

## SAMSON'S REMOVAL OF GAZA'S GATES

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From childhood I had always visualized Samson's feat of strength at Gaza with awe. However, my awe was tempered by a naive image of a gate such as one would expect at the entrance to a shabby Stone Age compound in the African bush: interwoven sticks and saplings like wickerwork. Of course, the heavy-weight weight lifter from the Soviet Union, Alexyev, would have no difficulty pressing the one hundred kilos (approximately 220 pounds) which an adequate wickerwork gate might weigh. (However, it might be beyond even Alexyev's ability to carry one hundred kilos a distance of thirty-six miles!)

Archaeological data and mathematical calculations have revived my appreciation for Samson's deed. In fact, it might be said that my awe has increased nearly a hundredfold though the credit must be given to the miracle-working power of God. The immediate response of Gaza's inhabitants was not recorded in Judges 16. However, the contractual arrangements between Delilah and the lords of the Philistine pentapolis reveal the respect which the Philistines had for Samson's capabilities: "Entice him, and see where his great strength lies and how we may overpower him that we may bind him to afflict him" (Judges 16:5a, NASB).

Various Commentators' Views

Keil and Delitzsch in their commentary on Judges 16:1-3 do not take into account the size of Gaza's gates. They merely give a quotation from de Velde which mentions that the gates were "heavy."<sup>1</sup>

John J. Davis<sup>2</sup> and Leon Wood<sup>3</sup> also ignore the bulk of Gaza's gates. Arthur E. Cundall at least provides information concerning the distance from Gaza to Hebron and adds the following helpful note:

As the gates of ancient cities were often nail-studded and covered with metal to prevent them being burnt during an attack, the weight may have been greater than that of the timber itself.<sup>4</sup>

However, Cundall did not volunteer any suggestion of the gates' weight.

The only tidbit gleaned from C. F. Burney's work is the description of the bar of the gate which extended from post to post as it stretched across the entire width of the gates.<sup>5</sup>

Of course, some commentators, like Edward R. Dalglish,<sup>6</sup> believe that Samson only carried off the smaller door (wicket) within the massive doors of the gate. The side posts and bars would only refer to this smaller gate in their view.

Although the commentators do not provide an abundance of information concerning this unusual feat of strength, the picture is reasonably clear. Samson had entered Gaza for unknown reasons but had quickly found reason to spend the night inside its walls (Judges 16:1). Unfortunately, Samson's great physical

prohess (supplied by an empowering ministry of the Spirit of God) was offset by his seldom controlled fleshly appetites. His brief tryst with the harlot of Gaza nearly brought a premature end to his judgeship. The Gazites received word (perhaps by the "grapevine" of the streets) that Samson was in the city. Whether or not Samson's fling was the result of entrapment, he was now definitely trapped (16:2). Shutting the gates of the city, the Gazites laid an ambush for the Israelite judge.

With his desires momentarily satisfied, Samson arose from his pallet of pleasure and entered the streets of Gaza at midnight. Under cover of darkness he managed to pass the ambushers, lift the massive gates from their sockets, and carry them nearly forty miles to the vicinity of Hebron (16:3).

#### The Description of Gaza's Gates

What was the structure of the gates of Gaza? How much did they weigh? What kind of energy had to be expended to remove them from their sockets and carry them approximately forty miles? With the aid of various pieces of information and a few mathematical formulae it is possible to give some general answers to these questions.

The Dimensions. Excavations at et-Tell (Ai?) have disclosed the postern gates from the Early Bronze IC (ca. 3000-2900 B.C.) level. The walls at the sides of the gates provide an indication of the probable height of the gates themselves. These particular gates had passages which were still intact up to the height of three

meters (about ten feet). The walls of the passages converged slightly in the upper courses. The convergence may indicate that the passage was originally covered. The height of the gates may have been around three meters in the light of this information.<sup>7</sup>

The width of the gates seems to have been in the vicinity of three meters since the evidence at Hazor<sup>8</sup> and Ashdod<sup>9</sup> demonstrates the existence of Solomonic gates from three to four meters wide. The evidence at Ashdod is particularly significant since that city was one of the Philistine pentapolis which included Gaza. M. Dothan reported that the gates at Ashdod from Middle Bronze II (ca. 1900-1550 B.C.--a few hundred years prior to Samson's day) were three meters wide between the tongues protruding from the walls.<sup>10</sup>

The thickness of the gates is more difficult to determine. Since the gates themselves have not survived the ravages of time and pillaging, there are none to measure. However, with the need for a solid structure in mind, it would not be beyond the realm of possibility for the gates to have been anywhere from 0.5 to 1.0 meter thick (approximately 1.65-3.30 feet thick).

The Materials. City gates were made of wood which was durable (like cedar) and sometimes plated with bronze.<sup>11</sup> The bronze plating protected the gates from axes and other tools of siege (as well as fire).

The bars of the gates were variously of bronze (cf. I Kings 4:13) and wood (cf. Amos 1:5; Nahum 3:18). The sockets into which

the bar fit were often of iron or bronze and were placed in the jambs on either side of the gates.<sup>12</sup>

The gate posts onto which the two leaves of the gates were secured could have been made of wood. However, there is some evidence that the leaves may have turned on pins which moved in sockets in the sill and lintel rather than turning upon hinges secured to posts.<sup>13</sup>

The Weight. The approximate weight of a gate with the dimensions given above and composed of the materials described above may be computed in the following manner:

$$\begin{array}{r}
 \text{Volume of the gates} \\
 \times 62.4 \text{ lbs. (/cu. ft.)}^{14} \\
 \hline
 \text{Equivalent weight of water} \\
 \times .53 \text{ (specific gravity of cedar)}^{15} \\
 \hline
 = \text{Actual weight of the cedar gates.}
 \end{array}$$

This formula proceeds as follows:

$$\begin{array}{r}
 3.3 \text{ ft. (approx. thickness--maximum)} \\
 \times 9.9 \text{ ft. (approx. height)} \\
 \hline
 32.67 \text{ sq. ft.} \\
 \times 9.9 \text{ ft. (approx. width)} \\
 \hline
 323.433 \text{ cu. ft.} \\
 \times 62.4 \text{ lbs. / cu. ft. H}_2\text{O} \\
 \hline
 20,182.2192 \text{ lbs. of H}_2\text{O (equivalent)} \\
 \times .53 \text{ (specific gravity, cedar)} \\
 \hline
 \underline{\underline{10,696.576176}} \text{ lbs.}
 \end{array}$$

In case the minimum thickness (1.65 ft.) is preferred, the total weight of the gates of cedar would be approximately 5,350 lbs. instead of 10,700 lbs.

These figures do not include the bar nor the bronze plating! If the plating were included, it would practically

double the weight of the gates (10,700 lbs. minimum; 21,400 lbs. maximum). The gates of Gaza could well have weighed in the vicinity of five to ten tons (approximately 4.5 to 9.1 metric tons)! The deed definitely takes on miraculous proportions. The praise must go to Samson's God who supernaturally empowered him (cf. Judges 13:25; 14:6, 19; 15:14; 16:20, 28).

The Energy Needed to Remove the Gates. For Samson to lift 5,350 lbs. to a height of three feet would require 16,050 foot-pounds of work. If he accomplished this in 30 seconds, the power exerted would be approximately 535 foot-pounds per second. The power exerted would be close to one horsepower (550 ft-lb/sec.).<sup>16</sup> However, Samson may have lifted as much as 21,400 pounds (and, perhaps in less than 30 seconds). The approximate horsepower expended in such a lift would be four times that of the minimum figure just computed, or about four horsepower.

Samson did not lift the gates and put them back down, however. He then proceeded to carry them from Gaza to the vicinity of Hebron (approximately 36 miles "as the crow flies"). The change in altitude involved approximately 3200 feet (Gaza is about 100 feet above sea level and Hebron is about 3300 feet above sea level). Samson also performed this feat between midnight and sometime (presumably) the following day. The time factor is not given in the account in Judges. For the sake of approximate computation, however, the figure of eighteen hours could be used as the maximum time period (allowing till about sunset the following day). The horsepower which would have been

exerted in such a situation would be approximately 28.5 horsepower (for moving the minimum 5,350 lbs. over a distance of 36 miles in 18 hours). This figure does not take into account the change of altitude which would increase the power output.

What is this by comparison to a man like Alexyev of the Soviet Union? By titanic effort Alexyev is able to lift 250 kilos (approximately 550 pounds) a distance of seven feet in fifteen seconds. That power output is the equivalent of slightly less than 0.5 horsepower. The obvious conclusion is that Samson was generating far more horsepower than even the most extraordinary human being is capable of doing.

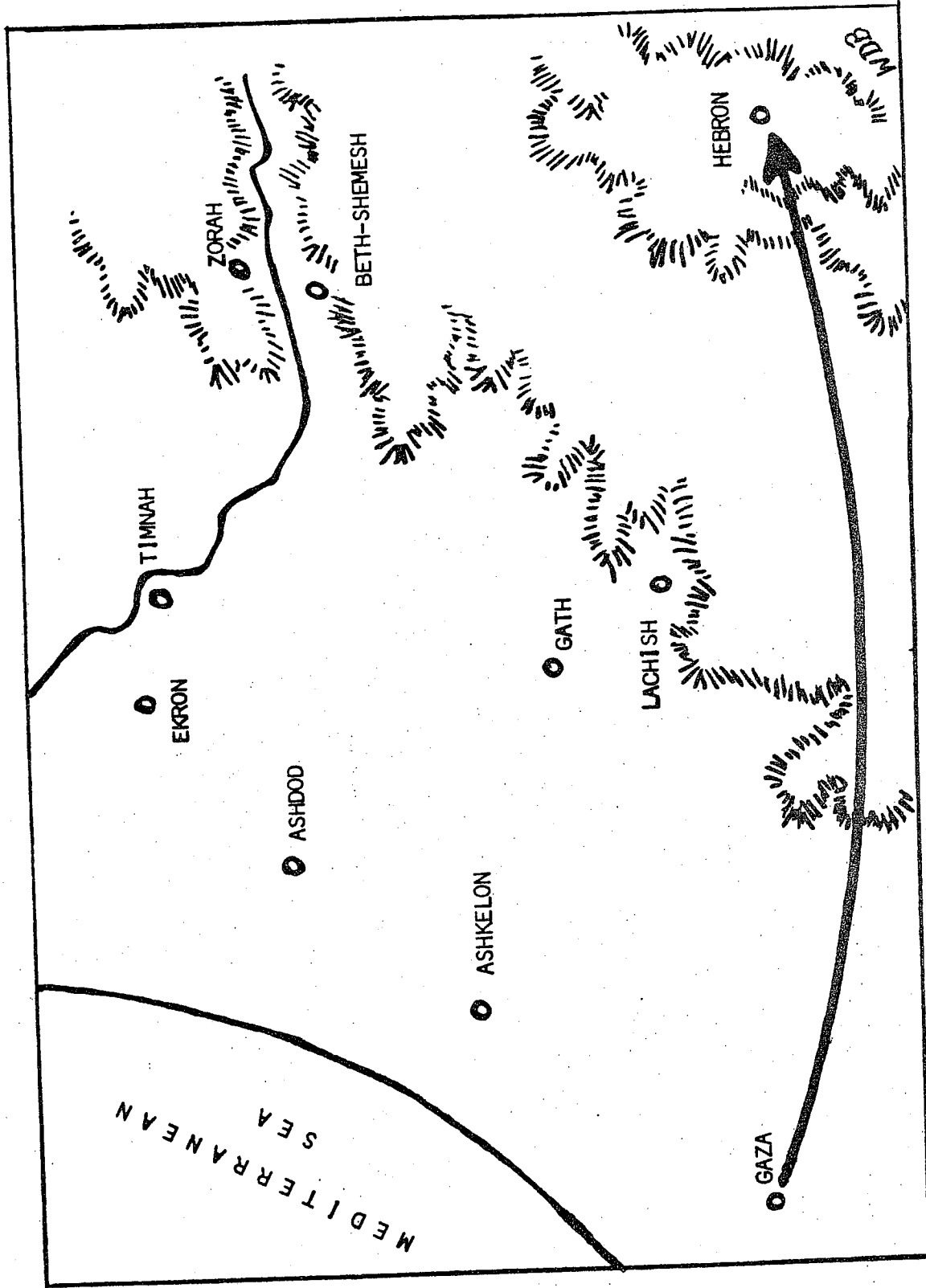
In conclusion, the removal of the gates of Gaza by Samson was indeed a miracle of unparalleled proportions. The computation of the gates' dimensions and weight can only heighten the awe which the reader of Judges 16:1-3 possesses in the presence of this supernatural feat of strength. Only God's power could accomplish this deed through a mortal being. The God of Israel is truly mightier than the gods of the Philistines!

## NOTES

1. C. F. Keil and F. Delitzsch, Biblical Commentary on the Old Testament: Joshua, Judges, Ruth, trans. James Martin (Grand Rapids: Wm. B. Eerdmans Publishing Co., 1970), pp. 418, 419.
2. John J. Davis, Conquest and Crisis: Studies in Joshua, Judges, and Ruth (Grand Rapids: Baker Book House, 1969), p. 138.
3. Leon Wood, Distressing Days of the Judges (Grand Rapids: Zondervan Publishing House, 1975), p. 326.
4. Arthur E. Cundall, Judges in The Tyndale Old Testament Commentaries, ed. D. J. Wiseman (Downers Grove, Ill.: Inter-Varsity Press, 1973), p. 174.
5. C. F. Burney (ed.), The Book of Judges with Introduction and Notes on the Hebrew Text of the Books of Kings in The Library of Biblical Studies, ed. Harry M. Orlinsky (New York: KTAV Publishing House, Inc., 1970), p. 377.
6. Edward R. Dalglish, "Judges," The Broadman Bible Commentary, Vol. 2: Leviticus-Ruth, ed. Clifton J. Allen (Nashville: Broadman Press, 1970), p. 448.
7. Joseph A. Callaway and Norman E. Wagner, "A re-examination of the Lower City at Ai (et-Tell) in 1971, 1972," Palestine Exploration Quarterly (July-December, 1974), p. 150.
8. Yigael Yadin, Hazor (London: Oxford University Press, 1972), p. 137.  
See, also, "Fortifications," Archaeological Encyclopedia of the Holy Land, ed. Abraham Negev (New York: G. P. Putnam's Sons, 1972), p. 114.
9. M. Dothan, "The Foundation of Tel Mor and of Ashdod," Israel Exploration Journal, 23 (1973) 1, pp. 10, 11.
10. A comparison of the width of various gates from Tell el-Far'a, Megiddo, Hazor, and Ashdod is found in footnote 29 on p. 10 of Dothan's article. Figure 5 (p. 11) provides a reconstruction of the passage structure of the gate at Ashdod.
11. See the reference to plating made by Cundall in the quotation already given (see footnote 4, above).



12. John Gray (ed.), Joshua, Judges and Ruth in The Century Bible, eds. H. H. Rowley and Matthew Black (Greenwood, S. C.: The Attic Press, Inc., 1967), p. 356.
13. George F. Moore, A Critical and Exegetical Commentary on Judges in The International Critical Commentary, ed. Alfred Plummer (Edinburgh: T. & T. Clark, 1895 [1966 ed.7]), p. 349.
14. Erich Hausmann and Edgar P. Slack, Physics (Princeton, N. J.: D. Van Nostrand Co., Inc., 1948), p. 193.
15. Ibid., p. 201. The choice of 0.53 for the specific gravity of cedar is based upon the range of the specific gravity of cedar (0.49-0.57). By choosing the mean specific gravity, the purpose of a reasonable approximation is best served. Other specific gravities include: Oak (0.60-0.90) and Pine (0.35-0.85).
16. Ibid., pp. 127, 128. According to the Human Factor studies on the astronauts in the Apollo program (1969-1971), the average human being can generate a maximum of one horsepower for one full minute. The same individual may be able to generate 0.125-0.25 horsepower for a maximum of one hour--after which he would be exhausted. (This information was supplied by Mr. Stan Swinney, science professor at Denver Baptist Bible College. Mr. Swinney served as team leader on the Human Factors Design Project in the Apollo program under the Systems and Research Division of Honeywell Inc.)



SAMSON CARRIED OFF THE GATE OF GAZA

A CROSS-SECTION OF THE TERRAIN  
ON SAMSON'S ROUTE FROM GAZA TO HEBRON

