SURVEY DATA RELEVANT TO THE GEOLOGICAL STRATIGRAPHY OF THE GIZA PLATEAU

1. AIM: To identify geologic units with reference to the designated "standard sequence" at the Sphinx precinct on the basis of correspondence to slope and direction of dip.

2. PROCEDURE: An attempt was made to determine the true slope angle and direction of dip for Members I and II (as designated by Gauri in 1980) in the Sphinx ditch. This was done on the basis of secure points marking 1. the contact plane between Members I and II; and 2. a given unit in Member II (Bed 3a) set by Gauri in 1980 and recorded in section and plan by Lehner. Using the dip slope and direction thus ascertained as a reference, points on units outside the Sphinx precinct were surveyed and analyzed with respect to points in known units in the Sphinx precinct to check for correspondence to the dip slope and direction.

3. REFERENCE SLOPE ANGLE AND DIRECTION OF DIP.

3.1. Member II Dip.

During the 1980 field season, 11 points were monumented in the vertical bedrock exposures forming the west and south sides of the Sphinx ditch along a thin "brown line" in Bed 3i (or between Beds 3a-b in Aigner's "Sphinx Sequence"). The position of each point (Plan I: G1, 3, 6, 7, 10, 12, 15, 16, 18, 19) was surveyed by triangulation from the survey grid. The elevation of each point was also determined.[1] From this data, the contour intervals of this unit were reconstructed by interpolation. In drawing the contour lines, the run or lie of the individual values (e.g. interval 17.0, 17.5, 18.0, etc.) as given by the interpolation was strictly adhered to.

Between the highest point monumented, G1 in the NW corner of the Sphinx "amphitheater," and the lowest point, G16 in the far SE corner of the Sphinx sanctuary, there is a distance of 136.85 ms. and a difference in height of 14.21 ms. This gives a slope of 5° 55' 41". At the same time, an average dip of 5° 55' 08" is obtained from the following data (see Plan I):

1. G1 - G16
   Distance: 136.85 ms.
   Dif. hei.: 14.21 ms.
   Slope: 5° 55' 41"

2. G19 - G16
   Distance: 38.55 ms.
   Dif. hei.: 3.72 ms.
   Slope: 5° 30' 42"

3. G18 - G16
   Distance: 43.55 ms.
   Dif. hei.: 4.0 ms.
   Slope: 5° 14' 52"

4. G7 - G16
   Distance: 74.70
   Dif. hei.: 5.43
   Slope: 4° 09' 27"

Average Slope: 5° 06' 08"

G1 - G16 Slope: 5° 55' 41"

An attempt was made to determine the true direction, or bearing, of the dip on the basis of the contour lines obtained through interpolation (Plan I). A protracter was placed over individual contour lines to arrive at the best possible perpendicular to the given contour line. Since the lines are not straight, this had to be an approximation. The best possible perpendicular was taken from five contour lines, and an average bearing was obtained:

Contour line	Bearing of Perpendicular [2]
13.5	N37° 16'W
15.0	N32° 16'W
17.0	N27° 46'W
19.0	N26° 46'W
22.0	N26° 46'W

Average Bearing
N30° 10'W

Average Strike
S59° 50'W

At the same time, the line from G1 to G16, which gives the greatest dip, has a bearing of: N43° 16' W (strike: S46°44'W).

The bearing of the dip and strike obtained by averaging, and that from G1 - G16 have both been plotted in Plan IV.

3.2. Contact Plane: Members I and II.

The same procedure was followed in determining the dip, and its bearing, of the contact between Members I and II (or the sedimentary surface of Member I).

In the 1980 field season, Dr. Gauri selected 8 points at the surface of Member I (Plan II: G2, 4, 8, 9, 11, 13, 17, 20). The position of each point and its elevation were determined. The reconstructed contours of this sedimentary surface were interpolated from more than these 8 points. It was determined that the undulating bedrock surface flanking the north side of the rock-cut Sphinx ditch and passing to the modern road embankment is this sedimentary surface, or the contact plane between Members I and II. It has been laid bare by the ancient quarrying away of Member II. The bottom sub-unit of Member II is a soft marly limestone (Bed 2a). This allowed the ancient workmen to clear away Member II without appreciably altering the much harder natural sedimentary surface of Member I - that is the quarrymen followed the depositional plane (not unlike stratigraphic excavation in archaeology). For

the topographical map of the Sphinx precinct (Plan III), this open area was contoured on the basis of spot heights taken every 5 sq. ms. over much of this area. Any of these points, along with those marked in the vertical cuts through Members I and II, could then be used for interpolating the contours of the Members I-II contact plane. This made for a denser cluster of interpolated points, on the basis of which the contour lines were strictly drawn, perhaps to a higher resolution than those of the Member II dip.

Predictably, the contours render a more irregular plane than that of the Member II dip. This is not due entirely to the higher resolution of the reconstructed contours, but mainly to the fact that the sedimentary surface of Member I is irregular. It features troughs and hummocks and has been characterized by Aigner as a reefal facies. Over this, Member II beds were deposited to gradually become more regularized during deposition.

Between the highest point, G2 in the NW corner of the Sphinx "amphitheater", and the lowest point, G17 on the floor of the SE corner of the Sphinx sanctuary, there is a distance of 108.55 ms. and a difference in height of 10.33 ms. This gives a slope of 5^{o} 26' 10". An average dip of 4^{o} 23' 41" is obtained from the following data.

1. G2 - G17
   Distance: 108.55 ms.
   Dif. hei.: 10.33 ms.
   Slope: 5^{o} 26' 10"

2. G20 - G17
   Distance: 19.95 ms.
   Dif. hei.: 1.45 ms.
   Slope: 4^{o} 09' 25"

3. G4 - G17
   Distance: 79.80 ms.
   Dif. hei.: 4.61 ms.
   Slope: 3^{o} 18' 22"

4. G8 - G17
   Distance: 64.75 ms.
   Dif. hei.: 5.3 ms.
   Slope: 4^{o} 40' 46"

Average Slope: 4^{o} 23' 41"
G2 - G17 Slope: 5^{o} 26' 10"

Because of the irregularity of this surface, it was more difficult to obtain a good average perpendicular to its interpolated contour lines - or the bearing of the true dip. The best possible perpendiculars were taken from the following contour intervals:

Contour Line	Bearing of Perpendicular
10.0	N15° 16'W
13.0	N09° 16'W
16.0	N25° 16'W
19.0	N13° 46'W
21.0	N14° 14'E

Average Bearing
N09° 52'W

Average Strike
S80° 08'W

The line from G2 - G17, which gives the greatest dip, has a bearing of N42° 46' W (strike: S47° 14'W).

The bearing of the dip and strike obtained by averaging, and that of G2-G17, have both been plotted on the general map (Plan IV). The difference between the bearing of the averaged dip and the greatest measured dip (G2-G17) is due to the irregularities of the Members I-II contact plane in the Sphinx area. The attitude of Member I beyond the Sphinx precinct has yet to be resolved.

It has generally been concluded that the dip of the Mokkatam Formation at Giza is from NW to SE. Said ( ) thought the angle of the dip to be about 12°; Gauri, on the basis of the dip measured in Member II (Bed 3i) at the Sphinx, considered the general dip to be between 5°-6°; Strugal and Rawzi (personal communication) doubted it was this great and saw the dip as closer to 3°-4°. The general trend of the dip direction is NW-SE, but in the upper NW corner of the Sphinx "amphitheater" the contours of the Members I-II contact plane begin to trend more north-south in their dip direction (Plan II). In fact a perpendicular (dip direction) trending NE-SW was obtained from contour line 21.0 on the reconstructed Members I-II contact plane.

It has been generally agreed (Gauri, Aigner, Strugal and Rawzi; all personal communications) that the prominent bedrock outcropping running E-W parallel to, and just north of, the modern road is Member I (cut as a vertical ledge into which tombs have been cut). Yet it is obvious that from the natural sedimentary surface of Member I just beside the immediate Sphinx ditch, the prominent outcrop further north rises considerably, even to the NE of the Sphinx before it falls away to the valley floor. This rise is in the direction of the strike of the dip obtained from points G2-G17 in the Sphinx amphitheater.

In regards to the rise of Member I N-NE of the Sphinx ditch, two other sequences of points are pertinent. Aigner, in the 1981 field season, identified the Member I-II contact in the "Water Shaft" sunk through the Second Pyramid causeway about 190 ms. west of the Sphinx ditch (G28), and again in Campbell's Tomb shaft (G29) about 70 ms. west of the Sphinx ditch. Elevations taken on the Member I-II contact at these points give 26.65 ms. and 21.165 ms. respectively. Lehner put a point (G25) at the contact between a residue of Member II marly bedrock and the Member I surface on top of the high ledge north of the Sphinx amphitheater and modern road (this residue of the Member II on Member I had been pointed out by Aigner). The elevation of G25 is 24.445 ms. Between G28 and G25 there is a loss in height of 2.205 ms. from SW to NE. Yet, between G25 and G2 there is a loss in height, in the opposite direction, of 3.785 ms. At the same time, all these four points

are nearly aligned and their approximate alignment nearly corresponds to the strike of the averaged Member I-II contact plane dip.

The second sequence pf points aligns more to the direction of the dip of the contact between Members I-II as given by G2-G17. A low bedrock trough filled with yellow marly limestone immediately before the east center facade of the Sphinx Temple was seen by Aigner as a residue of the bottom marly bed (2a) of Member II in a characteristic trough of Member I (this trough was left when the bedrock was cut away for the floor of the lower terrace on which the Sphinx Temple is founded). A point (G30) was set at this contact which had an elevation of 7.35 ms. Another point (G31) was set on the higher terrace to the N of G30, the surface of which was thought to retain the sedimentary surface of Member I. G31 has an elevation of 12.135 ms.

G30 and G31 lie with respect to G25 on a NW-SE alignment which has a bearing close to that of the Member I surface dip obtained from G2-G17.

G30 - G25	G31 - G25
Distance: 101 ms.	Distance: 77 ms.
Dif. hei.: 17.095 ms.	Dif. hei.: 12.31 ms.
Slope: 9° 36' 24"	Slope: 9° 04' 58"
Bearing: N30° 46'W	Bearing: N39° 31'W

Although the bearing of the line between these points is 5°-14° further toward the east than the G2-G17 alignment (which gave the greatest dip in the Sphinx ditch), the dip given by these points is 4°-5° greater than that given by G2-G17. Clearly, the Member I-II contact plane does not conform to the more regular dip slope and direction of Member II.

4. PROBLEMS: The survey data presented here was gathered to help resolve two stratigraphic problems: 1. the correlation between the limestone exposures in the Central Field to the SW of the Sphinx with the Member II-III sequence in the Sphinx ditch; 2. the correlation between limestone exposures to the N-NW of the Sphinx and east of the Great Pyramid to the Member I-II-III sequence in the Sphinx ditch.

4.1. ASSUMPTIONS: It was assumed that a standard reference dip slope and direction could be established for given units in the Sphinx ditch. It was desired to know if given units outside the Sphinx ditch (to the SW and NW) were the same as given units inside the Sphinx ditch. The outside units could often not be traced directly because of cultural denudation (quarrying) and obstruction (tombs, debris, etc.). If selected points on the outside unidenti-

fied unit made an alignment with points on a given unit in the Sphinx area which was close to the true bearing of that unit's dip direction, and if the slope angle between these points was close to the reference slope dip for that unit (at the Sphinx), it is likely that the unidentified unit was the same as that in the Sphinx ditch. The more the bearing of a line between two points in the same unit deviates from the true dip bearing, the less would be the angle of dip between the two points. If two points in the same unit are approximately aligned perpendicular to the dip, or on the strike, the angle of slope between them would approach zero - they will be at nearly the same elevation.

4.2. SPHINX AND CENTRAL FIELD SEQUENCES

At the beginning of his participation in the 1981 field season, Aigner thought that limestone beds equivalent to Member III at the Sphinx (head) were preserved in the outcrops immediately north of the Kent Kawes monument at the far south edge of the Central Field. He thought, further, that the section exposed by the vertical quarry cut through this outcrop (particularly at his log 8, which corresponds to G24, Plan IV) was equivalent to the sequence shown in section by the Sphinx statue and its ditch. The top of the Central Field outcrop (G21, G24) looked to be about on strike bearing of the general NW-SE dip direction. Therefore, it seemed appropriate that a preliminary sighting of the top of the Sphinx head and the top of this outcrop showed the two points to be at about the same absolute height.

Later, when Aigner and Lehner tried to trace individual beds from the south side of the Sphinx ditch, along bedrock exposures around the SE and south edges of the Central Field, it appeared as though the beds exposed in "quarry cubes" around the Kent Kawes monument were much 'higher', or younger in the stratification (although not necessarily at appreciably higher absolute levels). This seemed to conflict with the preliminary sighting with the surveyor's level, and the fact that the top of the outcrop near Kent Kawes was nearly on the strike bearing with respect to the Sphinx. Later Gauri and Lehner attempted to trace the beds by eye and it seemed Aigner's earlier conclusion was correct: the sequence exposed at or near Kent Kawes is equivalent to that of the Sphinx head and body (Members III, II respectively).

If Aigner's earlier conclusion is correct, a series of three to four salient thin yellow marly beds with concentrations of large nummulites that first show in quarry cube (QC) 15 (mastaba of Kay), and which can be traced to Kent Kawes, should be equivalent to the marly beds passing through the neck of the Sphinx (Beds 8b - 8d).

In March 1982, Lehner marked two points at the base of this series of thin marly beds on a NE-SW alignment with the head of the Sphinx - or about on the expected strike, took their elevations, and mapped their positions. G23 is at the SE corner of QC 15 (mastaba of Kay; photos. 2-4) and G24 is at the vertical section and outcrop just NE of the NE corner of Kent Kawes (photos. 5, 6; about at Hassan's mastaba of Thesty). These points were then tied to a point (G32) at the base of the Sphinx neck behind the head, precisely at the bottom of Bed 8b, the marly layer in the Sphinx neck. The following relations obtained (see Plan IV):

G32 - G23	G32 - G24 (base of marly beds at bottom of section)
Distance: 194.5 ms.	Distance: 251 ms.
Dif. hei.: 1.115 ms.	Dif. hei.: .495 ms.
G32 higher than G23	G24 higher than G32
Slope: 0° 19' 42"	Slope: 0° 06' 46"
Bearing S36° 14'W	Bearing: S45° 14'W

STRIKE Member II at Sphinx: G1 - G16: S46° 44'W
Averaged: S59° 50'W

The bearing of both G23 and G24 with respect to G32 falls close to the strike of Member II. G32-24 is particularly close to the strike as given by G1-G16 in the Sphinx ditch. There is no doubt (in Lehner's mind) that G23 and G24 are points set in the same unit. In both cases above, the angle of slope is close to zero. It is probable, therefore, that the thin marly nummulitic at points G23 and G24 represent the same stratigraphic units as the marly beds in the neck of the Sphinx. It follows that Aigner's earlier hypothesis is born out, viz. the sequence exposed at and near Kent Kawes (photos. 6, 7) represents that given by the upper part of the bedrock core of the Sphinx statue.

Predictably, more of the sequence is left near Kent Kawes than in the Sphinx (where some was cut away to form the head). The top of the outcrop at G24 (Aigner's log 8) has an elevation of 31.23 ms. The highest point in this general area, G21 (photo 7) N-NW of Kent Kawes, has an elevation of 34.275 ms. This compares to an elevation of little more than 30.5 ms. for the top of the Sphinx head.

G22 is located at the top of QC 11 (Aigner's log 7). In the vertical cut forming the east face of this cube, there shows a thick orangish-yellow marly bed. This appears much like Bed 6a in the Sphinx core. To test for the equivalence, the elevation of the top of this bed at G22 was taken and compared with a point, G33, at the top of Bed 6a in the south shoulder of the Sphinx (see Plan IV):

G33 - G22

Distance: 152.5 ms.
Dif. hei.: 4.175 ms.
G33 higher than G22
Slope: 1° 34' 05"
Bearing: S27° 44'W

4.3. SPHINX AND EAST FIELD SEQUENCES.

During the 1981 field season, Aigner traced Member I from the Sphinx ditch to the outcrop NE of the Sphinx, and along the edge of the escarpment bordering the modern village as far as the NE corner of the rock shelf extending east of the Great Pyramid. However, the Member I-II-III sequence was not so clear in the levelled bedrock closer to the Great Pyramid, between it and the Eastern Field cemetery.

The large boat pit cut out of the bedrock parallel to the east side of the Great Pyramid offered a vertical section through the bedding at this point. The sides of the boat pit show, toward the top and dipping generally N to S, a series of thin marly beds with concentrations of large nummulites. A point, G26, was monumented exactly at the base of these marly beds in the east side of the boat pit. Its posotion and elevation were surveyed in order to ascertain the dip and bearing with respect to points monumented on the Member I-II contact down in the Sphinx precinct. This was to follow through on a hypothesis put forth by Aigner that these marly beds mark the Member I-II contact east of the Great Pyramid.

In March 1982, Lehner observed, from the top of the Great Pyramid, two salient discontinuities, or "overlaps," on the exposed culturally levelled berrock floor of the area east of the Pyramid. The first corresponds to the thin marly nummulitic beds exposed in section in the sides of the boat pit. The second is further north and can be seen mainly about 10 ms. north of the other open boat pit cut parallel to the causeway of the Pyramid (photo. 8). A hunch was formed that the first line of overlapping strata is the contact between Member II and III - in which case the nummulitic marly beds showing in the boat pit would be equivalent to those in the Central Field at G23, G24, and in the neck of the Sphinx. According to the hunch, the more northern discontinuity corresponds to the Member I-II contact.

A point, G27, was monumented at the contact between the two overlapping strata making the north discontinuity. The position and elevation of this point was surveyed. The following relationships bear on Lehner's hunch that the series of thin marly bands at G26 (boat pit) are equivalent to those at G32 (the neck of the Sphinx) and therefore to those at G23, G24, and in Kent Kawes:

G32 - G26

Distance: 440.5 ms.
Dif. hei.: 22.8748 ms.
Slope: 2° 58' 21"
G26 higher than G32
Bearing: N24° 46'W

G23 - G26

Distance: 561 ms.
Dif. hei.: 23.9898 ms.
G26 higher than G23
Slope: 2° 26' 55"
Bearing: N9° 44'W

G24 - G26

Distance: 575 ms.
Dif. hei.: 22.3798 ms.
G26 higher than G24
Slope: 2° 13' 44"
Bearing: N3° 14'W

Member II Dip at Sphinx		Bearing of Dip Direction
Averaged:	5° 06' 08"	N30° 10'W
G1-G16:	5° 55' 44"	N44° 30'W

Assuming that the dip of Member II in the Sphinx ditch would be that of Member II over the whole Giza "plateau," and/or that it would be the same as the dip of the contact between Members II-III, the above data might allow that the thin marly beds at G32 (Sphinx neck) and G26 (boat pit) are equivalent. The slope between G32-G26 is about half the Member II dip at the Sphinx, while the bearing of these two points is about half that between points G1-G16 which gave the most prominent dip in the Sphinx ditch. In the other two relations, G23-G26 and G24-G26, the bearing is increasingly away from the dip direction, and the dip slope is correspondingly less.

Concerning Aigner's hypothesis, that the marly beds in the East Field boat pit may mark the Member I-II contact, the following relations between points in the Member I-II contact in the Sphinx precinct and G26 are pertinent (see Plan IV):

G2 - G26

Distance: 361.5 ms.
Dif. hei.: 25.2848 ms.
Slope: 4° 0' 0"
Bearing: N24° 14'W

G8 - G26

Distance: 400 ms.
Dif. hei.: 30.3148 ms.
Slope: 4° 20' 02"
Bearing: N30° 14'W

G25 - G26

Distance: 387 ms.
Dif. hei.: 21.4998 ms.
Slope: 3° 10' 47"
Bearing: N37°14' 0"

G30 - G26

Distance: 488 ms.
Dif. hei.: 39.5948 ms.
Slope: 4° 38' 19"
Bearing: N36°14' 0"

G31 - G26

Distance: 464 ms.
Dif. hei$_\delta$: 33.8098 ms.
Slope: 4° 10' 0"

Bearing: N32° 14'W

Member I-II Contact Dip at Sphinx	Bearing of Dip Direction
Averaged: 4° 23' 41"	N9° 52'W
G2-G17 : 5° 26' 10"	N42° 46'W

The slope between all the above points on the Member I-II contact plane at the Sphinx and G26 is very close to the averaged dip for the Member I-II contact plane at the Sphinx. The bearing of these points to G26 range from 6° to 20° less than that of the Member I-II contact dip direction taken from G2-G17, the greatest dip measured at the Sphinx. If the latter is more the true dip (as opposed to the averaged dip), it is noteworthy that while the bearings of the above points with respect to G26 are 6° to 20° less than that of G2-G17, the slopes are correspondingly 1° to 2° less.

Thus, the data may be more supportive of Aigner's hypothesis, viz. the marly units in the boat pit (G26) do represent the bottom of Member II, G26 being on the Member I-II contact plane. A problem in using the data is the wide range shown in the dip direction or bearing of the Member I-II contact plane within the Sphinx precinct. Given the apparent extreme irregularity of that plane, how may one be sure that two points are on the dip direction?

For the sake of completeness, the survey data pertinent to the second part of Lehner's hunch - that the more northern discontinuity (G27) in the Eastern Field is the Member I-II contact - is given below:

G2 - G27

Distance: 431 ms.
Dif. hei$_\delta$: 26.055 ms.
Slope: 3° 27' 34"

Bearing N13° 44'W

G8 - G27

Distance: 461.75
Dif. hei$_\delta$: 31.085 ms.
Slope: 3° 51' 04"

Bearing: N19° 44'W

G25 - G27

Distance: 439.75 ms.
Dif. hei$_\delta$: 22.27 ms.
Slope: 2° 53' 56"

Bearing: N25° 29'W

G30 - G27

Distance: 540 ms.
Dif. hei$_\delta$: 39.365 ms.
Slope: 4° 10' 09"

Bearing: N26° 44'W

G31 - G27

Distance: 514 ms.
Dif. hei.: 34.58 ms.
Slope: 3° 50' 55"
Bearing: N27° 59'W

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Geo Pt.	Location	Geo. Unit	Elevation	Aigner Log
1	NW corner Sphinx "amphitheater"	Member II Bed 3i	24.60	1
2.	NW Corner Sphinx "amphitheater"	Contact Member I- II	20.66	1
3.	Upper ledge, W side Sphinx ditch	Bed 3i Member II	18.925	1
4.	Lower ledge surf. W side Sphinx ditch	Member I-II Contact	14.94	1
5.	SW corner Sphinx ditch	Bed 3i Member II	17.15	1
6.	SW corner Sphinx ditch	Bed 3i Member II	16.98	1
7.	Sphinx corebody NW corner	Bed 3i Member II	15.815	1
8.	"Amphitheater" floor, N of Sphinx	Member I-II Contact	15.625	1
9.	SW corner Sphinx ditch	Member I-II Contact	14.34	1
10.	SW corner Sphinx ditch	Bed 3i Member II	15.595	1
11.	SW corner Sphinx ditch, base of causeway	Member I-II Contact	12.685	1
12.	S-SW Sphinx ditch	Bed 3i Member II	14.235	1
13.	S-SW Sphinx ditch	Member I-II Contact	10.635	1
14.	S Sphinx ditch, at major fissure	Bed 3i Member II	13.475	1
15.	S-SE Sphinx ditch side of causeway	Bed 3i Member II	11.695	1

Geo. Pt.	Location	Geo Unit	Elevation	Aigner Log
16.	SE Sphinx ditch, end of causeway	Bed 3i Member II	10.39	1
17.	SE Sphinx ditch center floor	Member I-II Contact	10.325	1
18.	Sphinx corebody, chest under boss	Bed 3i Member II	14.385	1
19.	Sphinx corebody SE corner (shoulder)	Bed 3i Member II	14.105	1
20.	Sphinx N forepaw inner side, base	Member I-II Contact	11.775	1
21.	N-NW of Kent Kawes monument	Member III top of outcrop	34.275	8
22.	Central Field Quarry Cube 11	Thick marly bed (equals 6a?)	15.375	7
23.	Central Field Quarry Cube 15 Mastaba of Kay	Base of 3-4 thin nummulitic marly beds	21.955	Between 7 and 8
24.	N-NE of Kent Kawes monument	Member III outcrop, top: base of thin marly beds:	31.23 23.565	8
25.	Top of N ledge, Sphinx "amphitheater"	Contact Member I-II	24.445	
26.	Boat Pit east of Great Pyramid	Base of thin nummulitic marly beds	45.9448	
27.	N of Boat Pit parallel to G.P. causeway	Discontinuity in bedrock surface	46.715	
28.	"Water Shaft" 190 ms. west of Sphinx	Member I-II Contact	26.65	3
29.	Campbell's Tomb, NE corner	Member I-II Contact	21.165	2
30.	Front, center of Sphinx Temple	Member I-II Contact (?)	7.35	
31.	Upper Terrace, NE of Sphinx Temple	Member I sedimentary surface	12.135	
32.	Sphinx, base of neck back of head	Member II-III Contact, Bed 8a	23.07	1
33.	Sphinx N shoulder	Bed 6a	19.55	1

NOTES

1. Elevations values given here are referenced to an arbitrary datum point which was defined as plus 10 ms. The elevation with respect to mean sea level at Alexandria is given by adding 9.331 to any of the elevation values given here, The value for sea level was transferred down to the Sphinx from the Survey of Egypt pins at the Great Pyramid; the value above M.S.L. for these pins was taken from J.H. Cole, "Determination of the Exact Siza and Orientation of the Great Pyramid of Giza," Survey of Egypt, Paper No. 39, p. 4.

2. The bearings given in this report are with respect to true north. When the survey grid was tied to the base of the Great pyramid during the 1981 season, it was found that the grid bearing is N01° 14' 00"W based upon the bearing for the east side of the Pyramid given by Cole, op.cit., p. 6. The bearings between the various geologic points was measured off the map with reference to the grid lines, to which 1° 14' was added (SW quadrant) or subtracted (NW quadrant), to give the bearing with respect to true north. These should be considered approximate (they are, anyway, rounded off to the nearest .25 of a degree) and preliminary, as far as true north. However, this does not affect the bearings relative to each other, or to that given for north (whether absolutely correct or not) - in other words for the purposes of relative comparisons in these notes.

PHOTOGRAPHS

1. Survey point at top of Quarry Cube 11, for G22 (thick marly bed (6a?) is three meters down face of QC 11), in Central Field.

2. G23 at SE corner of Quarry Cube 15, with Sphinx head in background. Rod marks G23 at base of thin marly nummulitic beds.

3. G23 at SE corner of QC 15, with Kent Kawes monument in background.

4. Quarry Cube 15 with G23 marked at its SE corner.

5. Top of outcrop at G24 (thin marly nummulitic beds are at base of the vertical section), Central Field, N-NE of Kent Kawes.

6. Outcrop north of Kent Kawes with rod marking G24 (top of outcrop).

7. Outcrop north of Kent Kawes with rod marking G21 in distance.

8. Eastern Field with G26 and G27 indicated.