

## The History of Pudden Bridge

(Originally known as Kirk Bridge; also known as Esch's Spur Bridge)



On February 11, 1913, the *Winfield Courier* announced that Walter Sharp had begun work the day before “on the new stone bridge at Kirk’s Ford on Grouse Creek, six miles southwest of Dexter”<sup>1</sup> The article went on to announce that the new bridge would have three arches, each a fifty-foot span, and added that the new bridge had been desired in the locality for twelve years. According to *The Dexter Tribune*, in these early days of construction, the work went along nicely under Lew Welch, who was acting as foreman for Walter Sharp on the job, though the paper’s statement of the bridge “at Henry Kirk’s Ford” being made of cement is somewhat surprising.<sup>2</sup>

This bridge was not to be the average Cowley County stone arch bridge. Besides being the largest stone arch bridge on Grouse Creek,<sup>3</sup> it would feature a unique design. Walter Sharp, who had already built many bridges, both stone and concrete, in Cowley by 1908,<sup>4</sup> decided to try something different when constructing this bridge. Rather than follow the typical method of constructing stone bridges in Cowley, which consisted of springing the arches off of very low abutments and piers located at the typical low-water line of the waterway, Walter Sharp decided to increase the waterway by springing the arches from high piers.<sup>5</sup> This would result in less masonry in the waterway. In the more traditional method of construction, as the arch and everything above it was built solid, the area of the bridge between the arches presented a significant obstruction to the water at higher levels. A good example of the previous type of construction can be seen in Cowley County’s double-arch Rock Creek Bridge.

Walter Sharp had successfully built concrete bridges after this pattern using flatter arches atop tall piers, and he decided to build Kirk (or Pudden) Bridge using the same technique to see if this method of increasing the waterway would work for stone arch bridges. He was experimenting, though, and as it happened there was something of a costly learning curve when building this bridge.<sup>6</sup>

When building stone bridges, local labor was commonly used<sup>7</sup> — Lew Welch was from Dexter.<sup>8</sup> The stones were locally available, allowing most of the money spent on stone bridge construction to remain local.<sup>9</sup> When building the Pudden Bridge, the stone was quarried from a nearby ledge.<sup>10</sup>

To keep the cost of stone arch bridge construction down, rather than cutting all of the arch stones to radial lines, Walter Sharp used grout to help make up the necessary angles for the arch stones, as described in an article he wrote for *The Wichita Daily Eagle*:

“All over Cowley County, especially the eastern part, splendid ledges of rock crop out; these ledges range in thickness from 12 inches up to 36 inches. After the dirt is stripped off, these great slabs of rock lay there and are split with plug and feather into blocks that somewhat resemble a paving brick; the size would perhaps be 18 inches in thickness, 24 to 30 inches wide and from 4 to 8 feet long. These rock[s] will be picked up by derricks from their bed, swung around [to] a convenient place to work on, putting the smoothest split side up. A man who has been taught how (not a stone cutter) takes his straight edge and tools and cuts a 2-inch margin on both sides of the up-turned face of the stone, squares both ends, cuts the sides to a line six inches back from the face and this arch stone is ready for its place in the arch ring. An ordinary 40 cents per hour man can do this in two to three hours...[A] stone cutter costing \$10 per day would put in a day and a half cutting this stone to a half inch joint and to radial lines. The outside or ring stone shows the radial lines, but all other sheeting stones are as shown. These stones are set on a two by four sheeting resting on [the] arch centers. The mortar joint meeting in [the] center of [the] 2x4[,] only that part of the stone [which has] a 2-inch margin draft touch[es] the 2-inch sheeting. These arch stones are bedded only three inches at [the] time of laying (except the ring stone[s]). After all the arch ring is completed then the grouting takes place. Some of the openings are large enough to put your arm in, but all are filled with a grouting of one-two-four mixture.”<sup>11</sup>

According to Walter Sharp, when building a new stone arch bridge, the Cowley commissioners made it a point to regularly inspect the work, so as to have a very clear idea of what they were

paying for.<sup>12</sup> We find in *The Winfield Daily Free Press* that Cowley County commissioners Howard and Huston left for Dexter on April 10, 1913, to inspect the Kirk Bridge.<sup>13</sup>

The Kirk Bridge gained a notable amount of publicity later in April when a serious accident befell the structure. On April 24, 1913 the Dexter Tribune announced that:

“The stone[work] for the first arch in the big bridge being built across Grouse Creek at the Henry Kirk Ford, south of town, collapsed when the bracing under the arch forms was removed, and practically all of the work on this arch and the middle abutment will have to be done over again. A part of the arch on the west end remains, where the bracing was not removed, but it has settled so much, that it will likely have to be torn down and rebuilt.

The forms were totally destroyed. It is estimated that it will take at least \$500 to repair the damage, and will cause a considerable delay in the completion of the bridge. The contractor of course will be held responsible by the county.”<sup>14</sup>

*The Winfield Daily Free Press* (quoting from the *Dexter News*) had this to say about the accident:

“The recently completed span of the stone bridge under process of erection at the Kirk ford, on Grouse creek, by the Sharp Construction Company, [collapsed] and fell into the creek early Saturday morning and the loss will probably aggregate several hundreds of dollars in lost labor and materials.

The span, or arch, constructed of stone, had been completed, and according to reports, was supposed to be sufficiently strong to remain in its right position until [reinforced] by the second arch, but when the forms were removed the support was not sufficient and the bridge collapsed[,] falling into the creek.

Mr. [Sharp] was notified and issued instruction to resume work at once. Accordingly, work was resumed again Monday morning and the rock that composed the arch removed from the creek to reconstruct the arch for the second time. The work will be [rushed as] fast as is consistent with safety, until the bridge is completed, and we hope that the contractors will be able to finish without any more [costly] calamities. —Dexter News.”<sup>15</sup>

From the above, it would appear that the cause of the collapse was due to the bridge’s relatively low, flat arches atop high piers. The arch had sufficient horizontal thrust that it needed to have the next span’s own thrust to cancel out the sliding tendencies. As there was insufficient mass to

resist this horizontal sliding motion of the arch, it simply slid out and collapsed. This is further borne out by a short mention of the accident which appeared in the *Douglass Tribune*:

“A stone arch bridge across Grouse creek at the Kirk ford in Cowley County in process of construction collapsed.... It was being built by the Walter Sharp construction company. The supporting spans had not been put in and when the forms were removed the arch spread and fell into the creek bed.”<sup>16</sup>

Despite concerns about the project being delayed by the collapse, Walter Sharp, with the aid of Lew Welch, succeeded in recovering quickly from the accident. In fact, on May 15, the *Winfield Daily Courier* announced that two arches were up and that commissioners Huston and Howard “went to Dexter Wednesday to inspect the foundation for the third pier of the Kirk ford bridge.” The *Courier*, in the same article, added that “Mr. Sharp himself is staying on the job since the accident, and the like will not happen again.”<sup>17</sup> As *The Dexter Tribune* observed the same day:

“Work on the big stone arch bridge at the Henry Kirk ford on Grouse Creek is progressing rapidly. L. W. Welch, of Dexter, who has the work in charge, has been working a force of sixteen or eighteen men, and has prosecuted the work so successfully that but little delay will be experienced as a result of the disaster to the first arch which went down when the bracing was removed from under the form. The forms have been placed for the third arch and the stone circle is being laid, which will bring the work to the side walls and filling in of the arches ready for the top construction. Mr. Sharp, the contractor, attaches no blame to Mr. Welch, whatever, for the accident that happened [to] the bridge, assuming the entire responsibility himself....”<sup>18</sup>

On June 5, *The Dexter Tribune* announced:

“Work on the Kirk bridge has been progressing without interruption and L. W. Welch, the [mechanic] in charge, says it will be completed in two more weeks.... Upon the completion of the bridge, Mr. Welch suggests that a picnic be held at the bridge and the bridge dedicated to the public use.”<sup>19</sup>

On June 26, 1913, the *Winfield Daily Courier* informed its readers:

“The bridge being built over Grouse creek near the Henry Kirk farm near Dexter is nearing completion. The county commissioners inspected it one day last week, but could not accept it because it was not yet finished. The structure is being built of stone quarried from a ledge nearby. It consists of three fifty-foot arches, being the longest stone bridge

on the creek.”<sup>20</sup>

Finally, on July 8, 1913, the *Winfield Daily Courier* announced:

“The Grouse creek bridge near the Henry Kirk farm south of Dexter has been completed. Only the approaches to it are yet to be filled in. The county commissioners will inspect it some time this week.”

The same article in the *Winfield Courier* then went on to describe the bridge in some detail:

“This structure, which consists of three fifty-foot stone arches, and [which is] also the largest stone arch bridge on Grouse creek, employs an engineering principle adapted from concrete construction. The extreme ends of the arches rest upon abutments constructed in the creek bank, while the other two extremities, as well as both ends of the central arch, rest upon piers extending eight feet above the surface of the water at normal stage. According to the older systems of stone construction, all extremities of the arches should rest upon abutments at the surface of the water.

The advantage of the newer principle, which has been used in concrete construction, and which was employed in the south bridge over the Walnut river and that over Timber creek northwest of Island park...increases the size of the waterway [to] advantage.”<sup>21</sup>

On July 10, the Cowley County commissioners inspected the bridge.<sup>22</sup> The following day, July 11, *The Winfield Daily Free Press* stated that the commissioners accepted the bridge, that although the rails were not in place the bridge had already been used, and that the contract price paid to Sharp was \$3,300.<sup>23</sup> However, on the same day, the *Winfield Daily Courier* reported that the bridge had not been accepted yet, although a different article in the same paper reported that the commissioners were considering the acceptance at press time.<sup>24</sup> On Saturday, July 12, the *Winfield Daily Courier* announced that:

“The county commissioners accepted the Kirk bridge Saturday, making the final payment. The total price paid was \$3340. The Walter Sharp Construction company, builder of the bridge, lost fifty dollars on it on account of the falling of one of the arches some time ago.”<sup>25</sup>

Later on, the *Winfield Daily Courier* elaborated on the topic of Sharp’s loss of fifty dollars, speculating that the costly collapse of the arch occurred because of his experimenting.<sup>26</sup>

On the inspection trip, the commissioners were accompanied by E. P. Greer of the *Winfield Daily Courier* and were entertained by the Kirks.<sup>27</sup> Not only was the feast they had at the Kirk place mentioned in the *Winfield Daily Courier*,<sup>28</sup> but Walter Sharp, in 1922, reminisced on the spread they had that day as well.<sup>29</sup> A picture of the Kirk Bridge appeared on the front page of the July 21 edition of the *Winfield Daily Courier*, featuring the Cowley commissioners, Henry Kirk, the editor of the *Winfield Daily Courier*, and Walter Sharp posing on the bridge.

Pudden Bridge (Kirk Bridge in those days) was considered scenic:

“The arches are started high up on the abutments and form most graceful arches with a much greater waterway than is usual under arch bridges.... The view of Grouse creek from this bridge is beautiful.”<sup>30</sup>

The bridge was a success, for in 1922 it survived an unprecedented flood of Grouse Creek. According to Walter Sharp’s account, the Grouse Creek valley received twelve inches of rain in a night, which overflowed Grouse Creek and formed a devastating flood miles wide in places. This flow of water carried away crops, drowned livestock, and left a path of destruction in its wake. Yet despite this onslaught, thirteen of the fourteen stone arch bridges on Grouse Creek were uninjured. The only bridge that was damaged was one south of Silverdale, which had some of the upper courses of masonry toppled by the accumulation of debris. Kirk Bridge, however, “stood the test.”<sup>31</sup>

On September 10, 1922, a picture of Kirk Bridge appeared in *The Wichita Daily Eagle* with the following caption:

“The Kirk bridge, three fifty foot spans, over Grouse creek. A duplicate of this bridge can be built for \$5,000 below any bid made on concrete providing the state engineer will approve the plans for it. And this stone arch bridge, says Mr. Sharp, will outlast any concrete bridge costing \$5,000 more than it.”<sup>32</sup>

In 1985, Kirk Bridge, under one of its alternative names, Esch’s Spur Bridge, was entered into the National Register of Historic Places. There can be no doubt that the Esch’s Spur Bridge is

indeed the same as the Kirk Bridge of old. A look at the map included with the National Register nomination form for the Esch's Spur Bridge confirms it is the same as Pudden Bridge. Pudden Bridge's plaque, in turn, reads "Kirk Bridge." Photographs in the nomination form for Esch's Spur Bridge look similar to modern photographs of Pudden Bridge and old photographs of Kirk Bridge.<sup>33</sup> Also, Cowley County's stone arch bridge map shows Pudden Bridge as being alternatively called "Kirk" or "Esch."<sup>34</sup> The three names are all for the same bridge.

In the National Register of Historic Places nomination form for Esch's Spur Bridge, it was stated that the bridge not only retained its integrity of location, design, setting, materials, feeling, and association, but that Esch's Spur Bridge, due to its use of local stone and labor, was remarkably well suited to its environment. It was also observed that the bridge may yield information that could be significant to engineering history.<sup>35</sup>

In 2007, Pudden Bridge was threatened by a rather alarming accumulation of debris against the structure, left behind by enormous flooding. At the time, it was stated that the bridge, if lost, would cost about a million dollars to replace. It was also observed that not only was the bridge important for local traffic crossing Grouse Creek, but that the bridge was a tourist attraction as well. The Emergency Watershed Protection Program, administered by the NRCS, found a way to work with Cowley County to preserve the bridge. A Cowley commissioner expressed gratitude to the NRCS for finding a way to help preserve the county's heritage.<sup>36</sup>

Pudden Bridge also received some publicity from KTWU's *Sunflower Journeys*. This television documentary featured interviews regarding Cowley's famous bridges.<sup>37</sup>

In 2016, Pudden Bridge received structural damage as a result of the same flooding that destroyed Cowley's stone Fox Bridge over Grouse Creek near Cambridge. It was observed that several stones had been knocked loose from the bridge (probably arch stones—see the photos in the appendix) and a call made to contractors in Ellsworth who inspect Cowley's bridges, with the intent of determining what to do next.<sup>38</sup> The county later announced that both Fox and Pudden bridges were barricaded due to damage sustained during an October flood. It was decided not to take any action towards repairing either bridge.<sup>39</sup>

As seen in the photos taken in May 2019, a couple of arch stones were missing from the upstream face of the middle arch, and now, after more flooding, a significant portion of the middle arch has collapsed, as can be seen in the accompanying photographs in the appendix.

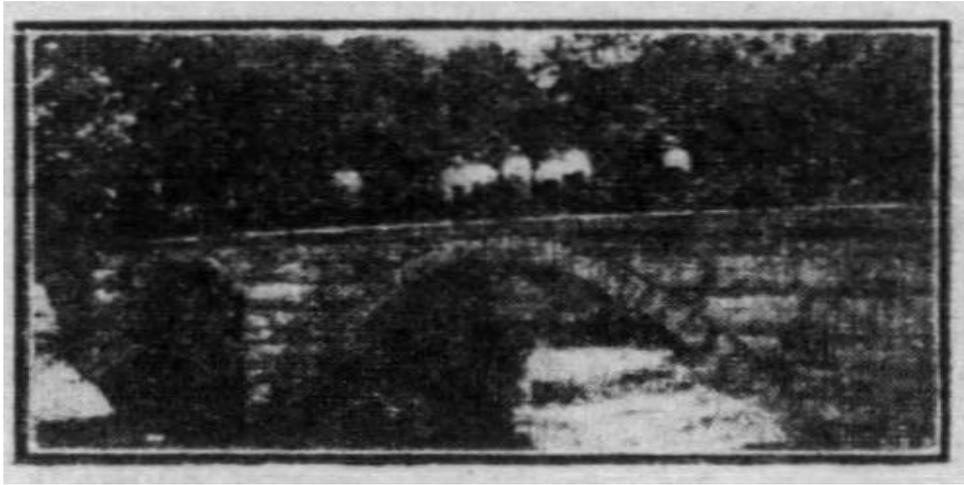
Pudden Bridge is one of eighteen stone arch bridges on Cowley's stone arch bridge tour map.<sup>40</sup> According to the Cowley County website, Pudden Bridge was one of the most expensive stone arch bridges built in the county and the only remaining triple-arch bridge in the county.<sup>41</sup>

On May 21, 2019, according to the County Regular Commission Meeting Minutes, a landowner mentioned his concern that Cowley, while replacing other bridges, was leaving Pudden Bridge closed. The county administrator stated that "Pudden bridge has been turned in for replacement and the other bridges were chosen over it by the State of Kansas."<sup>42</sup>

While stone arch bridges can indeed last a long time (Pudden Bridge is already over 100 years old) they do require maintenance and care to retain their integrity. It is our hope that a way to preserve and repair this piece of history will be found, both for future generations to enjoy and use and as a tribute to those builders who have come before.

## Appendix

### Photographs of Pudden Bridge



A picture of Pudden Bridge that appeared in the July 21, 1913, edition of the *Winfield Daily Courier*, featuring the Cowley commissioners, Henry Kirk, Walter Sharp, and the editor of the *Winfield Daily Courier* posing on the bridge.



The Kirk bridge, three fifty foot spans, over Grouse creek. A duplicate of this bridge can be built for \$5,000 below any bid made on concrete providing the state engineer will approve the plans for it. And this stone arch bridge, says Mr. Sharp, will outlast any concrete bridge costing \$5,000 more than it.

A picture of the Kirk Bridge that appeared in the September 10, 1922, edition of *The Wichita Daily Eagle*. The caption reads, “The Kirk bridge, three fifty foot spans, over Grouse creek. A duplicate of this bridge can be built for \$5,000 below any bid made on concrete providing the state engineer will approve the plans for it. And this stone arch bridge, says Mr. Sharp, will outlast any concrete bridge costing \$5,000 more than it.”



The plaque on Pudden Bridge, which refers to the bridge as “Kirk Bridge.”



A photograph of the middle arch taken in early May 2019, showing missing arch stones on the upstream face of the arch towards the western pier.



A picture of the overgrown deck of Pudden Bridge taken on October 20, 2019, showing debris left by severe flooding and, towards the far end of the bridge, the hole left in the deck by further collapse of the middle arch. The photo was taken looking west.



A picture of the bridge taken on October 20, 2019, facing east, showing more plainly the hole in the deck.



A closeup of the hole in the bridge deck, showing the loss of fill and spandrel walls caused by partial failure of the middle arch.



A view of the upstream face of Pudden Bridge, showing loss of masonry of the middle arch (partially obscured by the eastern cutwater). Photo taken on October 20, 2019, facing west.

## Notes

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- <sup>1</sup> "Kirk Ford Bridge," *Winfield Daily Courier*, February 11, 1913, Newspapers.com.
- <sup>2</sup> "Local News," *The Dexter Tribune*, March 13, 1913, Newspapers.com.
- <sup>3</sup> "Kirk Bridge Completed," *Winfield Daily Courier*, July 8, 1913, Newspapers.com.
- <sup>4</sup> "Cowley[']s Stone Bridges," *Arkansas City Daily Traveler*, December 7, 1908, Newspapers.com.
- <sup>5</sup> "Kirk Bridge Completed."
- <sup>6</sup> "At Loss of Fifty Dollars," *Winfield Daily Courier*, July 14, 1913, Newspapers.com.
- <sup>7</sup> Walter Sharp, "Grafting in Kansas Road Building," *The Wichita Daily Eagle*, September 9, 1922, Newspapers.com.
- <sup>8</sup> "Local News," *The Dexter Tribune*, May 15, 1913, Newspapers.com.
- <sup>9</sup> Sharp, "Grafting in Kansas Road Building."
- <sup>10</sup> "Kirk Bridge Near Completion," *Winfield Daily Courier*, June 26, 1913, Newspapers.com.
- <sup>11</sup> Walter Sharp, "Tyranny in Kansas Road Building," *The Wichita Daily Eagle*, September 8, 1922, Newspapers.com.
- <sup>12</sup> Walter Sharp, "A Story About Bridges," *Winfield Daily Courier*, May 8, 1922, Newspapers.com.
- <sup>13</sup> "Commissioners to Dexter," *The Winfield Daily Free Press*, April 10, 1913, Newspapers.com.
- <sup>14</sup> "Stone Arch Gave Way," *The Dexter Tribune*, April 24, 1913, Newspapers.com.
- <sup>15</sup> "Bridge Span [Collapsed]," *Dexter News*, quoted in *The Winfield Daily Free Press*, April 26, 1913, Newspapers.com.
- <sup>16</sup> "On the Banks and Borders of the Walnut," *Douglass Tribune*, May 2, 1913, Newspapers.com.
- <sup>17</sup> "Two Arches Up," *Winfield Daily Courier*, May 15, 1913, Newspapers.com.
- <sup>18</sup> "Local News."
- <sup>19</sup> "Bridge Nearing Completion," *The Dexter Tribune*, June 5, 1913, Newspapers.com.
- <sup>20</sup> "Kirk Bridge Near Completion."
- <sup>21</sup> "Kirk Bridge Completed."
- <sup>22</sup> "To Inspect Kirk Bridge," *Winfield Daily Courier*, July 9, 1913, Newspapers.com.
- <sup>23</sup> "Commissioners Accept Bridge," *The Winfield Daily Free Press*, July 11, 1913, Newspapers.com.
- <sup>24</sup> "Inspected Kirk Bridge," and "Commissioners Allowed Roads," *Winfield Daily Courier*, July 11, 1913, Newspapers.com.
- <sup>25</sup> "Accepted Kirk Bridge," *Winfield Daily Courier*, July 12, 1913, Newspapers.com.
- <sup>26</sup> "At Loss of Fifty Dollars."
- <sup>27</sup> "Commissioners Viewed Road," *Winfield Daily Courier*, July 10, 1913, Newspapers.com.
- <sup>28</sup> "A Country Dinner," *Winfield Daily Courier*, July 17, 1913, Newspapers.com.
- <sup>29</sup> Sharp, "A Story About Bridges."
- <sup>30</sup> "A Country Dinner."
- <sup>31</sup> Sharp, "Grafting in Kansas Road Building."
- <sup>32</sup> Walter Sharp, "Tyranny in Kansas Road Building," *The Wichita Daily Eagle*, September 10, 1922, Newspapers.com.
- <sup>33</sup> Larry Jochims, *Esch's Spur Bridge*, National Park Service (February 20, 1985), <https://npgallery.nps.gov/AssetDetail/NRIS/85001423>.
- <sup>34</sup> "2017 Bridge Brochure Map," updated 2017, [www.cowleycounty.org/uploads/wp-content/2017-Bridge-Brochure-map.jpg](http://www.cowleycounty.org/uploads/wp-content/2017-Bridge-Brochure-map.jpg).
- <sup>35</sup> Jochims, *Esch's Spur Bridge*, 3.
- <sup>36</sup> "Historical Bridge Saved with Emergency Watershed Protection Program Assistance," Natural Resources Conservation Service Kansas, [www.nrcs.usda.gov/wps/portal/nrcs/detail/ks/newsroom/stories/?cid=nrcs142p2\\_033631](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/ks/newsroom/stories/?cid=nrcs142p2_033631).
- <sup>37</sup> *Sunflower Journeys*, season 29, episode 7, aired November 3, 2016, on KTWU. [watch.ktwu.org/video/ktwu-sunflower-journeys-sunflower-journeys-2907/](http://watch.ktwu.org/video/ktwu-sunflower-journeys-sunflower-journeys-2907/).
- <sup>38</sup> Cody Griesel and Rebecca McCutcheon, "Stone-arch 'Fox Bridge' collapses," *The Cowley CourierTraveler*, October 10, 2016, [http://www.ctnewsonline.com/news/article\\_2d59c398-8f55-11e6-abae-a71c0271a28c.html](http://www.ctnewsonline.com/news/article_2d59c398-8f55-11e6-abae-a71c0271a28c.html).
- <sup>39</sup> "Bridges barricaded," *The Cowley CourierTraveler*, January 24, 2017, [http://www.ctnewsonline.com/news/article\\_f7f59eaa-e1d1-11e6-9449-97ad86142d44.html](http://www.ctnewsonline.com/news/article_f7f59eaa-e1d1-11e6-9449-97ad86142d44.html).
- <sup>40</sup> County, "2017 Bridge Brochure Map."
- <sup>41</sup> "Cowley County Stone Arch Bridges," accessed January 7, 2020, [www.cowleycounty.org/stone-arch-bridges](http://www.cowleycounty.org/stone-arch-bridges).
- <sup>42</sup> Board of Cowley County Commission, *County Regular Commission Meeting Minutes* (May 21, 2019),

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[www.cowleycounty.org/05-21-2019-commission-meeting-minutes](http://www.cowleycounty.org/05-21-2019-commission-meeting-minutes).