

## BOOK REVIEWS

**Calvinists Incorporated: Welsh Immigrants on Ohio's Industrial Frontier. Anne Kelly Knowles. 1997. University of Chicago Geography Research Paper No. 240. University of Chicago Press, Chicago, IL. 330 p. \$24.95.**

This fine study focuses on the Welsh migration to Jackson and Gallia counties in southeastern Ohio during the early to middle 19th century. It is distinguished for its analysis of the situation on both sides of the Atlantic, examining the conditions which contributed to the need to migrate, as well as the characteristics of the American settlement which the Welsh created. It probes the details of the changes they experienced in moving, not only from Wales to Ohio, but also from rural agricultural to urban industrial enterprise, and from poverty to relative economic success. It further explains the significant impact which religious beliefs exerted on these processes of change.

By the early 1800s, a particularly conservative religious sect called Calvinistic Methodism had gained many adherents in Wales. Right living according to the rule of Scripture was a significant attribute of the faith as was a strong belief in predestination. As the idea of emigration began to develop in this rural part of Wales, conflicts with religious beliefs immediately arose. For example, many believed that the desire to migrate signified an unwillingness to accept one's lot, as predestinarian doctrine required. To rebel against one's "God-given" situation, or even to express dissatisfaction with it, was sinful. There was also great fear that those who migrated would encounter conditions of sin, perhaps an inability to keep the Sabbath, that would be difficult to deal with. Such religious concerns were constantly influencing people's choices.

Knowles identifies three major periods of Welsh migration to North America—colonial, early to mid-19th century agricultural, and late 19th century industrial. Chapter 1 is a historical geography of migration in the second major period, during which the Jackson-Gallia area was settled. Four Welsh source regions are identified, each of which is distinctive in terms of the timing and direction of emigration. Central Cardiganshire, from which most of the Jackson-Gallia settlers came, for example, sees little activity until the late 1830s. It grows through the "chain migration" process, with early emigrants writing back to encourage others to follow. This broad historical geography is followed by detailed examination of what Knowles calls the "contexts of choice" of the Cardiganshire emigration. As the early 19th century agricultural economy within this county became less and less able to support the growing population, the option of leaving became more and more attractive. Those who decided to go had three internal options: the lead-mining industry within Cardiganshire itself, the southeast Wales iron region, and London. Large numbers of "Cardis" became pioneers in dealing with the outside world and sources of information about that world for the people back home.

Chapter 3, "Emigration and Settlement," is a strong analysis of both the restraints that religion placed on would-be movers and also the breaking away that eventually occurred. Preachers inveighed against a man's leaving the situation in which God had placed him, warning of the spiritual dangers to be found in the mines, or the urban industrial areas. Nevertheless, the burdens of life at home compelled many to weigh these spiritual concerns against the dire economic straits in which they found themselves, and to choose emigration. The initial Welsh settlement in the Jackson-Gallia district occurred in 1818. By 1850, it became one of the five largest Welsh settlements in the country. A great advantage was that this area, while having limited prospects for agricultural success, was sufficiently isolated to allow for reproduction of Cardiganshire culture. Although there were some non-Calvinist Welsh, it became a strongly Calvinistic Methodist and Mynydd Bach settlement. The settlement gradually built a reputation among Welsh-Americans for its high degree of religiosity, although it also was noted for its limited economic success.

By 1850, however, the isolation of the region had ended with the arrival of the railroad and development of the charcoal iron industry. The charcoal iron industry began as an "American" (as opposed to Welsh) enterprise, and the Welsh avoided participation. Their religion discouraged abandonment of farming, as it had discouraged migration in the first place. But in 1854, some less dogmatic Welshmen seized the opportunity to form a company and others followed. The Welsh developed their own form of capitalist enterprise. Charcoal iron manufacturing became a community effort. Welsh farmers were stockholders, often receiving stock in return for deeding timber and mineral rights to the furnaces. This greatly reduced the need for capital and was essential to the success of the companies. Welsh laborers also were willing to have their wages deferred, since they were able to provide their own necessities on the lands that they continued to farm. The management of the new companies was often in the hands of the chapel elders, the leadership of the religious community. Hard work, diligence, and obedience to authority were among the many religious tenets that were given industrial application. Religion affected day-to-day operations in many ways, the most obvious being the closing of the furnaces on Sundays.

The economic success of this industry raised more questions, since it posed a direct threat to many religious values. Knowles' final chapter, called "The Moral Context of Migration," considers these issues. What should one do with the wealth that was gained? The community was greatly concerned about the sin of pride; it was important to avoid ostentation. On the other hand, using one's wealth for God's work was admirable. Since it was common among the Welsh for individual contributions to the chapel to be announced to the entire congregation, many tried to outdo one another in their giving.

In summary, Knowles describes the story of the Jackson-Gallia Welsh as "a study of transition and in-

corporation in three acts Each of . . . three major points of transition for [them] involved a confrontation between religious values and a choice for change. The first such confrontation was the decision to emigrate; the second, the decision to become engaged with charcoal iron; the third, the prolonged negotiation with the meaning and consequences of prosperity." Her study provides an outstanding analysis of the arguments and outcomes of these confrontations.

One particular research problem, that of connecting Jackson-Gallia settlers with specific Welsh places of origin, was solved quite simply by Dr. Knowles. Given a lack of detailed records on emigrants from Britain, she turned to accounts created by the Welsh themselves, the thousands of obituaries printed in the many Welsh-American periodicals that were being published by the middle of the 1800s. From this examination she was able to develop a data base for over 1700 Welsh people (mainly men) for whom information was given about their Welsh place of origin as well as their destination. Nearly 1000 of these were residents of Jackson-Gallia. Added to the standard sources of local historical research in the US, such as county histories and directories, and church and company records, she was enabled to construct a remarkable picture, not only of the migration process, but of many of the participants in the process. Information from the obituaries allowed her to personalize the stories to a great extent. A typology of emigrant life-paths, shown graphically, is an interesting byproduct of the use of this technique. In addition, there is an extensive table in an appendix giving data on the individual Welsh settlers in Jackson-Gallia.

The ability to focus on individual experiences and then to draw significant conclusions from the accumulation of these experiences, is one of the great strengths of this exceptional study. It also clearly benefits from a research plan that was well-designed and carried out, as well as from excellent writing.

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**Applied Hydrogeology for Scientists and Engineers. Zekai Sen. 1995. CRC Press, Lewis Publishers, Boca Raton, FL. 444 p. \$99.95.**

*Applied Hydrogeology for Scientists and Engineers* is a comprehensive, clearly written, well-refereed, and well-illustrated textbook for both undergraduate and graduate students interested in the fields of hydrology, hydrogeology, and hydraulic engineering. It is also a good reference for researchers, lab technicians, and professionals working in these areas. The highlight of the book is the presence of a very large number of drafted figures (sketches, plots, flow charts, etc.) that greatly aid in understanding the subject matter. The book emphasizes the role of geology in controlling the

occurrence and movement of ground water. Special attention is also given to the practical applications of the various concepts, procedures, and analyses presented in the book.

The 444-page book contains twelve chapters, 379 figures, and an exhaustive list of references accompanying each chapter. The first four chapters deal with general concepts, evaluation of various geologic materials (alluvial fans and fills; sand dunes; glacial deposits; delta deposits; coastal deposits; various igneous, metamorphic, and sedimentary rocks; karst terrains) as ground water reservoirs, subsurface distribution of ground water, aquifer types, ground water flow properties (water energy; piezometric surface; hydraulic gradient; discharge; flow nets; and spacial, time, and force classifications of flow), and aquifer properties (porosity, permeability, specific yield and retention, storage and storage coefficient, hydraulic conductivity, transmissivity, homogeneity and anisotropy). Chapters 5, 6, and 7 describe linear and nonlinear laws governing flow, wells, and field measurements (observation wells, piezometers, drawdown measurements, discharge measurements and calculations), respectively. The various types of aquifer tests are described in Chapters 8 through 12, with Chapter 8 focusing on steady-state aquifer flow tests, Chapter 9 on porous medium aquifer tests and models, Chapter 10 on methods and models used for testing fractured medium, Chapter 11 on testing wells, and Chapter 12 on non-linear aquifer flow tests.

*Applied Hydrogeology for Scientists and Engineers* is one of the most detailed treatments of the subject of ground water hydrology that I am aware of. The book draws heavily on the research papers published in periodicals, journals, and symposia proceedings. It also reflects the author's experience on numerous field projects. The book certainly deserves a place in libraries and on the personal bookshelves of all hydrogeologists, engineering geologists, and hydraulic engineers.

Although *Applied Hydrogeology for Scientists and Engineers* is an excellent reference for those involved in ground water studies, there is room for improvement of certain aspects of the book in future editions. A shortcoming of the book is that many figure captions are too short to be self explanatory. One has to read the text to completely understand the relevance of the figures. Furthermore, some figures are inadequately marked while others are hard to read due to either very small size of the lettering or poor reproduction. Future editions of the book could also benefit from more up-to-date references. Finally, the book is very descriptive and qualitative in nature, and lacks worked examples or practice exercises altogether. Solved examples will enhance understanding of the numerous types of methods, procedures, techniques, and analyses described in the book.

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