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A table of contents for *The Expositor* can be found here:

https://biblicalstudies.org.uk/articles_expositor-series-1.php

A MISINTERPRETED MIRACLE.

CERTAIN of the Scripture narratives appeal to the astronomer as coming within the border of his own special studies, and chief amongst these is the account of the wonder that is recorded to have taken place during the battle of Beth-horon ; that first great decisive battle of the world which gave the possession of the Land of Promise to the children of Israel. May it be permitted then to an astronomer to explain how this particular narrative strikes him when viewed from his own standpoint ?

The astronomical interest of the tenth chapter of the Book of Joshua centres upon verses 12 and 13, for they have been taken to mean that the earth's rotation upon its axis was arrested for several hours, so that the setting of the sun was delayed beyond its proper time for quite half a day. The words ascribed in the record to Joshua at the supreme moment of the day are :—

“Sun, stand thou still upon Gibeon ;
And thou, Moon, in the valley of Aijalon,”

and the great majority of commentators have assumed that the day was far spent when Joshua thus spoke, and that fearing lest darkness should intervene before the Israelites could overtake their flying enemies, he ordered the sun, which he saw over Gibeon on the skyline, to remain there without setting, “until the people had avenged themselves upon their enemies.”

Yet in spite of the very general agreement of commentators, it is certain that the narrative forbids us to conclude that Joshua's words were spoken at or near the time of sunset, and this from the most simple of astronomical considerations.

It would have been quite natural for the Hebrew general

to speak of the sun as being "upon Gibeon," if at that moment he were far to the east of the city, and he saw the sun in its downward course just about to be hidden by its walls and towers. As a rule the celestial bodies do not appear to have any fixed relation of place with respect to objects on the earth. Thus, for instance, no one here in England could possibly associate the position of the September noon-day sun with any hill or building or city. If we were looking over London from Highgate Hill, we could not think or speak of the sun at that time as being either "upon" St. Paul's or ourselves at Highgate, since it would be obvious that he was just as much "upon" one part of the landscape as another. But at his rising or setting the sun does seem to be associated with the objects near it on the horizon, and would be so described with perfect naturalness.

There would then be no difficulty about the ordinary view if the sun alone had been mentioned, but Joshua addressed not only the sun but the moon. The moon, to him, was "in" the valley of Aijalon.¹ But as he must have been to the east of Gibeon to see the sun setting over it, he must also have been to the east of Aijalon which lies to the west of Gibeon. The moon, therefore, as well as the sun, must have been setting, but no one has ever seen the sun and moon setting together or rising together. For they can only be thus apparently close together when the moon is nearly "new"; that is to say, when it turns its dark side towards the earth. At best only the very thinnest arc could be illuminated under these circumstances, and this could not be detected in such close proximity to the sun. The mention, therefore, of both sun and moon, and each of them as apparently connected with some landmark, proves conclusively that it was not near sunset when Joshua spoke.

¹ The difference in the prepositions in the English versions is not in the Hebrew.

Yet the interpretation of the narrative that is commonly accepted is based on the assumption that it was so ;—that the day was far spent and the sun about to set.

Some commentators have taken a very different view, surmising that the incident happened soon after sunrise, since it is stated in the ninth verse that :—

“ Joshua, therefore, came upon them suddenly ; for he went up from Gilgal all the night.”

They suppose that Joshua's victory was of the nature of a night surprise, and that he broke in upon the Amorites shortly before daybreak.

If the incident took place shortly after sunrise, Joshua seeing the sun “ upon Gibeon ” must have had that city to his east. The moon then “ in the valley of Aijalon ” might have been to his west, opposite to the sun, and, therefore, full and just about to set. Under such conditions the moon can be seen in full daylight easily. But this hypothesis has serious difficulties of its own. First, it is hard to see how Joshua, coming from the camp at Gilgal which is far to the east of Gibeon, could, shortly after daybreak, be some distance from Gibeon to the west. Next, there would seem no reason why he should wish the day to be prolonged when he had it all before him. But the most serious objection is one of a strictly astronomical character.

We moderns in our great cities lead such artificial lives, and are so far removed from contact with nature, that the ordinary man is apt to think that the sun may be anywhere in the sky, and the moon at the same time anywhere in relation to it. It is not so. The position of the sun in the sky is strictly determined for every moment of every day. It follows in its apparent course a rigidly defined [path, and never departs from that imagined circle in the heavens which we call the ecliptic. And the path of the moon is as strictly defined as that of the sun, though it is not confined to the

ecliptic but oscillates for a short distance on either side of it. If then the moon appeared as if about to set behind the valley of Aijalon, whilst the sun had just risen from behind Gibeon, those two places must have appeared to the observer to be almost exactly opposite to each other, and Joshua must have been standing very nearly on the straight line joining them. But the valley of Aijalon lies about 17° N. of W. from Gibeon, so that to Joshua, when he spoke, the moon must have seemed to "bear" about 17° N. of W. and the sun about 17° S. of E. At the time of the equinox the sun rises due east, and, if the moon be then at the full, this will set not far from due west. From the autumnal equinox onward to midwinter the sun rises further and further south every day, and by consequence the setting place of the moon when full is further and further north. The day of the year which would be indicated by the sun rising over Gibeon whilst the moon was setting in the valley of Aijalon would be about October 30, of our present calendar. Later on in the year the sun's place of rising would be too far to the south, but after the winter solstice it would move north again and the conditions indicated would be satisfied a second time on or about February 12. At or about these two periods, and these two periods only, could sun and moon have held the supposed relation to each other.

But the month of February was already past before the battle of Beth-horon. Israel had passed the Jordan at the time of flood; that is to say, in early spring. They then kept the Feast of the Passover, which was observed at the first full moon after the spring equinox, corresponding roughly to our Easter. After the Passover came the taking of Jericho, the campaign against Ai, and the pilgrimage to the mountains Ebal and Gerizim for the reading of the Law. This not improbably took place on the anniversary of the original giving of the Law from Mount Sinai, and would,

therefore, correspond nearly to our Whitsuntide. The tribes then returned to Gilgal, and when there the Gibeonites made their fraudulent treaty with them which led swiftly on to the battle of Beth-horon. For since Beeroth, the most northern of the Hivite cities, was only four miles from Ai, and Gibeon, their chief city, only six miles from Jerusalem the headquarters of the Amorite league, it is certain that the events between the return of the Israelites to Gilgal and the battle of Beth-horon cannot have been spread over several months, but must have occupied only a few days. We may be sure, therefore, that the events recorded in the tenth chapter of Joshua took place during the very height of summer.

But, as we have already seen, the sun during the summer months could not be observed as bearing 17° S. of E. at its rising, nor for similar reasons could the full moon have been seen as setting 17° N. of W. If the sun had alone been mentioned in reference to some geographical position the question would have been indeterminate, but the mention of the moon, also with a definite geographical reference, defines the conditions within narrow limits, and it is certain that the sun cannot have just risen "upon Gibeon," any more than it can have been just about to set "upon" it.

There is, however, one other position in the sky, and one only, which the sun may hold in which it may naturally be spoken of as being "upon" a given locality; it may be in or near the zenith of that place. And this third use of the term is the most natural of all. For if the sun is above us, right overhead, so that a man can cover his shadow with his foot, then indeed there is no doubt about its relation to us; it is "upon" us; it is "upon" the place where we are. Joshua, therefore, must have been at Gibeon when he spoke, with the sun overhead.

And if we turn to the thirteenth verse, we find this fact definitely stated: "So the sun stood still in the midst of

heaven"; in the "halving" of the heavens, that is to say in its very centre. It was high noon in the middle of summer, and as Palestine is a sub-tropical country, it was probably within 10° or 12° of the zenith. In such a position, it could never occur to any one, least of all to those who were actually experiencing its scorching power, to describe the sun as other than "overhead." It was "upon Gibeon," "upon" Joshua.

Joshua was at Gibeon and it was noonday. Knowing thus approximately the time of day, and the place where the observation was made, it is possible to deduce the astronomical significance of the moon appearing to be "in the valley of Aijalon." I have worked out this problem elsewhere,¹ and it is sufficient to say here that it appears that the battle took place on or about the 21st day of the fourth Jewish month, which in that particular year almost exactly corresponded to July of our present calendar. The sun, therefore, had risen at five that morning, and, as it was noon when Joshua spoke, there were still seven hours before it would set. The moon was near, but had not yet passed, its third quarter, that is to say, it was about half full. It had risen soon after eleven o'clock on the previous evening, and had lighted the Israelites during the greater part of their night march up from Gilgal, and it would set in about half an hour.

What then was the meaning of Joshua's command?

"Sun, be thou silent upon Gibeon;

And thou, Moon, in the valley of Aijalon,"

for it is well known that the margin gives the literal meaning of the verb, which corresponds to our own word "dumb," being formed to imitate the sound made when a man closes his lips on his speech. It has, therefore, the general mean-

¹ *Astronomy of the Bible*, pages 362-365. See also *The Observatory*, for 1904, January, vol. xxvii., page 57. "Note on an Early Astronomical Observation recorded in the Book of Joshua."

ing of "to cease," "to be quiet," "to desist." The word occurs again in the next verse :—

" And the sun was silent,
And the moon stayed."

The word "stayed" is correctly translated, though it might be better rendered as "stopped." But the parallelism of Hebrew poetry obliges us to take it here as a synonym of the first verb, and indeed it also is sometimes rendered "to cease." Both sun and moon ceased from something that they had been doing before. The passage may, therefore, be rendered thus :—

"Sun, cease thou upon Gibeon ;
And thou, Moon, in the valley of Aijalon.
And the sun ceased,
And the moon stopped,
Until the people had avenged themselves upon their
enemies.

Is not this written in the Book of Jasher ? "

Joshua then commanded the sun to "cease upon Gibeon." To cease from what—from moving or from shining ? There can be no question as to which of the two he must have desired. There never could have been any question in the mind of any man who was himself in the position of the Hebrew captain. The highland of southern Palestine in summer is one of the hottest countries of the world ; the sun was right overhead pouring down its pitiless rays upon him. The last thing that he could have wished would have been to fix the sun in that intolerable position. The only meaning that can be ascribed to the words, "Sun, cease upon Gibeon," is that it should cease from its shining ; that it should close its rays as a man closes his lips ; that it should "be dumb."

And we know that this actually did take place. For we

learn from the eleventh verse that, as the Amorites fled from before Israel, "The Lord cast down great stones from heaven upon them unto Azekah and they died: they were more which died with hailstones than they whom the children of Israel slew with the sword." A mighty hailstorm, such as is here indicated, involves that the heaven was covered with clouds, and the temperature suddenly lowered; the size of the hailstones implies that the lowering of temperature was extreme. The great heat was replaced by sharp cold.

This hiding of the sun and moon is referred to in the beautiful prayer of Habbakuk where he says:—

"The sun and moon stood still in their habitation,
 At the light of Thine arrows they went,
 And at the shining of Thy glittering spear.
 Thou didst march through the land in indignation,
 Thou didst thresh the heathen in anger."

It is quite clear in this passage that "stood still" does not correctly express the meaning of the Hebrew word, as it would be in contradiction to the verb in the next line. As in the xviiith Psalm, the arrows of Jehovah are the hailstones, the lightning His glittering spear, and the passage should be rendered:—

"The sun and moon ceased in their habitation,
 At the light of Thine arrows they vanished."

The meaning of the chief occurrence of this great day is now clear. Joshua, seeing the extraordinary efforts which his troops had already made,—for they had been seventeen hours on the march,—and feeling the oppressive heat of the sun, was anxious for that heat to be tempered. The Lord answered his prayer and much more than answered it, for not only did He deliver the Israelites from the oppressive heat, but He sent the hailstorm which overwhelmed their enemies; and it was this incident that so greatly impressed

the chronicler, and moved him to the twice repeated comment, "the Lord fought for Israel."

This was the chief incident of the day; the marvellous faith of the servant of the Lord, which impelled him to speak to sun and moon as if full authority over them had been given into his hands, and the instant and gracious response on the part of the Lord who was not offended with his servant as if he had been presumptuous, but "hearkened unto the voice of a man," and "fought for Israel," obeying, as it were, a human command.

This was the most remarkable incident of the day; it was not the only one. For it is written, "The sun ceased in the midst of heaven, and hasted not to go down about a whole day." The sun's "silence," its "ceasing," was one thing; its "hasting not to go down" was another. The "going down" of the sun is the work of the afternoon, of the half-day from noon till sunset, but we are told that in this case the going down lasted not for half a day, but "about a whole day." The sun hasted not in his movement, but went down slowly, twice as slowly as its wont.

The usual mode of reading this passage supposes that the stopping of the sun was the stopping of its motion, not the stopping of its shining, and that it was actually arrested in the midst of heaven, or that, astronomically speaking, the earth ceased to rotate on its axis. This interpretation is contradicted by the rest of the passage, which distinctly asserts that the sun went down,—i.e. it was not arrested. It is true that it went down slowly, it "hasted not" in its going, but it went down, and later on we find its setting recorded.

What is meant by this slackening of the sun's movement? How did the Israelites recognise that the sun, which was probably clouded over and invisible to them most of the afternoon, was moving more slowly than its wont? How

did they recognise that that afternoon was drawn out so as to be equivalent to "about a whole day?"

We find it recorded in verse 10 that: "The Lord discomfited the Amorites before Israel, and slew them with a great slaughter at Gibeon, and chased them along the way that goeth up to Beth-horon, and smote them to Azekah and unto Makkedah." The route from Gibeon to Makkedah, through the Beth-horons is nearly thirty miles, and this by itself is a full day's work for an army on the march, without allowing for any fighting. Yet it was accomplished between noon and sunset, and this distance marched was the only means that the Israelites possessed for measuring the flight of time. Thirty miles march was to them "about a whole day," the two were convertible terms; and "the sun hastened not to go down" whilst they made that march.

If it be asked, "Was this march a miraculous one?" I do not know that we have the means for giving a decided answer. The achievement was certainly extraordinary, but it is not quite clear that it was superhuman. When the Israelites heard the confident shout of their captain, and saw the instant change in the aspect of the heavens which followed it, there must have been a great uplifting of their spirit, over and above the revival of their physical energy at the sudden cooling of the air. Men can do great things when they are convinced that the Lord is with them indeed.

The Israelites were mightily strengthened; that is clear whether we regard that strengthening as having been miraculous in the strict sense of the word, or as the result of natural causes, though combined in an extraordinary manner. And we must assume this strengthening to have taken place whether we suppose, as I have done, that the day was lengthened only in relation to the march accomplished by the Israelites, or, as in the usual interpretation, that it was lengthened in absolute duration. In either case the achievement of the

Israelites was the same ; between one sunset and the next they climbed a mountain, marched sixty miles and fought a battle. On the one theory the two sunsets were separated by twenty-four hours ; on the other by about thirty or thirty-one. But whichever of these two hypotheses be correct, the marvel which impressed the sacred historian so much, was, not that the march of a whole day was accomplished within an afternoon, but that the Lord had " hearkened to the voice of a man," and had " fought for Israel." At Joshua's word, He had brought it about that the sun was darkened in his going forth and the moon did not cause her light to shine, and He had smitten more of the Amorites with His hailstones " than they whom the children of Israel slew with the sword."

This is, then, the way in which the narrative, examined astronomically, impresses me. I gather from it that at noon of a hot day, in the middle of summer, the Hebrew captain found that his projected task was less than half accomplished, and that his men, exhausted by their past efforts, and by the oppressive heat, were unequal to fulfilling the part which remained. Part of the Amorite host had been vanquished at Gibeon, but evidently much the larger part had escaped and were making good their flight by the way of Beth-horon. In this emergency, Joshua commanded the sun to " be silent," that is, to forbear from its fierceness. His command was answered ; for no doubt the mighty hail-storm which caught the Amorites in the steep descent of the Beth-horons was accompanied by a complete clouding of the sky, and a great lowering of the temperature, which would be felt far beyond the range of the actual hail-burst. Refreshed and encouraged by the sudden coolness, the Israelites continued the pursuit, and traversed in the seven hours of the afternoon a distance which under ordinary circumstances would have been the work of an entire day. In that new

strength they were enabled to overtake their enemies, though the latter had evidently a considerable start in the race.

I do not think that the earth was arrested in its rotation on its axis, or that the sun remained fixed in its apparent position in the heavens for several hours. I do not think it is reasonable to suppose that Joshua desired anything of the kind, or that, attentively read, the actual words of the narrative will permit that interpretation to be put upon them.

But there is another point in which the narrative impresses me very strongly. The two most important astronomical facts are both told us in two different ways. The two statements are in perfect accord but could not have been derived the one from the other.

We are told explicitly that it was noonday in high summer, for "the sun was in the midst of heaven." We also learn this implicitly, but certainly, from the statement that Joshua commanded the sun to "be silent upon Gibeon," and the "moon in the valley of Aijalon."

We are told explicitly that the Israelites chased their enemies from Gibeon to Makkedah by way of the Beth-horon, a distance of some thirty miles. We know from our own experience that this is a whole day's march for an army. We are also told implicitly that this full day's march was accomplished whilst the sun was in its going down, that is to say, in the afternoon, the half-day.

It is difficult to give an adequate expression of the force which these correspondences, especially the first, have to an astronomer. The introduction of the moon in Joshua's command seems at first sight to be irrelevant; indeed, it has been widely supposed to have been introduced by the author of the war song, quoted from the Book of Jasher, merely for poetic effect, to round off the parallelism characteristic of Hebrew poetry. This cannot have been so. If

the reference to the moon had been inserted by the song writer merely for poetic effect, it would most assuredly have been given some astronomically impossible position. Astronomers know well that if astronomical details are not inserted from direct observation, and at the time, they are bound to betray themselves as "faked." Our poets, novelists and artists almost always fail when they attempt to give a realistic effect by the introduction of an astronomical detail. One example from a familiar poem by Tennyson, a poet who was most careful and accurate in his scientific details, may suffice. In the second part of the "May Queen," the dying girl is represented as saying:—

"Last May we made a crown of flowers : we had a merry day ;
Beneath the hawthorn on the green they made me queen of May ;
And we danced about the maypole and in the hazel copse,
Till Charles' Wain came out above the tall white chimney tops."

But on May Day, when Charles's Wain "comes out," it is right in the zenith, and the May Queen, "dancing round the maypole or in the hazel copse," could never have associated its seven stars with the chimneys of the village houses, for the stars were "upon" her; they were right above her head.

The mention of the moon as in the valley of Aijalon, irrelevant as it may seem, can be explained in only one way. Joshua actually did utter those very words; probably because, at the very moment when his scouts reported to him the escape of the greater part of the Amorite force, he looked in the direction of his retreating enemy, and caught sight of the moon which had lighted him in his night march up from Gilgal. He may further have intended to express by the form of his command that he wished the clouds, for which he yearned, to cover the sky from zenith to horizon, and hence to hide not only the sun but the moon as well. Incidentally the mention of the moon shows that at the moment when

Joshua spoke, the storm cloud had not begun to rise. Just as when Elijah's servant watched from Mount Carmel, the storm would come up from the west, from the sea, and the moon would be hidden first of all, before the "heaven was black with clouds and wind."

Joshua must have uttered his command both to sun and moon just as we have the words recorded ; neither reference can have been put in haphazard by some later writer. The war song from the Book of Jasher must have been composed at the time, possibly on the very evening after the battle, but certainly whilst all the circumstances were fresh in the minds of those who had taken part in the great events of that day.

So too with the prose chronicle. It could not have fitted in so precisely with the poetic record—for it fits as the one half of a tally does with the other,—unless it also had been strictly contemporaneous with the events which it recorded. If the chronicle be multiple, then all of the records from which it is compiled must have been written at the very time of the events. When or how the complete Book of Joshua took its present form is a different question, but the astronomical evidence renders it clear that it preserves to us here, in the tenth chapter, records which were made at the time of the Battle of Beth-horon, and preserves them unaltered.

E. WALTER MAUNDER.