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### The "Golden" Plates

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## Chapter 81

### The "Golden" Plates

*Mormon 9:33 "if our plates had been sufficiently large"*

What did Joseph Smith notice when he first closely examined the plates of the Book of Mormon? How heavy were the plates? How difficult would it have been for Joseph to have carried the plates while doing that broken-field running through the forest near his home several days after receiving the plates and hiding them in a birch log?<sup>1</sup>

Joseph evidently managed to knock down and elude several pursuers despite the weight of the plates (which he might have carried like a football in that "farmer's smock" in which he wrapped them that day<sup>2</sup>). It is not simply a matter of Joseph being "large" and "stout," since Emma Smith later described having moved the plates around in a linen cloth while cleaning house. Better still, what would any one of us be able to say about them after having "hefted" and examined the plates for ourselves, just as the Eight Witnesses did in 1829?

A surprising amount of consistent information can be gleaned from eyewitnesses: Joseph himself gave us the length, width, and thickness of the whole set of plates as 6" x 8" x 6" in his famous Wentworth Letter.<sup>3</sup> On separate occasions, David Whitmer gave larger dimensions of 7" x 8", and 6" x 9", and 8" x 10";<sup>4</sup> Martin Harris claimed a smaller set at 7" x 8" x 4".<sup>5</sup> Following Joseph's dimensions would amount to .1666 cubic foot (.005 cubic meter), and such a volume of solid, pure twenty-four karat gold at 1204.7 pounds per cubic foot would weigh 200.8 pounds (90.4 kilograms).

As shown many years ago by metallurgist/blacksmith Reed H. Putnam, hammered plates of pure twenty-four karat gold would probably not weigh more than about 50 percent of the solid dimensions, i.e., 100.4 pounds (45.2 kilograms). However, Putnam also pointed out that, if the plates were made of the more practical Central American tumbaga alloy of eight karat gold with copper, they would weigh around 53.4 pounds (24 kilograms).<sup>6</sup>

Unknown to Putnam, William Smith, a brother of the Prophet who had handled and hefted the plates in a pillowcase, claimed on several occasions that the set of plates weighed about

sixty pounds,<sup>7</sup> as did Willard Chase,<sup>8</sup> while Martin Harris said that they weighed forty to fifty pounds.<sup>9</sup> William Smith added that the plates were "a mixture of gold and copper."<sup>10</sup>

Moreover, if the plates were made of the tumbaga alloy, other details fit into place. Take the color of the plates: The plates are consistently described as "gold" and "golden." When tumbaga (which is red) is treated with any simple acid (citric acid will do), the copper in the alloy is removed from its surface leaving a brilliant .0006 inch, twenty-three karat gilt coating. Indeed, this process was used in ancient America.<sup>11</sup> Plus, this surface covering is much easier to engrave.

Likewise, pure gold would be too soft to make useful plates. But tumbaga is remarkably tough and resilient, even in sheets as thin as .02 inch. Joseph Smith, Martin Harris, and David Whitmer all suggested that the plates were "not quite as thick as common tin."<sup>12</sup> Whitmer added on another occasion that each plate was as thick as parchment,<sup>13</sup> while Emma described them as like thick paper.<sup>14</sup> Tin in the early nineteenth century may have been around .02 inch or less, and parchment even thinner. Thus, each Book of Mormon plate could have been between .015-.02 inch thick.

If each plate (allowing for air space and irregularities) occupied from .03-.05 inch, the six-inch thick collection would have contained between 120 and 200 plates. If each was engraved front and back, there were 240 to 400 surfaces. Removing the portion that was sealed still leaves at least 80 and perhaps as many as 266 surfaces upon which our present Book of Mormon was contained. The text could fit on this many plates, particularly since there is some evidence that the characters on the plates were written on both sides and were quite fine or small.<sup>15</sup>

Thus, reasonable sense can be made of the physical description of the plates and of their possible metallurgical composition.

*Based on research by Robert F. Smith, October 1984.*

## **Footnotes**

1. See B. H. Roberts, *Comprehensive History of the Church*, 6 vols. (Salt Lake City: Deseret News Press, 1930), 1:86.
2. *Ibid.*, 90-91.
3. B. H. Roberts, ed., *History of the Church*, 4:537; compare *Evening and Morning Star*, 1:8, 58b.
4. See "An Old Mormon's Closing Hours," *Chicago Tribune* (Jan. 24, 1888), p. 8, col. 4; "The Book of Mormon," *Chicago Tribune* (Dec. 17, 1885), p. 3, col. 5; *Kansas City Journal* (June 5, 1881), p. 1.
5. See *Iowa State Register* (Des Moines), August 16, 1870; reprinted in Milton V. Backman, Jr., *Eyewitness Accounts of the Restoration* (Salt Lake City: Deseret Book, 1986), 226.
6. See Reed Putnam, "Were the Plates of Mormon of Tumbaga?" presented in 1954 and 1964 to the Society for Early Historic Archaeology, printed by the *Improvement Era* 69 (September 1966): 788-89, 828-31, available as a F.A.R.M.S. Reprint.
7. See *Saints' Herald* 31 (4 October 1884): 644; *William Smith on Mormonism* (Lamoni, Iowa: Herald Steam Book, 1883), 12.
8. See Eber D. Howe, *Mormonism Unveiled* (Painesville, privately published by the author, 1834), 245-46.
9. See *Tiffany's Monthly* 5, no. 2 (1859): 165-66.
10. "Sermon in the Saints' Chapel," *Saints' Herald* 31 (1884): 644.
11. See Heather Lechtman, "Pre-Columbian Surface Metallurgy," *Scientific American* 250 (June 1984): 56-63; and Constance H. Irwin, *Fair Gods and Stone Faces* (New York: St. Martin's, 1963), 298, who refers to it as *mise en couleur*.
12. *Times and Seasons* 3 (March 1, 1842): 707; *Chicago Times* (Jan. 24, 1888), p. 8, col. 1.
13. See *Kansas City Journal* (June 5, 1881), p. 1.
14. See "Last Testimony of Sister Emma," *Saints' Herald* 26 (Oct. 1, 1879): 289-90.
15. See Memorandum of Theodore Turley, statements of John Whitmer, April 4, 1839, cited in Richard L. Anderson, *Investigating the Book of Mormon Witnesses* (Salt Lake City: Deseret Book, 1981), 131.