

‘BEHOLD, THERE WERE TWINS IN HER WOMB’ (GEN. 25:24-26; 38:27-30)

MEDICAL SCIENCE AND THE TWIN BIRTHS IN GENESIS

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Summary

Eran Viezel claims that the book of Genesis is ignorant of the fundamentals of childbirth, particularly the presenting foetal member. While the head normally emerges first, Genesis mistakenly thinks that the hands present, as they do in livestock deliveries. Therefore, the veracity of the twin births in Genesis 25:24-26 and 38:27-30, where a hand exits the womb first (Jacob and Zerah), should be rejected. The present article, however, exposes significant inaccuracies and unsupported assumptions on Viezel’s part. Moreover, while maintaining that both births are anomalous, this article proposes medically realistic scenarios for the parturitions of the twins in Genesis.

1. Introduction

In a recent *Vetus Testamentum* article, Eran Viezel rejected the historicity of the twin births in Genesis (25:24-26; 38:27-30) on sociological and obstetric grounds.¹ Although others have reached similar conclusions,² Viezel does so by supplementing his exegesis with medical and veterinary science. He argues that the male authors of the OT were ignorant of human childbirth and mistakenly believed that the hands, instead of the head, were the first foetal members to emerge from the birth canal. Two factors account for this error, according to

¹ Eran Viezel, ‘The Influence of Realia on Biblical Depictions of Childbirth’, *VT* 61 (2011): 685-89.

² E.g. ‘In terms of gynaecology, the incident itself is impossible.’ (‘Der Vorgang selbst ist gynäkologisch unmöglich.’) B. Jacob, *Das erste Buch der Tora: Genesis* (Berlin: Schocken, 1934): 544.

Viezel: first, the biblical authors, as males, were absent from the actual deliveries of their children; second, they were acquainted with the birthing of sheep and cattle, which deliver forelimbs first. They therefore drew an uncritical analogy – from the familiar to the unfamiliar – and assumed that human beings are born in the same manner, hands first. He further supports his claim with the observation that both biblical births come across in the narrative as normal rather than extraordinary.³ Moreover, with the aid of an obstetric textbook, a standard in the field,⁴ Viezel also contends that infants who enter the world with an extended arm have already died (of a broken neck) before leaving the uterus,⁵ and this turns out to be another reason to doubt the Genesis accounts as they stand.

The present author, nevertheless, considers Viezel's article to fall well short of its objectives, both with respect to its sociological reconstruction and its assessment of the medical situation. Since the former has been addressed in a separate article,⁶ this paper will deal with Viezel's application of obstetrics – both human and animal – to the twin births in Genesis. In the process, birthing scenarios that are both faithful to the text of Genesis and obstetrically credible will be formulated.

2. Preliminary Considerations

2:1 Livestock Births

At the very outset, Viezel's veterinary theory contains an oversight that jeopardises his entire project. If, in fact, livestock births were the model for normal human births, as Viezel supposes, why would our narrator report the presence of one hand instead of two? Quadruped livestock are normally delivered with *both* forelimbs extended, as Viezel himself

³ Viezel, 'Realia', 687.

⁴ F. G. Cunningham et al., eds, *Williams Obstetrics*, 21st ed. (New York: McGraw-Hill, 2001). I am grateful to Dr Julius L. Leary – an experienced obstetrician-gynaecologist with over 4,000 deliveries to his credit – for his review of the early drafts and helpful suggestions. Where I follow his observations, I will cite him as Leary, 2015.

⁵ Viezel, 'Realia', 687 n.6.

⁶ John Makujina, 'Male Obstetric Competence in Ancient Israel: A Response to Two Recent Proposals', *VT* 65 (2015): 1-17.

reports.⁷ Yet he fails to disclose that the appearance of a single leg is considered a malpresentation and usually requires intervention.⁸ If the forelimb of a calf, for example, is tucked inside, it must be manually extended before the delivery can proceed.⁹

Therefore, Viezel's analogy between the twin births in Genesis and quadruped deliveries breaks down at this critical point. If the writer were attempting to depict typical human births based on typical quadruped births, we would expect Jacob to have held Esau with both hands and Zerah to have extended both his arms. Instead, only one arm is out of its normal position, forcing Viezel either to concede the point or reinvent his theory to claim that *abnormal* quadruped births were the model for *abnormal* human births. But this route only increases the complexity and ad hoc nature of his proposal, especially since hand protrusion is already a feature of human malpresentations and needs no analogy from quadrupeds to make sense in and of itself.

2:2 Twin Births and Complications

Second, it is presumptuous to draw dogmatic conclusions about what can and cannot happen in a twin pregnancy, since twin deliveries tend to be highly unpredictable, and the abnormal is to be expected. A number of foetal positions are possible at the onset of labour and can result in reversals, entanglements, and malpresentations.¹⁰ For example, in a breech–vertex presentation the chins of twins can engage like hooks and prevent parturition.¹¹ Other types of entanglements are also known and will be discussed below.

⁷ Viezel, 'Realia', 689.

⁸ D. G. Pugh, *Sheep and Goat Medicine* (Philadelphia: W. B. Saunders, 2002): 163-65; Patrick T. Colahan et al., *Equine Medicine and Surgery*, 5th ed., vol. 2 (St Louis: Mosby, 1999), 1129-130, 1151, 1155; R. G. Mortimer, 'Calving and Handling Calving Difficulties', n.p. (<http://www.cvms.colostate.edu/ilm/projects/neonatal/Calving%20and%20Handling%20Calving%20Difficulties.pdf>, accessed 1 September 2014); R. A. Cady, 'Dystocia: Difficult Calving, What It Costs and How to Avoid It', 3-4 (<http://www.cybermanual.com/dystocia-difficult-calving-what-it-costs-and-how-to-avoid-it.html>, accessed 21 March 2017).

⁹ In some cases malpresenting forelimbs (of kids and lambs) do not result in protracted labour and may not require intervention. The condition is, nevertheless, abnormal. Pugh, *Sheep and Goat Medicine*, 164.

¹⁰ F. G. Cunningham et al., eds, *Williams Obstetrics*, 22nd ed. (New York: McGraw-Hill, 2005): 938-39; Alfredo Baens, 'Intercollision of Twins', *Philippine Journal of Surgery* 3 (January–February 1948): 17-20, esp. 17; Cynthia Caillagh, 'Coming to Twins', *Midwifery Today* 110 (Summer 2014): 9-15, esp. 13.

¹¹ Cunningham et al., *Williams Obstetrics*, 22nd ed., 939-40.

2:3 *The Transverse Lie*

Third, the deadly transverse lie position (horizontal in the uterus), which often involves an arm prolapsed (extended) into the birth canal,¹² need not apply to Jacob or Zerah. Viezel is under the mistaken impression that the transverse lie is the only position that is compatible with the description of the twin births in Genesis.¹³ But, as we shall see, other less perilous presentations can account for the biblical data as well, and even the transverse lie does not spell a hopeless situation.

Viezel also seems to think that the *full* extension of the arm is somehow a key factor in the fatality. Nevertheless, the literature that he cites makes no such claim, nor does it suggest that the baby is already dead when the hand prolapses, as Viezel avers. On the contrary, his edition of *Williams Obstetrics*¹⁴ indicates that death (maternal and foetal) occurs at a stage of delivery after the prolapse, when the mother's uterus ruptures.¹⁵

More importantly, in Jacob's case, the prolapsed arm is not required at all to conform to the biblical description, although Viezel insists that this is the case.¹⁶ (In fact, one gets the impression that Viezel has an undue preoccupation with extended foetal arms, which seems to drive his interpretation of biblical texts.¹⁷) Since Genesis 25:26 says nothing more than that Jacob's 'hand was holding (אָחַזָה) the ankle of Esau',¹⁸ the idea that Jacob's arm was outstretched should be attributed to the reader, not the text. Rather, as I will argue below, a compound presentation with a flexed arm (instead of prolapsed) is a plausible

¹² Cunningham et al., *Williams Obstetrics*, 22nd ed., 510.

¹³ Viezel, 'Realia', 687 n.6.

¹⁴ Cunningham et al., *Williams Obstetrics*, 21st ed., 456-57.

¹⁵ Cf. Ronald S. Gibbs et al., eds, *Danforth's Obstetrics and Gynecology*, 10th ed. (Philadelphia: Wolters Kluwer, 2008): 412.

¹⁶ Viezel, 'Realia', 685-87. This is also the interpretation of Julius Preuss, *Biblischtalmudische Medizin: Beiträge zur Geschichte der Heilkunde und der Kultur überhaupt*, 3rd ed. (Berlin: S. Karger, 1923): 501.

¹⁷ 'Zerah's brother Perez grabbed his twin by the feet and pulled him back, and then hurried to be the first out of the womb ... We may conclude that Perez's hands, which pulled at Zerah's feet, were outstretched in front of him.' Viezel, 'Realia', 686.

¹⁸ Unless otherwise indicated, all translations belong to the present author. In this context עִקָב probably refers to the area just above the heel, the ankle (קָרסֶל), which has contours that the human hand can more easily grasp. עִקָב likely refers to the same region in Genesis 3:15 and Job 18:9, and almost certainly in Genesis 49:17 (fetlocks).

option in Jacob's case, and even Viezel asserts that this position gives the baby 'a good chance of survival'.¹⁹

As for Zerah, the transverse lie could only result in foetal mortality if Zerah had been born in that position. But since a prolapsed arm is not limited to the transverse presentation and since the text discloses that he *retracted* his hand, there is no reason to assume that Zerah's delivery was ultimately unsuccessful. Therefore, Viezel's diagnosis of the mortal implications of the twin births as described in Genesis has significant shortcomings.

2:4 Routine Deliveries?

Fourth, Viezel's contention that neither of the twin births is treated as unusual by the narrator is not only flatly contradicted by the implications of his own veterinary proposal, but is also highly subjective. He reasons that 'the continuation of the story in each case – Jacob's grasping of Esau's heel and the tying of the crimson thread on Zerah's wrist – presumes that this is the natural way in which babies are born'.²⁰ He seems to mean that the narrative has a 'business-as-usual' tone to it, without any explicit indicators of anomalies. But it escapes him that Hebrew narrative is ordinarily laconic and only engages in detailed descriptions when it serves an important purpose.²¹ This makes it unlikely, then, that the manifestation of hands represents a normal birth phenomenon. Additionally, the fact that the children are named after the circumstances of their birth (e.g. Jacob, 'he grabs the ankle'; Perez, 'breaking through') testifies that their births were not routine.²²

¹⁹ Viezel, 'Realia', 687 n.6. Cf. Dwight P. Cruikshank and Charles A. White, 'Obstetric Malpresentations: Twenty Years' Experience', *American Journal of Obstetrics and Gynecology* 116 (15 August 1973): 1097-104, esp. 1101. Compound presentations are more likely during the delivery of the second twin (2.7%) than the first (0.6%). Nicholas Asimakopulos, 'Compound Presentation: Prolapse of Three Extremities with the Head', *Canadian Medical Association Journal* 92 (April 1965): 929-31, esp. 930.

²⁰ Viezel, 'Realia', 687.

²¹ Robert Alter, *The Art of Biblical Narrative* (New York: Basic Books, 1981): 20-21, 79-80, 112; Shimon Bar-Efrat, *Narrative Art in the Bible* (JSOTSup, 70; Sheffield: Almond Press, 1989; tr. from Hebrew): 48-53.

²² Cf. Kenneth A. Mathews, *Genesis 11:27–50:26* (NAC, 1B; Nashville, Tennessee: Broadman & Holman, 2005), 724. Naming babies after distinguishing birth features has analogies in Mesopotamian literature. See M. Stol, *Birth in Babylonia and the Bible: Its Mediterranean Setting* (Cuneiform Monographs, 14; Groningen: STYX, 2000): 131-32, 160.

In the following sections I will further challenge Viezel's proposal by offering obstetric scenarios that are consistent with the descriptions given by the narrator of Genesis. Consequently, the discussion will alternate between the text and putative historical event in order to demonstrate a harmony between the two. Throughout the analysis an attempt will be made to distinguish between the medically unusual and the medically expected in each of the deliveries.

3. Jacob and Esau (Gen. 25:24-26)

When her days to give birth were completed, behold, there were twins in her womb. And the first one came out red; he was entirely like a hairy cloak. So they named him Esau. Afterward his brother came out, while his hand was holding the ankle of Esau.²³ So he was named Jacob. Isaac was sixty years old when she bore them.

Genesis 25 is careful to record the birth order of Jacob and Esau along with key details that accompany each delivery. In Esau's case, his reddish appearance and hairy overlay are noted because of their importance for the future development of the plot; for Jacob, however, it is the fact that he is holding his brother's ankle during parturition, as this is an omen of Jacob's future disposition and behaviour (Gen. 27:35-36). From this rather economical description certain obstetric events may be posited, each of which are in cadence with the extant narrative.

The medical history of Rebecca (Gen. 25:21) assures us that she was a primigravida (experiencing a first pregnancy), and the comment in verse 24 signals that she had come to full term: 'her days to give birth were completed'.²⁴ Moreover, there is little doubt that the twins were dizygotic (fraternal) because of the physical differences between them (Gen. 25:25; 27:11). The description in Genesis 25:25-26 also requires that the presentation of both twins be vertex (crown of the head), Esau

²³ That the hold occurred during parturition is signalled by the participle construction. See GKC (*Gesenius Hebrew Grammar*), 359.

²⁴ Cf. Tarja S. Philip, *Menstruation and Childbirth in the Bible: Fertility and Impurity* (Studies in Biblical Literature, 88; New York: Peter Lang, 2006): 83. Additional examples of the formula are preserved in Job 39:2 and Luke 1:57; 2:6.

first, then Jacob. This configuration occurs about 40% of the time and is the most common type of twin presentation.²⁵

After the onset of labour, Esau's vertex would have presented and his membranes burst, if they had not already. Although the rupture is normal, it is also necessary if Jacob was to grip Esau's ankle. Up to this point, then, everything is relatively predictable.

Nevertheless, for Jacob to have effectively held Esau's ankle at any time during their birth, it is essential that his own foetal membranes (consisting of the amnion [inner membrane] and the chorion [outer membrane]) ruptured as well, thereby allowing his hand an unimpeded grip around his brother's limb. Consequently, the first abnormality enters the picture: Jacob's foetal membranes must have broken sometime prior to the full expulsion of his brother from the womb.²⁶ And although the chance of an early rupture of the membranes is higher in twin A (Esau), it occurs often enough in twin B that its absence cannot be taken for granted.²⁷ Moreover, the intrauterine battering of the twins recorded in Genesis 25:22 (they 'struggled together') would increase the possibility of a puncture in Jacob's membranes.

I further suggest that Jacob's face was positioned over Esau's feet, which were most likely retracted in the normal position. This would

²⁵ Cunningham et al., *Williams Obstetrics*, 22nd ed., 939; Koichi Uchino, 'Prediction of Dystocia by Entanglement (Impaction) in Vertex-Vertex Type Twin Delivery', *Asia-Oceania Journal of Obstetrics and Gynaecology* 19 (December 1993): 417-25, esp. 418, 424; Birgit Arabin and Ioannis Kyvernitakis, 'Vaginal Delivery of the Second Nonvertex Twin: Avoiding a Poor Outcome When the Presenting Part Is Not Engaged', *Obstetrics and Gynecology* 118 (October 2011): 950-54, esp. 951; Frank A. Chervenak et al., 'Intrapartum Management of Twin Gestation', *Obstetrics and Gynecology* 65 (January 1985): 119-24, esp. 119-20; Margarita de Veciana et al., 'Labor and Delivery Management of the Multiple Gestation', *Obstetrics and Gynecology Clinics of North America* 22 (June 1995): 235-46, esp. 239.

²⁶ I have resisted using the phrase 'premature rupture of membranes' (or PROM) since in obstetrics this refers to a puncture of the foetal membranes any time *prior* to contractions. Gibbs et al., *Danforth's Obstetrics*, 186. In Jacob's case (Zerah's as well) the rupture could have occurred after the onset of contractions.

²⁷ See Anna Dera et al., 'Twin Pregnancy: Physiology, Complications and the Mode of Delivery', *Archives of Perinatal Medicine* 13 (2007): 7-16, esp. 11; Arabin and Kyvernitakis, 'Vaginal Delivery', 950-54, esp. 953; de Veciana et al., 'Labor and Delivery Management', 243; Mary Cooper, 'Helping a Mother with Twins: Choose Your Words Wisely', *Midwifery Today* 110 (Summer 2014): 27; Valerie El Halt, 'A Study Outline of Twin Pregnancy, Labor and Delivery', *Midwifery Today* 39 (Fall 1996): 25-26, 38, esp. 26. *Contra* Ibn Ezra, who considers it a great anomaly, and Julius Preuss, who for the same reasons suggests a monoamniotic gestation: *Biblischtalmudische Medizin*, 501.

have put Jacob in the ideal location to grab Esau's ankle, with little displacement of Jacob's arm from its normal place close to his own chest and chin. The positioning proposed is, in fact, common in vertex–vertex presentations and in the proper configuration offers the best possibilities for a safe delivery.²⁸ Therefore, the presentation most hospitable for Jacob's grasp ranks high on the probability scale.

Esau would also have entered the second stage of labour more or less normally, with one major exception: he was carrying a passenger with him, his brother Jacob. Jacob so closely followed him that the two would have moved through the various cavities and inlets (pelvis, cervix, birth canal) almost as one continuous unit instead of as two fetuses, Jacob's head close by the breech of Esau, and Jacob's hand clasping his brother's trailing ankle – trailing because once in the birth canal Esau's legs would have naturally extended.

Any doubt that twins can be born in such close succession is dispelled by the more exceptional phenomena of interlocking twins and impacted twins, which in very rare cases (vertex–vertex, breech–vertex) have occupied the birth canal at the same time and been delivered both successfully and, in some cases, simultaneously.²⁹ Moreover, one study reported that about 25% of the time (in the cases it reviewed) the second twin was born within 5 minutes of the first, the average being 21 minutes,³⁰ and in some cases the physician has to

²⁸ The variation of the vertex–vertex presentation associated with the fewest incidences of entanglement would put twin A (Esau) face up, on his mother's spine, and twin B (Jacob) face down, with his back toward his mother's pubic bone. Otherwise, the vertex–vertex position yields the second highest rate of entanglement, outdone only by the breech–vertex. Uchino, 'Prediction of Dystocia by Entanglement', 418-24. See especially the illustration on p. 422, which depicts the presentation I have proposed for Rebecca's twins.

²⁹ A. W. Petit, 'An Unusual Twin Birth: A Case in Which the Two Heads Were Born at the Same Time', *Journal of the American Medical Association* 81 (6 October 1923): 1206-207; Andrew P. Miller, 'Successful Vaginal Delivery of Locked Monoamniotic Twins', *Canadian Medical Association Journal* 117 (23 July 1977): 158-59; R. O. Swann, 'Interlocking and Collision in Multiple Pregnancies', *American Journal of Obstetrics and Gynecology* 73 (April 1957): 907-10, esp. 910; Albert P. Kimball and Phillip R. Rand, 'A Maneuver for the Simultaneous Delivery of Chin-to-Chin Locked Twins', *American Journal of Obstetrics and Gynecology* 59 (May 1950): 1167-68.

³⁰ William F. Rayburn et al., 'Multiple Gestation: Time Interval between Delivery of the First and Second Twins', *Obstetrics and Gynecology* 63 (April 1984): 502-506, esp. 504, 505; Caillagh, 'Coming to Twins', 13, 15; Marlene Waechter, 'Belly Buddies', *Midwifery Today* 110 (Summer 2014): 60-62; Susan Smith, 'Homebirth Twins', *Midwifery Today* 39 (Fall 1996): 20-21, 39.

order the twin-bearing parturient to stop pushing lest the second child follow the first in an uninterrupted sequence.³¹

3:1 Jacob's Grip

Moreover, it is unnecessary to assume that Esau *pulled* Jacob along since the forces that were expelling Esau outward (gravity, uterine contractions, and active pushing by the mother) would have exerted the same kinetic influence on Jacob. Even so, some level of traction is not outside the realm of possibility. The strength and tenacity of Jacob's grip is to be expected in as much as the grasp reflex begins at about sixteen weeks of gestation and reaches full development by week twenty-seven.³² The palmar reflex, as it is labelled, has moreover been regularly observed in utero, where foetuses have been detected (via ultrasound) grasping their umbilical cords, the fingers of the opposite hand, and other body parts.³³ More importantly, the foetal grasp can be remarkably strong, powerful enough to lift a grip-locked infant off a bed, and if the infant's arm is pulled the grip becomes stronger and causes flexion at the elbow and shoulder, just as I have proposed for Jacob.³⁴

3:2 Twins are Born

At this point the final series of events can be conjectured: Esau's head emerged, after which his shoulders (now rotated) delivered and should

³¹ Leary, 2015.

³² M. C. Allen and A. J. Capute, 'The Evolution of Primitive Reflexes in Extremely Premature Infants', *Pediatric Research* 20 (1986): 1284-89, esp. 1287; Dubravko Habek et al., '3D-Ultrasound Detection of Fetal Grasping of the Umbilical Cord and Fetal Outcome', *Fetal Diagnosis and Therapy* 21 (2006): 332-33, esp. 332; Ákos A. Jakobovits, 'Grasping Activity in Utero: A Significant Indicator of Fetal Behavior (the Role of the Grasping Reflex in Fetal Ethology)', *Journal of Perinatal Medicine* 37 (2009): 571-72; David M. Sherer, 'Fetal Grasping at 16 Weeks' Gestation', *Journal of Ultrasound in Medicine* 12 (June 1993): 316.

³³ Dubravko Habek et al., 'Fetal Grasping of the Umbilical Cord and Perinatal Outcome', *Archives of Gynecology and Obstetrics* 268 (October 2003): 274-77, esp. 274, 276; Habek et al., '3D-Ultrasound Detection', 332-33; Jakobovits, 'Grasping Activity in Utero', 571; Boris M. Petrikovsky and Gary P. Kaplan, 'Fetal Grasping of the Umbilical Cord Causing Variable Fetal Heart Rate Decelerations', *Journal of Clinical Ultrasound* 21 (November/December 1993): 642-44.

³⁴ Allen and Capute, 'The Evolution of Primitive Reflexes', 1285, 1287; Louis Robinson, 'Darwinism in the Nursery', *Nineteenth Century* 30 (November 1891): 831-42, esp. 838-39. Therefore, it is odd that Preuss – a medical doctor who otherwise takes Genesis 25:26 literally – suggests that Jacob only appeared (*schien*) to grab the heel of Esau. *Biblich-talmudische Medizin*, 501.

have been fully expelled with his torso. Nevertheless, the complete egress failed to occur, at which time the midwife (unmentioned in Genesis, but safely assumed) probably discovered that Jacob was holding the ankle of his brother.³⁵ Then, either Jacob released his grip autonomously, the midwife applied traction to overcome the grip, or she unlocked it manually, allowing Esau to be fully delivered, with his cord trailing and compressed by Jacob. Esau's cord was cut. Then, with the birth canal stretched by Esau's passage, Jacob was quickly born, with his grasping hand now probably retracted to its normal position (either spontaneously or mechanically by the midwife).³⁶ Alternatively – though not ideally – Jacob could have been delivered successfully, even with his arm beside his head.³⁷

a. 'Holding patterns'

Two additional factors should be considered. First, although Viezel envisions Jacob departing from the womb with an outstretched arm, the Genesis account permits an alternative interpretation: *contra* Viezel, the description does not mandate that Jacob's arm was fully extended during delivery; as stated earlier, it could have been flexed near his head and face, and still remain consistent with Genesis 25:26, 'afterward his brother came out, while his hand was holding the ankle of Esau'.

Second, it is likely that the foot or leg of Esau was compressed against Jacob's face, which itself would be compressed by the birth

³⁵ The midwife's witness of the ankle hold needed only to be momentary to be positive. Moreover, it did not have to be visual, since she could have felt or otherwise concluded from the resistance and other clues (nail lacerations on Esau's ankle) that Jacob had held the ankle of his brother at some point during the delivery.

³⁶ See Cunningham et al., *Williams Obstetrics*, 22nd ed., 511; Donald P. C. Chan, 'A Study of 65 Cases of Compound Presentation', *The British Medical Journal* (August 1961): 560-62, esp. 562; Asimakopulos, 'Compound Presentation', 929-31; Alan F. Guttmacher, 'Compound and Complex Presentations Associated with Plural Births: Etiology, Incidence, and Prognosis', *Clinical Obstetrics and Gynecology* 5 (December 5 1962): 1000-1008, esp. 1003; E. R. Yeomans and C. M. Cormier, 'Management of the Fetus with Compound Presentation', 1 (<http://www.uptodate.com/contents/management-of-the-fetus-with-compound-presentation>, accessed 7 January 2015).

³⁷ See Cruikshank and White, 'Obstetric Malpresentations', 1101. So the birth of Euan Christopher, twin B, who presented vertex and was born with 'his hand on his face' <http://www.vbac.co.uk/stories/story.php?s=sarah2> (accessed 19 December 2016). The ancient gynaecologist Soranus of Ephesus (early second century AD) adds that if the head is small enough the baby can actually be pulled out by the hands (if both arms are extended), replacement of the arms being unnecessary (*Gyn.* 4.8). All citations of Soranus are taken from *Soranus' Gynecology* (Baltimore, Maryland: Johns Hopkins University Press, 1956; tr. from Greek).

canal, which already would be restricted in size by Esau's umbilical cord. These factors would increase the pressure of the grip and the resistance felt at the other end. It would also make the strength of the grip, its duration, the slipperiness of the ankle and the ratio of the palm to the circumference of the ankle less factorable in the outcome. No injury to Jacob's face is anticipated, since mainly soft tissue is involved.³⁸

3:3 Assessment of Probabilities

The abnormalities in this birth, then, amount first to the early rupturing of Jacob's membranes, which would enable him to grasp the ankle of his brother. The second anomaly would be the almost simultaneous births of the two brothers, with the added complication of Jacob grasping his brother's ankle – anomaly number three. Interestingly, conditions that would facilitate or increase the likelihood of the last anomaly are themselves quite normal: the intrauterine position of the twins and the grasp reflex.

In any case, the first two abnormalities are hardly unprecedented, and the third (grabbing the ankle), though unprecedented, is certainly conceivable. Although the present author has not found a documented twin delivery like Rebecca's, where the second twin holds on to the ankle of the first, twins clutching each other during parturition has been observed.³⁹ Also medical records reveal at least one case where a foetus held its umbilical cord *during* and after the delivery. Those reporting this birth considered it 'quite a bizarre finding'.⁴⁰ Given that bizarre events such as this occur outside the world of Genesis, Viesel is in no position to discredit the remarkable elements in the births of Jacob and Esau as the inventions of an obstetrically benighted male author.

4. Perez and Zerah (Gen. 38:27-30)

And it came about at the time of her delivery that behold, there were twins in her womb. And it came about when she was in labour that one put forth a hand. And the midwife took a scarlet cord and tied it on his hand, saying, 'This one came out first.' But it came about, as soon as he drew back his hand, that behold, his brother came out; and she said,

³⁸ Leary, 2015. Cf. Uchino, 'Prediction of Dystocia by Entanglement', 418.

³⁹ Cooper, 'Helping a Mother with Twins', 27.

⁴⁰ Habek et al., 'Fetal Grasping of the Umbilical Cord', 276.

‘What a breach you have made for yourself.’ So he was named Perez. Afterward his brother, on whose hand was the scarlet cord, came out. And he was named Zerah.

Genesis informs us that Tamar, like Rebecca, was also a primigravida and pregnant with twins. The first significant event during this birth is the emergence of a hand, whose possessor is, at this point, unidentified. The reader then becomes aware of the midwife, who, with the narrator, will share the task of describing the birth; she is already about her duties, which include tying a scarlet cord on the hand of this child. In so doing, she officially marks the firstborn among the twins, something that is further documented by her announcement ‘this one came out first’ (38:28).⁴¹ (In cultures where primogeniture is linked to inheritance rights, the identification of the firstborn twin must have involved formalised procedures.⁴²) Following this, the child withdraws its hand, and its sibling immediately replaces it and is born, causing the midwife to remark ‘What a breach you have made for yourself.’ Afterward, the twin with the scarlet cord (צֶרֶחַ, ‘cord’ is implied, see Josh. 2:18; Song 4:3) is born and named Zerah.

This is obviously no ordinary birth, even for twins. But for that reason alone it should not be dismissed as ahistorical or medically absurd. The birth of the hand and the unusual events that follow bear the distinct signature of a rare but well-documented type of twin dystocia known as ‘impaction’. And the Genesis record appears to be an ancient attempt at reporting and incorporating this strange phenomenon into its highly sophisticated and interconnected presentation of redemptive history.

4:1 Impaction

Impaction and similar entanglements prohibit natural delivery due to various types of twin-to-twin obstructions.⁴³ According to Edward D. Nissen, impaction ‘is the indentation of any foetal parts of one twin on to the surface of its cotwin, thereby permitting partial engagement of

⁴¹ Announcements of this type were expected from the ancient midwife. See Soranus, *Gyn.* 2.10.

⁴² Cf. Stol, *Birth in Babylonia*, 135. Even today midwives have methods for quickly marking the first twin. El Halta, ‘Twin Pregnancy’, 26; Diane Barnes, ‘When Twins Are on the Way’, *Midwifery Today* 39 (Fall 1996): 41.

⁴³ Edward D. Nissen, ‘Twins: Collision, Impaction, Compaction, and Interlocking’, *Obstetrics and Gynecology* 11 (1958): 514-26.

both simultaneously'.⁴⁴ Impaction, moreover, creates an impasse to parturition and must be corrected for delivery to continue. In our case, I suggest that Zerah's arm was trapped in the cervix with the presenting head of Perez, a condition that has been observed and reported in both ancient and modern medical literature. Soranus writes, 'Moreover, difficult labor takes place on account of the number of children (when indeed there are two, both advancing at the same time, which become wedged in the neck of the uterus)' (*Gyn.* 4:3). Even more in keeping with my diagnosis is the modern observation of Drs E. R. Yeomans and C. M. Cormier: 'In multiple gestations, a possible scenario involves the head of the first twin and an extremity of the second twin within the birth canal.'⁴⁵ The plausibility of this scenario is further enhanced by the verdict of two Swedish obstetricians who have independently reached the same general conclusion about the births in Genesis 38 as this article has. In fact, Drs Håkan Rydhström and Göran Cullberg treat the deliveries of Perez and Zerah as an overlooked piece of medical evidence and describe this as case of 'twin entanglement with excellent fetal outcome'.⁴⁶

Although entanglements are admittedly very rare – 1 in 1,000, or more, twin deliveries⁴⁷ – it will be demonstrated that supposing an impaction accounts for every one of the perplexing obstetric events in the Genesis report: the appearance of the hand; its conspicuous withdrawal; the interruption of Zerah's delivery; the unexpected expulsion of Perez; and the successful belated birth of Zerah. (The infrequency of entanglements is less of a factor to authenticity when it is realised that the phenomenon of conjoined twins is also reported in

⁴⁴ Nissen, 'Twins', 521-22.

⁴⁵ Yeomans and Cormier, 'Compound Presentation', 1. See also Nissen, 'Twins', 520.

⁴⁶ Håkan Rydhström and Göran Cullberg, 'Pregnancies with Growth-Retarded Twins in Breech-Vertex Presentation at Increased Risk for Entanglement during Delivery', *Journal of Perinatal Medicine* 18 (1990): 45-50, esp. 45. Likewise, Heinrich Fasbender, another physician, detects an impaction and release in Genesis 38:28-29: *Geschichte der Geburtshilfe* (Jena: Gustav Fischer, 1906): 4-5. Preuss is also aware of this diagnosis: *Biblich-talmudische Medizin*, 502.

⁴⁷ Guttmacher, 'Compound and Complex Presentations', 1005; Fugate Carty, 'Interlocking or Collision of Twins', *Hawaii Medical Journal* 16 (March-April 1957): 404-405; S. K. el Deiry, 'Two Cases of Locked Twins', *The British Medical Journal* (April 1960): 1174-77, esp. 1174. Another study cuts the number almost in half, to 1 in 645 twin births, but also indicates that once breech-vertex entanglements are extracted from this core figure, the likelihood of entanglements in other presentations (e.g. vertex-vertex) actually decreases to 1 in 1,500 twin deliveries. Rydhström and Cullberg, 'Pregnancies with Growth-Retarded Twins', 48.

ancient literature, although it is likewise exceptional.⁴⁸) Moreover, one of the conditions hospitable to twin entanglements, in a vertex–vertex presentation (as will be posited here), can be safely assumed in this pregnancy. According to Alan F. Guttmacher, the problem is ‘largely an entity confined to primigravidas’,⁴⁹ a qualification that Tamar easily meets. Another condition is also possible, but not nearly as certain: if Tamar’s children were underweight at birth – as twins commonly are – it would also facilitate entanglement.⁵⁰

4:2 Twin Zygosity

In Tamar’s case, two basic types of gestation are possible, each one with its own numerical advantages and disadvantages for creating an impaction. Unlike the case of Jacob and Esau, Tamar’s twins are not restricted by the biblical record to being dizygotic. They could have been either dizygotic or monozygotic (identical) twins. The possibility of monozygotic twins is realistic since it accounts for about one third of twin conceptions.⁵¹ But for this hypothesis to possess any advantage over its alternative, the monozygotic twins would also have to be monoamniotic. Monoamniotic twins, twins that have no physical barrier between them (sharing one amnion and chorion), would provide the ideal conditions for entanglement and would not mandate an early rupture in the sac of Zerah.⁵² Nevertheless, since only about 1% of monozygotic twins are monoamniotic,⁵³ the advantage that it has in increasing the possibility of entanglement may be offset by the

⁴⁸ See Stol, *Birth in Babylonia*, 163; Soranus, *Gyn.* 4.3. Guttmacher states that the frequency is about the same as with twin entanglements, which is about 1 in 1,000 twin births. ‘Compound and Complex Presentations’, 1006. A more recent study (1971), however, reports that approximately 1 in 635 twins are conjoined. Cunningham et al., *Williams Obstetrics*, 22nd ed., 926.

⁴⁹ Guttmacher, ‘Compound and Complex Presentations’, 1005; Nissen, ‘Twins’, 522. So R. F. Lawrence, ‘Locked Twins: Report of Three Cases’, *Journal of Obstetrics and Gynaecology of the British Empire* 56 (February 1949): 58-63, esp. 62-63; S. Misra, ‘A Rare Complication of Twin Pregnancy: Impaction of Twins’, *Journal of Obstetrics and Gynaecology of India* 26 (October 1976): 774-75.

⁵⁰ Nissen, ‘Twins’, 523; Misra, ‘Impaction of Twins’, 774-75; Cunningham et al., *Williams Obstetrics*, 22nd ed., 922-24.

⁵¹ Cunningham et al., *Williams Obstetrics*, 22nd ed., 913, 914; Dera et al., ‘Twin Pregnancy’, 7.

⁵² Nissen cautions, however, that although theoretically the conditions for entanglement would be ideal, ‘the literature is rife with cord rather than fetal entanglements in monoamniotic twins’. ‘Twins’, 522. So Cunningham et al., *Williams Obstetrics*, 22nd ed., 925-26.

⁵³ Cunningham et al., *Williams Obstetrics*, 22nd ed., 925.

infrequency of the condition (about 3 in 1,000 twin births) that hosts entanglements in the first place (a common amnion).⁵⁴ A related condition is worth mentioning: monozygotic twins sharing one chorion but having two amnions can end up as monoamniotic if the dividing membrane ruptures.⁵⁵

The other option is that Perez and Zerah were dizygotic, like Jacob and Esau. This type of pregnancy is about two thirds more likely than the monozygotic variety. Even so, a prematurely ruptured sac would be necessary for Zerah's arm to have had the freedom to wedge between the head of Perez and his mother's cervix.⁵⁶ And in Zerah's case we lack the documentation needed to suggest a puncture from aggressive ambulatory activity. All things considered, however, an early rupture of the membranes does not rank as highly unusual or unheard of in dizygotic twin pregnancies.

A determination of the correct twin conception is impossible given the paucity of information at our disposal. Nevertheless, it is also unnecessary, since the following proposal can apply to any of the foregoing models.

4:3 Presentation

As was the case with Jacob and Esau, the most common presentation, vertex–vertex, can be assumed without much difficulty here. Not only is it the most common, but it also offers an opportunity for an arm impaction in the cervix to occur.⁵⁷ It would then have been possible for Zerah's arm to prolapse and become entrapped in the cervix against the head of Perez. The same outcome could also have occurred if Zerah was in the oblique position (spine up) instead of the vertex.⁵⁸ In this position the foetus lies at a forty-five-degree angle instead of

⁵⁴ The numbers presented here can be misleading since the likelihood of twinning and the type of twinning depend on race and ethnicity. Cunningham et al., *Williams Obstetrics*, 22nd ed., 915.

⁵⁵ Cunningham et al., *Williams Obstetrics*, 22nd ed., 925. The majority of monozygotic twins (some 60–70%) are of this variety, monochorionic and diamniotic. Gibbs et al., *Danforth's Obstetrics*, 221.

⁵⁶ Leary, 2015. See also Nissen, 'Twins', 522.

⁵⁷ Leary, 2015. Similarly, Preuss, *Biblich-talmudische Medizin*, 502. According to K. Uchino, vertex–vertex presentations, wherein twin A lies on top (face down) and twin B lies on the mother's spine (face up), are prone to impaction, albeit of a different kind than I am proposing here. 'Prediction of Dystocia by Entanglement', 419, 421, 423.

⁵⁸ Leary, 2015. The oblique lie is not that common, however, in a first pregnancy. Cunningham et al., *Williams Obstetrics*, 22nd ed., 510.

horizontally (transverse) or vertically (vertex or breech). In either case, an impacted arm at the cervix would have left Zerah's hand exposed in the birth canal, easily detectable by the midwife.

a. *Conduplicato corpore?*

Along with the vertex–vertex presentation, Julius Preuss also entertains the possibility of a shoulder presentation (i.e. transverse lie) for Zerah.⁵⁹ While this may be optimal for explaining the protruding hand and ruptured membranes, shoulder presentations for the first twin account for an extremely small percentage of twin presentations, especially in first pregnancies.⁶⁰ Additionally, a more acute positional rotation would be needed for Zerah to have corrected himself for his eventual delivery. Preuss, however, suggests that Zerah could have been born from the transverse position if he had been doubled over on himself, much like a sheet of paper folded in half, a position known as *conduplicato corpore*.⁶¹ But for this type of delivery to stand a chance of succeeding the foetus would have to be sufficiently undersized and the mother's pelvis oversized.⁶² Besides, other less extraordinary possibilities can account for Zerah's final delivery, as the following discussion will disclose.⁶³

4:4 Diagnosis and Delivery

At this point we can project that the midwife, with her diagnostic hand in the birth canal, detected the hand of Zerah protruding through the cervix.⁶⁴ She further assumed the hand to be the presenting part of the

⁵⁹ Preuss, *Biblich-talmudische Medizin*, 502.

⁶⁰ Chervenak et al., 'Intrapartum Management of Twin Gestation', 120; Guttmacher, 'Compound and Complex Presentations', 1000; Cunningham et al., *Williams Obstetrics*, 22nd ed., 510; Cruikshank and White, 'Obstetric Malpresentations', 1098, 1102.

⁶¹ Soranus may be describing this condition in *Gyn.* 4.12.

⁶² Cunningham et al., *Williams Obstetrics*, 22nd ed., 510.

⁶³ Even with the transverse lie, another delivery option is more imaginable. Once the hand retracts, a skilled obstetrician/midwife can, under the right conditions, reach up and pull the baby out by the ankles (internal podalic version). See Cunningham et al., *Williams Obstetrics*, 22nd ed., 583, 940-41; Lawrence, 'Locked Twins', 58; Waechter, 'Belly Buddies', 62; Catharina Schrader, *Mother and Child Were Saved: The Memoirs (1693–1740) of Frisian Midwife Catharina Schrader* (Amsterdam: Rodopi, 1987; tr. from Dutch), 51, 52, 54, 56, 82-83, 84; Soranus, *Gyn.* 4.3.

⁶⁴ An internal examination (with two fingers) is a standard and reliable diagnostic technique for disclosing the presenting member of the foetus. See Yeomans and Cormier, 'Compound Presentation', 1; Cunningham et al., *Williams Obstetrics*, 22nd ed., 413. Moreover, this technique was taught by Soranus (*Gyn.* 4.6) and is

first twin and tied a cord around it.⁶⁵ If she felt the head of Perez at all, she probably thought it belonged to the child with the exposed hand, as would be the case in a compound presentation.

a. Withdrawing the hand

What is reported next tends to strike readers as the most unexpected element of the birth: Zerah retracts his arm. Nevertheless, it is highly predictable (and desirable) when one recognises that Zerah's reflexes would have been fully developed at this point, and irritation or stimulation by the midwife's palpation and the tightening of the loop could have instigated him to withdraw his arm successfully.⁶⁶ This, in fact, occurs often enough in compound presentations of singletons, where the child's arm presents beside its head. In such cases, the hand can retract either spontaneously, when stimulated, or when pushed into the correct position by the physician.⁶⁷

With the removal of the arm, Perez's head would have been free, or freer, to fully occupy the cervix and be successfully delivered, which is apparently what occurred. The midwife's remark reflects her astonishment at the reversal, which she attributed, understandably, to Perez. Zerah, presumably in the desirable vertex position (and not

documented in the Mishnah: 'If the young of a woman died in its mother's womb, and the midwife put in her hand and touched it, the midwife contracts seven-day uncleanness, but the mother remains clean until the child comes forth' (*m. Hullin* 4:3). Herbert Danby, *The Mishnah: Translated from the Hebrew with Introduction and Brief Explanatory Notes* (London: Oxford University Press, 1933): 519. Therefore, our midwife's diagnosis was probably digital, although it may have been visual as well; any of these avenues can reliably yield the report in Genesis 38:28.

⁶⁵ An unassisted midwife would be prudent to quickly mark the firstborn twin. A delay could result in a loss of its identity in the chaos of the birthing chamber, and standard protocol, such as clearing the nasal and oral passages, would take higher priority than tying a string. (Even homebirths of twins today call for three or four assistants: Cooper, 'Helping a Mother with Twins', 27.) Or perhaps she saw it as an opportunity to place the cord on the child while his hand was entirely immobile. Any doubt that an ancient midwife was capable of the manoeuvres described in Genesis 38:28 is dispelled by Soranus, whose profile for a midwife included a number of demanding psychological and physical prerequisites and involved tasks requiring a considerable amount of digital dexterity (*Gyn.* 1.3, 4; 2.2, 4, 6, 15; 4.8). See also Schrader, *Mother and Child*.

⁶⁶ Physicians and midwives sometimes pinch the foetus's hand to make it retract. Asimakopulos, 'Compound Presentation', 929-31; Yeomans and Cormier, 'Compound Presentation', 1; Leary, 2015.

⁶⁷ Asimakopulos, 'Compound Presentation', 929-31; Cruikshank and White, 'Obstetric Malpresentations', 1101, 1102; Chan, '65 Cases of Compound Presentation', 560-62; Yeomans and Cormier, 'Compound Presentation', 1; Soranus, *Gyn.* 4.8.

likely to abandon it),⁶⁸ would then have followed without much difficulty. If he was originally in the oblique position (spine up), uterine changes after the birth of Perez would likely have corrected him to the vertex position and facilitated a normal delivery.⁶⁹

4:5 Assessment of Probabilities

In the final assessment, the highly unusual events in this birth are limited to the monoamniotic twin model and the impaction. Monoamniotic twins, though ideal for explaining the entanglement sans ruptured membranes, suffer from a low statistical probability of occurring. The alternatives, the more common dizygotic and monozygotic (diamniotic–dichorionic and diamniotic–monochorionic) twins, alleviate that statistical problem but have liabilities of their own in that separate membranes would require an earlier-than-expected rupture in Zerah’s case. The impaction of the prolapsed arm by the presenting head of Perez is statistically low, though certainly not undocumented or physically impossible.

The proposed vertex–vertex presentation, however, ranks among the more probable events in this birth. Likewise, the retraction of the hand occurs often enough in compound presentations so as not to be construed as highly unusual, especially when stimulation is involved. Finally, the correction of Zerah to an acceptable presentation following the birth of his brother is also highly conceivable if his initial position was oblique instead of vertex. If he was in the more likely vertex position to begin with, no correction would be necessary, and even in the event of a transverse presentation a successful delivery would not be out of the question.⁷⁰

Consequently, there is no reason to share Viezel’s scepticism toward Tamar’s parturition, or to invalidate it on obstetric grounds. Although not without its statistical difficulties, the impaction hypothesis makes

⁶⁸ See de Veciana et al., ‘Labor and Delivery Management’, 239.

⁶⁹ Leary, 2015. Cf. Jaron Rabinovici et al., ‘Randomized Management of the Second Nonvertex Twin: Vaginal Delivery or Cesarean Section’, *American Journal of Obstetrics and Gynecology* 156 (1987): 52-56; Christian Adam et al., ‘Twin Delivery: Influence of the Presentation and Method of Delivery on the Second Twin’, *American Journal of Obstetrics and Gynecology* 165 (July 1991): 23-27, esp. 25; Hung N. Winn et al., ‘Intrapartum Management of Nonvertex Second-Born Twins: A Critical Analysis’, *American Journal of Obstetrics and Gynecology* 185 (November 2001): 1204-208, esp. 1204; Waechter, ‘Belly Buddies’, 60-62.

⁷⁰ See note 62.

sense of the otherwise mystifying details of the birth narrative and, therefore, has the advantage of wide explanatory scope. It also has the benefit of simplicity because a single model – twin impaction – accounts for the various birth phenomena, including the actions and reactions of the midwife.

4:6 *The Problem of Duplication*

Apart from medical considerations, the narrative of Tamar's parturition faces additional impediments to its veracity. Its strong resemblance to the births of Jacob and Esau betrays a fictional undertow, according to C. Levin.⁷¹ He adduces, for instance, the nearly identical announcements that twins were about to be born (25:24 and 38:27) as evidence of literary invention. But this is hardly the kind of agreement that rules out the historicity of Genesis 38:27-30. The narrator is free to announce the (authentic) gestation of two sets of twins using similar vocabulary, especially if he wished to forge thematic links between two historical events. There is, of course, genuine continuity between the two births in the sphere of *events* (twins, abnormal deliveries, hands), which could raise suspicions. Even so, the normally laconic nature of Hebrew narrative combined with the author's selection of events that match or recall earlier events can give the impression that the two scenes are artificially similar. This is all the more likely if the differences are overlooked, as they often are. Had the narratives been more robust, however, and included mundane details of the births, the uniqueness and authenticity of these events would be less questionable.

Levin's appeal to the differences in the births is puzzling. After asserting the inauthenticity of the birth scene because of its parallels with the earlier account, Levin executes a volte-face and announces that the deviations also support literary dependence. That is, because the struggle for supremacy between Perez and Zerah is settled at birth, it seems to be deliberately played off against the protracted contest between Jacob and Esau, which is only initiated at birth. Yet Levin makes no attempt to disclose what purpose this allegedly invented difference serves in the narrative, or to what motifs it contributes. And without a credible reason one is left to the unlikely convention of free

⁷¹ Christoph Levin, 'Tamar erhält ihr Recht (Genesis 38)' in *Diasynchron: Beiträge zur Exegese, Theologie und Rezeption der Hebräischen Bibel*, eds T. Naumann and R. Hunziker-Rodewald (Stuttgart: W. Kohlhammer, 2009): 279-98, esp. 282-83.

motif.⁷² Actually, by pointing out differences between the two, Levin makes a case for the independence and authenticity of Tamar's delivery, and he only accounts for a few differences at that. For example, he fails to deal with the problem of the mismatching hands: we would expect a narrator who is *not* constrained by the facts to attribute the extension of the hand to Perez, who otherwise corresponds to Jacob, instead of Zerah, who parallels Esau.

5. Conclusion

Viezel's article boldly accuses the twin birth narratives in Genesis of obstetric incompetence because they carelessly co-opt animal birth presentation models into their depictions of human deliveries. In contrast, this article has argued that, due to a series of key miscalculations on Viezel's part, he has proposed a rather exotic solution to a problem that doesn't really exist: the Genesis twin deliveries are *neither* obstetrically incoherent *nor* anatomically unrealistic or impossible. There is, therefore, no need for an alternative paradigm (livestock birth) – which is itself beset with serious shortcomings – to account for the unusual features of the twin birth narratives. The human obstetric explanations are more than sufficient, as this article has endeavoured to demonstrate. If anything, the ability of these births to submit to modern medical explanations ought to inspire confidence in their authenticity and bolster the much-maligned historicity of the patriarchal narratives to which they belong.

⁷² See Alter, *Art*, 79-80, 112; Alan R. Millard, 'Story, History, and Theology' in *Faith, Tradition, and History: Old Testament Historiography in Its Near Eastern Context*, ed. Alan R. Millard et al. (Winona Lake, Indiana: Eisenbrauns, 1994): 37-64, esp. 47.