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21H.421 Paper 2

Quabbin: Sources on a Geologic Time Frame

Organization of the Sources

The geology of the Quabbin Reservoir and surrounds seems at first to be an obscure topic, as there appears to little of geologic interest in the region. However, a more in-depth study of this topic reveals a large number of geologically significant features, many of which serve as geologic landmarks for the area. Along with this abundance of physical geology comes a corresponding amount of sources and texts dealing with the region's geology. Information covering the geology of the Quabbin Reservoir tends to fall into three categories: general overviews, guidebooks for specific geologic study, and more specific microgeologic studies. Useful sources in each category are given below.

General Sources and Overviews

When considering research on the topic of geology in the United States, a valuable first reference to turn to is the "Roadside Geology" series, published by Mountain Press Publishing Company. These books generally give a broad overview of the geology of a particular state, with specific road trips through regions of interest. Their main weakness is the lack of off-road information, although can usually be found elsewhere. Roadside Geology of Massachusetts, by James W. Skehan, provides an excellent overview of the geology of Massachusetts, including sections relating to the Quabbin region in particular. In addition, the text, which has excellent maps and diagrams, is useful as a resource to locate specific geologic features in other sources. The book, due to its general nature, mostly coversmacrogeology, but has a healthy appreciation for mineralogy as well. The book's lack of jargon makes it accessible to the average reader, again adding to its value as a first reference for the topic. Once this has been consulted for general information, sources that deal with particular regions of interest may be located easily.

One of the most commonly studied geologic regions around Quabbin is the Connecticut River Valley, a long, narrow feature stretching the length of the Connecticut River and bisecting the state of Massachusetts. It is located approximately fifteen miles to the west of the reservoir. The geology changes greatly across this distance, but the amount of information on the

Valley is considerably larger than that on Quabbin alone. George W. Bain's Guidebook: Geology of Northern Part – Connecticut Valley serves as a general reference and introduction to this region. This source may be difficult to find, as it was never formally published, but local colleges may have a copy. Like the guidebooks listed below, this contains various field excursions, but is far more general and approachable in its description of the Valley's geology and history. Line drawings and maps of the region (including three-dimensional block diagrams) provide a good visual for the information presented in the text. Terminology is used with definitions, and efforts are made to ensure the text is reader-friendly.

Although O. C. Farquhar's Conference on Economic Geology in Massachusetts seems to focus solely on this topic, several papers presented at the above conference give a more general description of the region's geology. In particular, an article titled "Progress of Bedrock Geologic Mapping in West Central Massachusetts" (pages 29-44) covers the geology of the Quabbin region and its northern and southern extensions. This particular article is another source that should be consulted early, as it provides background information that will ease later research. The rest of the text is less useful, although some discussion of the geology of reservoirs and groundwater sources may be useful for more specific study of those topics.

Guidebooks and Explorations

Geologic conferences often produce guidebooks of field excursions in the immediate area of the conference, and these can be useful when looking at specific geological features and local regions of interest. Raymond Joesten's Guidebook for Fieldtrips in Connecticut and South Central Massachusetts is one such guidebook. Although the trips are sometimes useful, they are often too in-depth to be useful for a general overview of the topic. In addition, the text's maps and drawings were difficult to interpret and lacked any reference points to non-geological features such as bodies of water or town centers, which made locating the features on other maps difficult. Most of the sources weren't very accessible to those not familiar with the field, although "Stratigraphy and Structure of the Ware-Barre Area, Central Massachusetts" (pages 341-373) was relatively readable and contained some general information that was relevant to the particular region (to the southeast of the reservoir). Other guidebooks are perhaps better resources to consult, although this one may be of interest to those studying the southern reaches of

this region.

A more specific and readable guidebook, Peter Robinson and John B. Brady's Guidebook for Field Trips in the Connecticut Valley Region of Massachusetts and Adjacent States, contains several useful overviews of the region's geology, including discussions of local geologic features (such as the Pelham Dome). Several of the papers in this guidebook cover the direct region of interest. "The Pelham Dome, Central Massachusetts: Stratigraphy, Geochronology, Structure, and Metamorphism" (pages 132-169) covers the local geography in some depth and has very nice maps that may serve as reference frames for other, less readable maps. A paper on hydrology and the geologic features of the reservoir, "Hydrogeology and Water Resources of the Connecticut Valley and Western Quabbin Reservoir Watershed" (pages 199-215) is also a good resource, although perhaps more specific than might be helpful. Another good overview of the eastern regions of the reservoir may be found in "Glaciation of the Worcester Plateau, Ware-Barre Area, and Evidence for Succeeding Late Woodfordian Preglacial Climate" (pages 467-487), which discusses the little-encountered topic of how glaciation affected the region's geography far more recently than most other geologic changes.

A last useful guidebook, also edited by Peter Robinson, is Guidebook for Fieldtrips in the Connecticut Valley of Massachusetts. Several field excursions and papers are quite valuable, including "Gneiss Domes and Recumbent Folds of the Orange Area, West Central Massachusetts" (pages 17-47), which studied the region lying directly under the reservoir and included several nice diagrams and maps that were relatively easy to follow. The descriptions of rock strata and formations in the region were quite detailed without being difficult to follow. However, the most valuable paper in the text, and one that should be consulted in any research on this topic, is "Geology of the Quabbin Reservoir Area, Central Massachusetts" (pages 114-127). This paper covers the topic in extreme detail, although at times it seems to miss the larger picture of the geology for the smaller focus of mineralogy and rock strata. In addition, those taking part in this trip were allowed to boat on the lake and land at points that are generally off-limits to the public, making the information in this paper far more valuable. A detailed map of the reservoir's strata and diagrams of specific formations are included. This guidebook is worth searching out for this paper

alone.

Microgeology, Mineralogy, and More Specialized Information

As sources that relate to this topic become more specific, they generally turn tomicrogeology and mineralogy and away from macrogeology, which is the general topic of interest. However, these more specific sources often contain broad introductions to the region of interest, which generally deal with macrogeology. Stuart R. Michener's Bedrock Geology of the Pelham-Shutesbury Syncline, Pelham Dome, West-Central Massachusetts is perhaps the most broad and macrogeology-focused of these sources. Although most of the text is still devoted to microgeology, a few brief sections (in particular, the "Introduction," "Generalized Structural History of the Pelham Dome," "General Structure of the Pelham-Shutesbury Syncline," and "Summary Geologic History of the Pelham-Shutesbury Syncline") are macrogeology-oriented. In addition, the region of interest lies directly under the western half of the reservoir, making this paper an valuable resource for this topic.

Richard A. Jasaitis' Geology of Pre-Mesozoic Bedrock of the Amherst Area, West-Central Massachusetts also provides an in-depth study of this region, although the language is much harder to follow and the text gets quite specific at times. The region covered in this source is due west of the reservoir. The most useful part of the text is the "Geologic History of the Amherst Area," which focuses more on macrogeological aspects of the region, and discusses the origins of the geologic features present.

As the sources become more specific and specialized, they more further into the realm of microgeologyand minerology. Petrography, Mineral Chemistry, and Geochemistry of the HardwickTonalite and Associated Igneous Rocks, Central Massachusetts, by Charles Kenneth Shearer, deals mostly with microbiology and is more specific than the two sources above, which are general overviews of more specific topics. The "Introduction" and "Distribution and Correlation of the Hardwick Pluton and Associated Igneous Rocks" cover more macrogeological topics than the rest of the source. The source contains several maps of the region with geologic strata distributions, all of which are easy to read and contain a large volume of information separate from that in the text. The region of interest lies underneath the eastern half of the reservoir, and thus the

source (like the two above) is valuable due to its location, despite its lack of general information.

The most specific source that still contains some macrogeologic information is Margaret A. Roll's Effects of Acadian Kyanite-Zone Metamorphism on Relict Granulite-Facies Assemblages, Mount Mineral Formation, Pelham Dome, Massachusetts. Like other sources, this touches on the Pelham Dome, located to the west of the reservoir and within its immediate geologic area. This text's "Introduction" section is quite relevant to the topic, and discusses the location and macrogeology of the region in some detail. However, the rest of the source is relatively useless unless microgeology or mineralogy are of interest, as there is no further mention of macrogeology.

Summary of the Sources

Most of these texts are quite specific, and few of them deal directly with the geology of the reservoir itself. In addition, several lack much mention of the macrogeology of the region, instead focusing on the microgeology and mineralogy of the strata present. However, we may combine these various small points of information into a well-rounded overview of the geology of the Quabbin reservoir. In addition, other types of documentation (such as glaciation information, rock strata, and surveying) may be added to enrich our knowledge of the topic. By pulling data and information from all of the above sources, we may provide a greater understanding of the Quabbin Reservoir's geology and its geologic history.