain-water from ruining the burial and equipment. No type of blocking ever prevented violation, but all well-made blocking did keep out the filling and the rain-water, except those blockings which were bound with mud plaster.

The most effective blocking, type I, consisted of an interior blocking which filled the long connecting passage between shaft and chamber and of an exterior blocking, the portcullis slab, placed against the opening in the side of the shaft. This blocking was used for shafts of types 1 and 2 and the early large shafts of type 3. When the portcullis slab was discarded, the interior blocking persisted and is here labelled blocking type II. This type was primarily adapted to forms of shaft which, having a long connecting passage (types 3 and 4), permitted a thick interior blocking, but it was also used in some shafts with short connecting passage (type 5) or no passage at all (type 6) by building the blocking inwards to fill the end of the chamber.

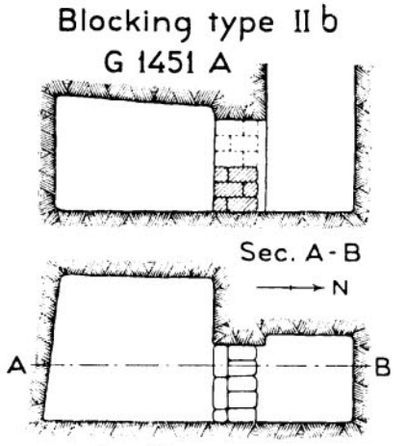

Fig. 78

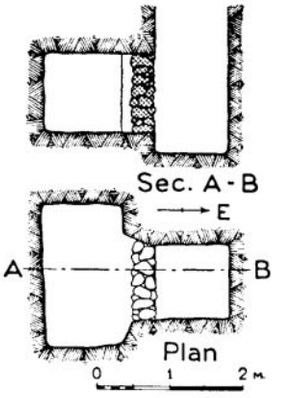

Fig. 79. Type III c, G 1413 C

Blocking type II: thick interior blocking as in type I but without the portcullis slab:

II a: with thick c.b. wall; used in types 3, 4, and more rarely in type 6.

II b: thick interior blocking of masonry and plaster; used almost exclusively in shaft types 3 and 4; see Fig. 78.

II b (filled): thick blocking with two masonry walls filled in between with rubble and plaster or even rubbish; used in types 3 and 4.

With the introduction of the shaft type 5 with short connecting passage, the interior blocking still continued to be the natural method of blocking, but the wall was necessarily reduced in thickness. Thus the thin interior blocking (type III) came into use. It must be remembered, however, that a few shafts of type 5 were still blocked with thick walls and that the thin wall once introduced was not confined to type 5.

Blocking type III: interior thin blocking wall:

III a: c.b., vertical; used rarely in types 4, 5, and 6, and more frequently in type 8.

(1): c.b. laid with mud plaster and covered outside with mud plaster.

(2): laid dry.

III b: interior vertical; masonry; used in types 4 and 5; Dyns. IV–VI.

(1): bound with gypsum.

(2): bound with mud plaster.

(3): built dry.

III c: interior wall of rough stones; used in types 3–6; Dyns. V–VI.

(1): bound with gyps.

(2): bound with mud plaster; see Fig. 79.

(3): laid dry, or with mortar washed away by rain.

III d: interior vertical wall built of rubble; used in types 5, 6, and 8; Dyns. V–VI.

(1): bound with gyps.

(2): bound with mud plaster.

(3): built dry or with mud plaster washed away by rain-water.

III e: thin vertical interior wall consisting partly or wholly of vertical slabs; appears late in Dyn. V and not extensively employed; used in type 5.

(1): bound with gyps.

(2): bound with mud.

The last-named variation of the thin interior blocking was introduced after the use of the same construction in exterior blocking, and seems not to be directly derived from the portcullis slab. The opening to the chamber may be filled by one or more slabs resting on the rock floor or they may rest on one or two courses of masonry.

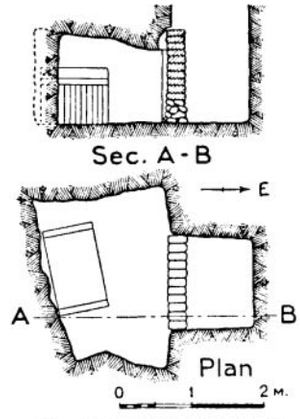

Fig. 80. G 1451 B II

As shown above, the thick interior blocking (type II) was derived directly from the interior part of the old portcullis blocking and was peculiarly suited to the shaft types 3 and 4 with long connecting passages. The thin blocking, type III, was in turn adapted to the type 5 with short connecting passage, and arose no doubt out of the use of that shaft type. With the introduction of type 6 without any connecting passage, an exterior blocking became more practical owing to the unsuitability of the interior wall to resistance against the pressure of the filling of the shaft. A comparatively small number of the shafts of Dyn. V had vertical exterior blockings (type IV), but most of them presented a sloping surface on the pit side. These were either leaning blockings or wedge-shaped blockings. None of these later types occurs in the large mastabas of the six nucleus cemeteries, but I give here the variations of these exterior blockings:

Blocking type IV: exterior vertical wall:

IV a: c.b. wall; rarely used; see Fig. 80.

IV c: wall of rough stone used from the end of Dyn. IV to Dyn. VI (end).

(1): bound with gyps.

(2): bound with mud plaster.

(3): laid dry or with mud plaster washed out by rain-water.

IV e: exterior vertical wall consisting of vertical slabs.

IV e†: vertical slabs resting on horizontal masonry.

(1): bound with gyps.

(2): bound with mud plaster.

Blocking type V: exterior leaning masonry resting on shaft side above doorway:

V a: sloping c.b. wall; very rare.

V c: blocking wall of rough stones; small number of examples.

(1): bound with gyps.

(2): bound with mud.

(3): laid dry or mud plaster washed away by rain-water.

V d: leaning wall of rubble; rarely used.

(2): bound with mud.

V e: composed in whole or in part of leaning slabs with their upper ends resting on side of shaft above doorway; most frequent blocking in Dyns. V–VI.

V e†: with leaning slabs resting on floor or on debris covering the floor.

(1): bound with gyps.

(2): bound with mud plaster; see Fig. 81.

(3): laid dry or with mud plaster washed away by rain-water.

V e: leaning slabs resting on horizontal courses of stone.

(1): bound with gyps.

(2): bound with mud; see Fig. 82.

(3): laid dry or with binding not preserved.

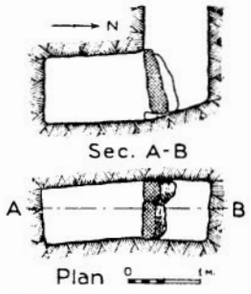

Fig. 81. G 1177 F

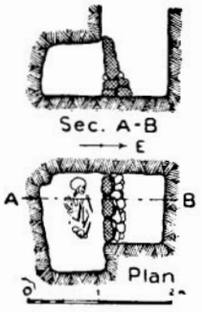

Fig. 82. G 1156 a A

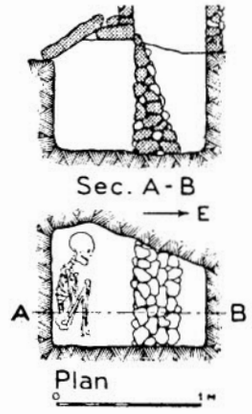

Fig. 83. G 1210 D

V ex: exterior blocking not reaching top of doorway and the space at the top closed by small leaning slabs.

(1): bound with gyps.

(2): bound with mud.

(3): with no binding preserved.

Blocking type VI: exterior wedge-shaped blocking decreasing in width from bottom to top and extending above the roof of the chamber:

VI a (2): built of mud bricks and bound with mud plaster.

VI c: built of rough stones.

(1): bound with gyps.

(2): bound with mud plaster; see Fig. 83.

(3): laid dry or with mud plaster washed away.

Blockings of type VI c may be thin or thick, in some cases nearly filling the bottom of the shaft.

VI d: built of rubble; thick or thin.

(2): bound with mud plaster.

(3): without plaster or mud preserved.

VI d†: rubble on horizontal courses of masonry.

(2): bound with mud plaster.

VI e: with edge-shaped blocking surmounted by leaning slabs.

(2): bound with mud plaster.

In order to give an idea of the use of these blocking types in the mastabas later than the six nucleus cemeteries, I give here a summary of their occurrence in 353 shafts of the Cems. 1000–1600 and 3000.

Blocking type I: 5 certain and 2 doubtful examples.
Blocking type II: 6 examples.
Blocking type III: 101 examples.
Total interior blockings, 114 examples.
Blocking type IV: 33 examples.
Blocking type V: 155 examples.
Blocking type VI: 51 examples.
Total of exterior blockings, 239 examples.
Sum total of interior and exterior blockings, 353 examples.

The leaning blockings of type V are the most numerous, 155, or 43·9%, and 140 are of the type variation with leaning slabs, 39·66%. Type III comes next in frequency with 101 examples, 28·61%. The older types I and II are infrequent, as the greater part of the mastabas are from Dyns. V–VI.

f. The Filling of the Shaft after Burial

Every large shaft found by us in the Giza Necropolis had been penetrated by grave-robbers, and a large proportion of those with lined chambers by thieves who stripped the chamber more or less completely of its fine white casing and pavement. In the Eastern Field many of the chambers had been re-used in the Ptolemaic–Roman period, and some of them (G 7130 B, G 7230 B, and G 7330 B) had been considerably altered by the cutting of *loculi* and extra chambers. Many shafts in the Eastern Field, and some in the Western Field, had been cleared out in quite modern times by excavators, mostly working illicitly. As a result the filling of the shaft as found by us varied considerably, but no shaft was entirely intact. Nevertheless, in the bottom of the shaft a few cubic metres of the original filling were often found intact. This original filling was usually clean limestone debris apparently resulting from the cutting of the rock shaft and chamber, and was fairly hard packed by time and the superincumbent weight. The character of this original filling was clearly shown by the fan-like dump-heaps piled up by the thieves when they threw the excavated shaft filling over the side of the mastaba into the street opposite the pit. These dump-heaps consisted of the same clean limestone debris as the original filling found in place, but necessarily loosened by excavation and dumping. The least amount was found in shafts in which the portcullis slab had been leaned northwards to gain access to the masonry blocking. Above this original filling the debris varied considerably according to whether the thieves had attempted to refill the shaft or not. In some cases the shaft had been left open and refilled by drift sand, a process that took some time and left traces of weathering on the upper part of the shaft. In other cases they raked back the filling which they had piled on top of the mastaba, and in these cases a certain amount of disturbed thieves' debris was found above the original filling. But it was seldom that they filled the shaft completely, and the upper part was filled with drift sand. When the shaft had been excavated in modern times the drift sand often contained pieces of newspaper and even tin cans. When the shafts had been cleared for re-use in Roman-Ptolemaic times they were kept open to permit the use of the chamber as a communal or family burial-place. All these re-used burying-places had been more or less plundered in modern times and were found filled with a very dirty, dusty sand mixed with *shawwabtis*, amulets, and fragments thereof.

These were the chief varieties of the filling of the shafts as found by us, but it must be remembered

that no two shaft fillings were alike. At the top we usually expected to find sand, but it was impossible to tell what lay under the sand. In a great shaft behind the offering-stela of Khnumenti, G 2374, we came on typical original filling in the mouth of the shaft and cleared downwards through a packed mass of this filling for 7 m., when the shaft terminated abruptly without a chamber and unused. In the case of the sloping passages filled with plug-stones, the thieves had usually tunnelled an entry through or over the roof of the passage, leaving the plug-stones in position, and only one of this type of burial-place, G 2381 A, was found intact. A large number of small shafts of all periods were found untouched by thieves.

The packing of the shaft with stones was a very unusual practice, found only in the tomb of Hetep-heres I. In the shaft of Hetep-heres the bottom of the shaft to a metre or so above the doorway was filled with well-laid small blocks of stone packed in plaster. Above this came a space in which blocks of stone and tubs of plaster seem to have been thrown into the shaft in confusion, but the upper 10 m. of the shaft were filled again with well-laid courses packed in plaster, as was the small stairway descending from the north into this part of the shaft. The mouth of the shaft was closed with irregular blocks of local limestone imitating in appearance the surrounding rock.

The mouth of the shafts does not seem to have been concealed except in the case of the Hetep-heres tomb, nor covered in any way except in G 5230 and perhaps the Mer-ib tomb (G 2100–annex). In G 5230 the mastaba was roofed with heavy blocks of nummulitic limestone continuously, and these blocks seem to have been laid over the mouths of both the shafts (A and B). G 2100–annex was roofed in a similar manner, but it is uncertain whether the roofing covered the mouths of the shafts.

The chambers, when the thieves had left the shaft open, had been partly filled by drift sand which filled the doorway and continued in a gravity slope through the passage and into the chamber, where it had spread out fan-like around the entrance. When the sand was removed, and in those chambers which were free of sand, the floor was found littered with the fragments of decayed wooden coffin, limestone coffin if any, pottery and fragments of pottery, and such other objects as the thieves had left ('thieves' debris'). When the white limestone of the floor and casing had been wholly or partially removed, this litter was badly trampled or entirely removed.