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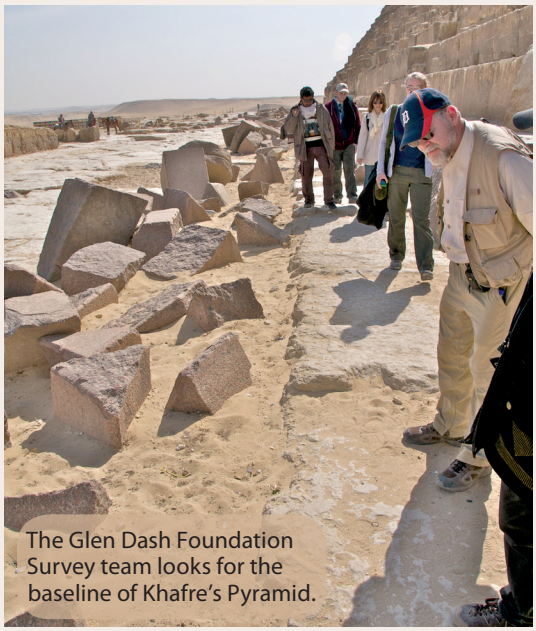

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Corner Conundrum: A Mapping Mantra

If we had clear-cut lines and corners, we could give precise coordinates for the pyramids to those who believe this is meaningful in terms of the builders' intentions. But, could the builders have measured distances to an accuracy of millimeters or centimeters over hundreds of meters, given sighting by eye without our telescopic instruments and challenges such as the stretch and sag of a rope?

Maps are by nature abstractions based upon assumptions, estimates, and interpretations. Mapmakers transform complicated physical realities into neat lines. Maps of the Giza Necropolis represent pyramids, tombs, and temples with clean rectangles, features that ceased to exist centuries ago and in some cases never existed as such.

Khufu's Great Pyramid is a good example. First, the original finished corners, and most of the original baselines, are missing completely. When David Goodman and I surveyed the Khufu Pyramid in 1984, we took measurements from points marked with bronze plugs at three of the corners. The people who set the plugs must have meant them to mark the corners, which they would have established by extrapolating from patches of *in situ* masonry in the foundation platform. Or they may have extrapolated from the line of the platform still visible in the bedrock floor. But this extrapolated line was *not* the baseline of the pyramid. As shown in the photo above, the bottom of the casing, set back from the upper edge of the platform, became the true baseline. But of the original 921.44 meters of this baseline only 54.44 meters remains, less than 6%. Most of this is near the centers of the sides, which makes extrapolations far less accurate than if we had segments closer to either end. With most of the original builders' lines gone, the baseline and dimensions of the Great Pyramid are now our own extrapolation.

When we read of the cosmic significance that some authors place on the exactitude of the Great Pyramid dimensions, we should bear in mind that the original builders' lines are reconstructed from less than 6% of the base.

Mapping the baseline of Khafre's pyramid is no easier. Petrie, who in 1881–82 surveyed the Giza pyramids according to professional standards of his time, went into the issue: what do we take as the baseline?* It turns out that Khafre's builders created the baseline of his pyramid simply as a vertical cut in the foot of the bottom course of casing stone, which was granite, so that the slope of the pyramid met the top surface of the pavement of the court surrounding the pyramid. Khafre's builders' custom-cut the natural limestone base underneath the casing to bring the granite blocks flush at the top (it was easier to cut away the limestone than the much harder granite). Only four casing blocks remain in place: two side by side at the far western end of the southern side and another pair near the center of the northern side. We therefore need to take as the baseline the outer edge of the emplacement cuttings, or socle, for the missing casing stones.

The builders never finished making the baseline of the Menkaure Pyramid, as we know from trenches dug into the debris covering most of the base. They shaved the tops of the lowest casing course even and flush, while leaving the bottoms at different levels, accommodating the slope and irregularity of the rough foundation. Maybe they intended, like Khafre's builders, to trim the baseline by cutting a vertical, lower face into the bottom of the slope of the casing blocks. Since they never completed this task, there is no straight and square baseline. Recently the Giza Inspectorate excavated through the debris at the western end of the northern side and showed that Menkaure's builders set the lowest casing here down into a trench cut into bedrock, several meters wide and 1.70 meters deep! We do not know the exact location of the corners, still embedded in debris, but like the pyramids of Khufu's queens, the base footprint is almost certainly a trapezoid.

Mastaba tombs (Arabic for "bench") look like flat-topped, stretched-out pyramids with sloping sides, and they present similar issues. During the Glen Dash Foundation Survey, "Where's the corner?" became a mapping mantra, and even "Where's any good stretch of straight [builders'] line?" For those theorists who demand high precision for pyramid points, we wondered, just what is the point?

*W. M. F. Petrie. 1883. *Pyramids and Temples of Giza.* London: Field and Tuer, pages 96–99.