agreed-upon criteria exist for evaluating the "effectiveness" of an organization (Hirsch and Levin 1999). Ultimately, then, the definition of the "straight-line-on-a-curved-surface" concept is likely to remain unsettled and open to debate.

Thus, the direction-facing problem, in addition to its importance to major religious institutions, underscores an important point about the inter-connections among social ideas, intuitive assumptions, and scientific analysis. When social ideas, such as unity among a group's members, are translated into concrete action, such as having a central location for directing thoughts and prayers, the actions will likely be based on prevailing—often unstated—norms and assumptions (DiMaggio and Powell 1983); in this case, the assumption that a "straight" path (even on a curved surface) has a unique meaning. When confronted with new realities, however, such as immigration to North America, where the two possible geography-based "straight"-line options differ markedly, problems may arise. Ultimately, while a mathematical and geographic analysis of the direction-facing problem can help frame the scientific issues, it cannot solve the problem fully—this task is a theoretical (even theological) matter, with which the relevant groups and institutions themselves must grapple. Still, students of geography should realize the next time they are in a synagogue, church, mosque, or temple that even here we can apply the principles and techniques of geographic analysis.

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NOTES

1. Note that the equations used in this article assume that the earth is a perfect sphere, although it is in fact spheroidal, flattened slightly at the poles. "On the spheroidal earth the shortest line is called a geodesic. A great circle [however] is a near enough approximation of a geodesic for most problems of navigation" (American Practical Navigator 1981, 700) and is therefore used here. Readers interested in the (extraordinarily complicated) formula for the initial angle of a geodesic may wish to consult a text on geodesy (e.g., Bomford 1983).

2. For even greater precision in determining a rhumb line, one can take into account that the earth is not a perfect sphere by slightly modifying the equation for M (see Pearson 1984, 83); I have found, however, that this result rarely differs by more than one-sixth of a degree, so the more complicated rhumb line formula is not used here.

3. To calculate the Bahá'í qiblah, based on the great-circle path toward Acre, see Brown and Bromberek (2000).

REFERENCES

NOTE: All biblical or classical Jewish, Muslim, and Bahá'í texts are cited in the body of the article and not by their author(s) in the References section.


