

software. The book does a very good job at discussing measurements, and operations on data sets (the first 4 rings), but just a small portion of the book is spent on people, and the social context required for a GIS. Chrisman wants to get across the notion of exploring GIS in his nested 6-ring context. The concept seems very valid, however, the book seemed a little off balance with the highly technical sections on surfaces, and levels of measurement, and then the very light touch on the institutional, social and cultural context. I agree with the author that many GIS books are very technically slanted. However, I doubt this book will be read, if not only understood, by those other than technically literate GIS/computer/geography users.

As I have mentioned, there are extensive references to the cartographic processes, as well as several references to surfaces, which help to make several key points in the book. However, again the level of detail and amount of information on the technical side seems to make the final two chapters out of place. For example, Chrisman spends a lot of space, relative to other topics, on compression for raster images such as the TIFF standard and quadtrees.

The order of the material was also presented slightly different than other GIS books. The very technical topics first and then the broad approach of GIS, where it fits, evaluation, etc. are at the end. Even in chapter 10: which covers evaluation and implementation, Chrisman has a list of steps to implement a GIS, and construction is of course last, with assessment and analysis for a system listed first.

I think the GIS terminology is very well explained and many examples are given. In addition, the comparison to cartography is helpful to many geographers and cartographers. However, the connection to the decision-makers interested in the "broader context" may

not be appropriate. This book is heavily focused on surfaces, cartographic background, which may not be suitable for many desktop GIS users. However, I don't think Chrisman intended it for the masses of GIS users. It is a wonderful book for someone involved with GIS, or intends on learning more about geographic information.

The author has a web site encouraging continued exploration. The web site is <http://www.wiley.com/college/chrisman>. It is a great site full of content. It includes the book's table of contents, a definition of GIS, the book's index, and more.

Overall Chrisman meets his goal of starting the reader on an exploration of GIS. Very good examples are given as well as problems to look for during the implementation and technical phases of a GIS. In addition, he makes connection from GIS to other fields, or past processes to help the user understand a concept. Some examples of how he does this are provided here. A simple example, a reminder is given to the reader regarding "standardizing" a ranking from say 1 to 9. An assignment of numbers, Chrisman reminds the reader, does not automatically construct valid arithmetical relationships. Pitfalls with digitizing are highlighted. For example, taking the digitizing tablet's resolution as a measure of accuracy. Projections and classification reductions are other examples Chrisman uses to get the reader on this exploration. Many links are made to other technologies, or just older methods of doing the same thing. Such as the overlay method taken from photo-mechanical reproduction, seeing through multiple layers. In addition to uses and specific technological tools, the author also gave specific examples from real-world projects such as the Pennsylvania project to site a disposal for radioactive waste. He used this project in

the example of overlay. Other operations are detailed, such as raster overlays to get a cost surface. A good example is given in the transformation section of the book. Chrisman explains the process of Dasymetric mapping of population density. Showing population density after taking out uninhabited areas from the pre-defined set boundaries, in this case the census tracts-also called controlled guesswork. The importance of a good cultural context is explained with the backdrop of systems that chose the hardware and software on technical merit, not the purpose of the organization.

I think current "power" users of GIS will learn interesting details and further their understanding of GIS. One of Chrisman's underlying goals, I believe, is to have the reader question some of the data or processes currently in place in a GIS department.

Shapes of Ireland: Maps and Their Makers, 1564-1839, J. H.

Andrews Geography Publications, Dublin, 1997 346 p. Illus. by Sharon Hill, AGS Collection, Univ. of Wisconsin-Milwaukee

"Shapes of Ireland: maps and their makers, 1564-1839", by J. H. Andrews, successfully presents and evaluates the cartographic impacts of the mapping history of Ireland. The early cartographic styles, with both their shortcomings and genius, juxtapose with the territorial and political struggles of the lands of Ireland and Britain that differ culturally and socially. Ireland owes most of its cartographic representation to English mappers, many never having set foot on its green and hilly shore. The story is poignant and true and told with erudition. It is only by reading between the lines that one sees the reasons for its late-blooming cartographic production. From present day evidence, most of Irish carto-

graphic history, owing to circumstance, style, and need is rooted in the English school. The need for the English to map Ireland finds reason in military and economic causes. The fact that the data was located in Dublin and the cartographer usually in London substantiates the theory that this was often long-distance work. Traditionally, the Irish themselves were a word-of-mouth people, apparently seeing no need to extensively record mapping data on paper, evidenced by a complete lack of extant provincial maps today. Andrews characterizes them as perhaps neither ambitious enough or too ambitious to be satisfied with the simple objective of presenting an early completed map. The conflict between linguistic representation, love of land, and knowledge of place, makes for some dramatic accounts of English/Irish mapmaking during this tumultuous time of the union of Ireland and Great Britain.

Andrews draws a magnificent picture of the historical cartographic development of Ireland, for all of its frailties. The apparent lack of Irish-made maps is evident. This is attributed to the causalities of time and human carelessness. The last stage of conquest of Ireland, 1603, nearly coincides with the present evidence of the early English/Irish mapping. At this time, travel to the once-Gaelic Ireland, now under the influx of the English, was easier, what with the network of towns, the spread of the English language, and the extension of agriculture to feed the mainland. It actually was a wealthy and developed land, for some. There was no reason why it should not be mapped extensively. But its mapping was flawed. The English cartographers in the 18th-early 19th century found the current wave of triangulation to be more relevant to commercial interests than the mathematical details of latitude and longitude of this small island. Vast areas were missed out, whole coun-

ties were found wanting for evenly surveyed representation, and place-names were Anglicized. The Irish were not found on the map of Ireland.

Andrews relates the details of fieldwork, compilation, production, and distribution of the nine key maps of Mercator, Boazio, Speed, Petty, Pratt, Jeffreys, Beaufort, Arrowsmith, and Larcom. The genealogical history is traced with specificity of what is currently known. The characteristics of the cartographer and the maps themselves are closely examined. Examples of the salient contributions to this cartographic history are shown and described. The maps are viewed as specimens of cartography, not as examples of iconography, propaganda, or art. They are examined by Andrews to the scholarly standards of the present day. As a further disclaimer, the manuscript map is silenced out, preempted by the printed map, which, according to Andrews, has more intrinsic precedence through his identification of merit and influence as determiners of successful historic mapping. He evaluates such criteria as legibility, comprehensiveness, aesthetic appeal, relationship to other maps, and its inherent noteworthiness as a means to identify merit. To assess the range of influence, Andrews specifies the derivations of the map, and its use. Using this as a guideline, he concludes that the printed map complies with more of the characteristics of merit and influence than the manuscript map, bringing the early phase of Irish mapping to about 1590. As mapping history progresses, Andrews carries onward the importance of the maps derived rather than the those which are the cause. The key maps he identifies throughout the text are evaluated for the degree of new information brought forth from them. It is the key map that is the foundation map, the cause, giving rise to the derivative map, the

effect. In the ultimate effort to map Ireland, it is now the derivative map that is most complete and useful and representative of accuracy. How accurate it was assessed at the time is unsure, for those in the map workshop were often not those who had done the fieldwork. He nevertheless acknowledges 'the place of new mistakes on new maps,' 'that the cartographer only tells the truth as he sees it,' and that reputations already won often contributed to the recognition of a map.' We have the evidence of its size and relative detail upon it. Occasionally, we have the documented explanations of cartographic procedures described by the mapper himself. Often the cartographic influence itself was illusory, a place across the rough sea described and mapped by a colonizer safely at home in London. Having said all this, he defines the 16th century as marking the take-off period of map accuracy. The period reviewed by Andrews falls within this prescribed time. We can therefore be relatively certain that his examples are the definitive maps congruent with the mapping history of Ireland.

Following the 'later is best' theory, Andrews traces the cartographic representation of Ireland to the 20th century. Along the way, he reviews the progress of the Ordnance Survey, including the eventual need for the O.S. to seek the advice of commercial cartographer John Bartholomew of Edinburgh in the 1890s. Contending with the complexities of color, relief, and scale, the Ordnance Survey was pressured by both the military occupations of late-Victorian imperialism and increased tourism following the famine of the 1840s. Commercial competition forced the Survey to bring their work up to date in keeping with the technologies of the day. The non-geographical concerns such as color schemes, decoration, marginal text-matter, or specialized thematic

material, make for competitive cartographic work. The accuracy of the map declines as information accumulates or over-simplification ensues in keeping with customer demands or business concerns. Andrews contends that "maps become as correct as paper and ink will allow, or for that matter, as the users desire." He tells of the scale issue in which 'improvement lies henceforth in selectiveness rather than completeness.' The simple problem of placing all that needs to be mapped with the constraint of a single sheet of paper made for some difficult decisions.

Within the time-span of two and a half centuries, Andrews cites the key-map concept as integral to the appreciation of Irish map history. As time progresses, the key-map concept 'the evolutionary flow (of information) may divide instead of converging, and one powerful family may be challenged by another of the same generation. The solution is then to treat both contenders as key maps.' This solution definitely has a limit, that the unique distinction of key map not be widely applied and cartographic history become redundant. The mapping of Ireland now is at the behest of the computer. Geographical information systems have made the change of scale and point coverage a matter of mathematical adjustment. Map history of Ireland is still in the making, as is the mapping of this green and beautiful land.

In conclusion, J. H. Andrews has compiled and written a comprehensive account of the mapping history of Ireland. It is also a story of colonization and conquest of a country by an imperial power. This is a world-wide tale in history. The story has more than one ending. There could be other characters. The issues of the history of cartography are relevant to other places and times. Andrews has shown the relevance of cartography to history and place and the people who

make the maps. Those who inhabit this land may have less interest in the story. The conquered not only have less voice, but perhaps less interest in the conquered land, as they struggle for their daily needs. Remembering it was for militarism and tourism, following the Irish famine that maps reached a zenith of popularity. The cartographic history here is seemingly as complete as it could be, short of a wonderful discovery that would fill in some early gaps. It probably would be Andrews himself who would be the scholarly discoverer of such missing links in the map history of Ireland. I wish him well, that he never completely closes the book on his research in this most interesting area.

Counties USA 1997: A Directory of United States Counties. Kay Gill and Darren L. Smith, eds. Detroit: Omnigraphics, Inc., 1997. 573 pp., Index, Maps. \$85.00 hardcover (ISBN 0-7808-0094-X).

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This basic reference book provides limited descriptive statistical data for each county in the United States. The counties are arranged alphabetically by chapters for each state, making the book very easy to use. Each state chapter is preceded by a Bureau of the Census base map showing the boundaries and names for each of the counties in that state. Basic contact information for state officials (telephone and fax numbers, and Internet addresses) are then provided. Contact information is also given for each county and includes the county seat mailing address, telephone and fax numbers, and Internet address when available.

The descriptive statistical data provided for each county includes both 1990 and 1995 population, population density (1995), and land and water area in square miles. Brief descriptions of the county's location and name origin are also given.

The book has limited utility since all of this information it contains can be found in other sources. The 1990 population, population density, land and water area in square miles, and the brief descriptions of the county's location and name origin is the same as what can be found in *American Places Dictionary* (Omnigraphics, Inc., 1994). The 1996 *County and City Extra: Annual Metro, City and County Data Book* (Bernan Press, 1996) is a much more comprehensive source for statistical data. Carroll's *Municipal/County Directory: 1996 Annual* (Carroll Publishing, 1996) has much more comprehensive contact information at the county level. Similarly, Carroll's *State Directory: 1997 Library Edition* (Carroll Publishing, 1997) provides more comprehensive contact information at the state level.

The most disturbing thing about *Counties USA 1997* is the large number of errors evident in the land in square miles data. A possible printing or data entry problem caused all counties with land or water areas of four or more digits to be incorrect. For example, the land area for Bayfield County, Wisconsin is listed as 1 square mile! In reality it is 1,476 square miles. This problem results in an unacceptable number of errors of fact throughout the book. In western states such as Wyoming, where all counties have land areas greater than 1,000 square miles, the number listed for the area in square miles is always wrong. Because all of the information in *Counties USA 1997* is found in other sources and the many obvious errors, it is difficult to recommend its purchase to any individual or institution.