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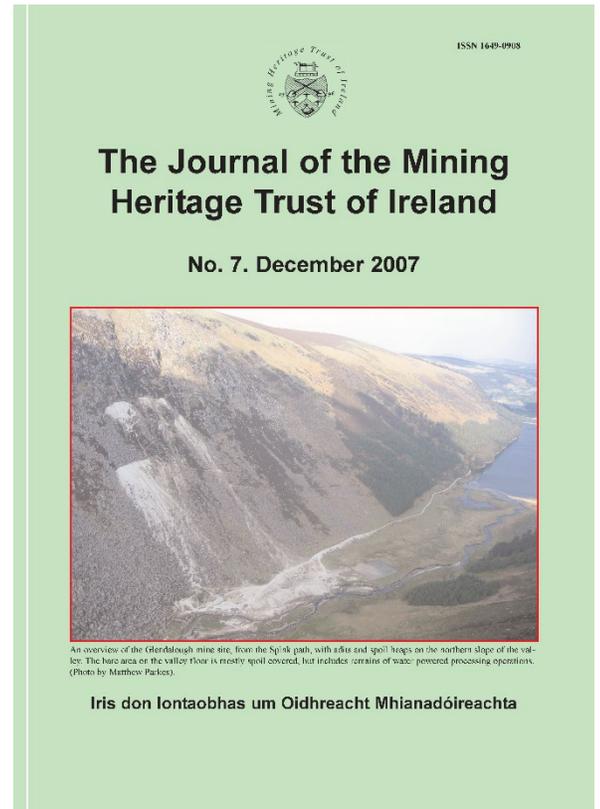
The Mining Heritage Trust of Ireland formally ceased its existence in 2019 but has provided a continuing website of resources with free access for those interested in the activities of the organisation in its various formats from 1996-2019, and in Irish mining heritage in a broader sense.

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GALWAY'S MINING HERITAGE: INTERACTIVE MAPS ON THE WEB

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Abstract: The Internet provides an excellent resource for communicating a range of information relating to mining heritage. The generation of interactive custom mining heritage maps on the World Wide Web using the Google Maps interface is discussed. Examples are drawn from mining heritage records of County Galway. The use of 3D earth viewer applications such as Google Earth for displaying geospatial mining heritage information is also described. *Journal of the Mining Heritage Trust of Ireland*, 7, 2007, 33-36.

MINING HERITAGE AND THE INTERNET

The role of the Internet in the communication of information on mining heritage is well appreciated. A simple Web search for 'mining heritage', results in a broad and varied list of Web sites, from international organisations and world heritage sites, to national trusts and local interest groups. Aside from presenting information on mine sites and organisations, the Web serves as an excellent resource for archived literature and illustrations of past mining activities. Some of the earliest examples of literature on mineralogy, such as Georgius Agricola's (1494 - 1555) 'De Re Metallica', are available on the Internet in digital format (The Archimedes Project 2007; Farlang 2007a; Farlang 2007b).

The Mining Heritage Trust of Ireland identified the potential resourcefulness of the Internet in the early days of the World Wide Web. In 1997, Fewer (1997) referred to the MHSI home page and provided a list of mining history web resources that were available on the Web. Morris (2001) later provided an update of sites of interest to the mining heritage community. In a presentation to a NAMHO conference, Claughton (2001) considered the future role of the Internet as a tool for accessing, archiving and disseminating information corresponding to mining history. Claughton (ibid.) concluded that the Internet could serve as an excellent tool in this regard, but that it could not 'replace time spent in the field and the record office'. Claughton even considered the use of serving 3D computer models of mine plans on the Web, 'to help our understanding of the structure and development of mining'. Two years previous, Russ and Wetherelt (1999) demonstrated this, by generating a large-scale, web deliverable 3D VRML (Virtual Reality Modelling Language) model of South Crofty Mine, Cornwall.

COUNTY MINING HERITAGE INITIATIVES

The Geological Survey of Ireland (GSI) Mining Heritage web page (GSI 2007) states that the 'identification of key mining heritage assets in the county should be a priority action in a county's Heritage Plan'. Several county heritage plans have prioritised 'mining heritage' (or quarrying) in their action plans, whereas other counties generalise this and list 'industrial heritage' in their priority actions. The cover of the County Cork Heritage Plan 2005-2010 shows the Man Engine House at

Allihies, Co Cork. The importance of mining heritage was acknowledged by Galway County Council in the county's heritage plan (Galway County Council 2004) as part of Action 3.16, which aims to 'promote and make available information relating to important geological sites in County Galway'. A component of this action was completed in August 2006, when the Galway's Mining Heritage: Extracting Galway Conference was held at Oughterard, County Galway. The proceedings of the conference were subsequently published by the MHTI (MHTI 2006).

EXTRACTING COUNTY GALWAY'S MINING HERITAGE

The proceedings of the Galway's Mining Heritage conference provide an insight into past and present mining activities in County Galway, as well as an introduction to the County's geology and a study into the use of stone in pre-Christian times. Also included in the publication is a record of all known mining heritage in County Galway (MHTI 2006, p38-40). This record lists 59 mining heritage sites. One site, Dooneen (Irish Grid Ref: V 57780 45895) corresponds to Dooneen Mine at Allihies, County Cork. The remaining 58 sites are to be found in County Galway, four of which are east-southeast of Galway city, and the remaining 54 located throughout Connemara, Cois Fharráige and Joyce's Country. The record presents information in a format that conforms to the MHTI Mine Inventory (see Critchley 1999). This inventory was manually digitised, georeferenced in a GIS and further processed to render that data in a format that can be displayed in a Google Map application.

GOOGLE MAPPING APPLICATIONS

The ability to generate free, customised maps is one of the more exciting aspects of the current Web applications such as Google Maps (Google 2007a) and Google Earth (Google 2007b). Using Web languages such as HTML, XML and AJAX, customised Google Maps can be generated to provide informative map applications. For further information on generating custom Google Maps see <http://www.google.com/apis/maps/>. Google Earth enables users to access information in an interactive and navigable 3D virtual globe. Google Earth uses a markup language called KML (<http://code.google.com/apis/kml/>).

GALWAY'S MINING HERITAGE IN GOOGLE MAPS

An interactive Google Map displaying the mining heritage sites for County Galway is available at <http://geoscene.ie/res/gmaps/mines/mines.html>. Each mine site is identified by a place-marker (cross-hammers icon) (Figure 1). Information for each site is accessed via a pop-up information window. A drop-down menu is provided in a sidebar adjoining the map, in which the complete list of sites is presented. Information windows are accessed by clicking on the markers within the Google Map or by clicking the menu list items (Figure 2). Google Maps information windows may display text, photographs, links to other web pages, or QuickTime movies. An example of how a table displaying the Mine Inventory data for each mine is provided by clicking on the Teernakill Copper and Sulphate Mine place-marker. The background map layer can be set to show a coloured 'road map' or recent satellite imagery, or both (hybrid). Whilst the resolution of the satellite imagery from much of County Galway is poor, sites such as Teernakill Copper and Sulphur Mine in the Maam Valley, and Cloon Mine, at Cleggan, are clearly visible. At Teernakill, the old mine buildings are discernible, as can the old route of the Leckavrea (Teernakill) Tramway be traced eastwards to the mine pier on the shores of Lough Corrib.

A Google Map for the Berehaven Mines, Co. Cork was also

produced; owing to the wide spread recognition of the importance of this mining locality. The resolution of the imagery for the Allihies region is very high for the western, coastal region. However, two mines are located in an area where the satellite imagery resolution is poor, and no surface features can be distinguished (see <http://www.geoscene.ie/res/gmaps/mines/berehaven.html>).

GALWAY'S MINING HERITAGE IN GOOGLE EARTH

The record of County Galway's mine sites was also converted to a Google Earth KML file (http://www.geoscene.ie/res/gmaps/mines/galway_mining.kmz; Figure 3). This enables users to open the file freely and directly in Google Earth, and to navigate to each location either manually or by clicking on a placemark. The ability to view the landscape surrounding each mine from a variety of perspectives, thanks to Google Earth's 3D navigation functionality, makes this an exciting and powerful way to share mining heritage information (Figure 4). The potential for creating a detailed mining heritage information utility, by using information windows with text and imagery, and old site maps overlain on the satellite imagery, is great. One benefit of the Google Earth file is the ability to display the data in a Google Map also. This is possible by inserting the URL address for a KML file in the Google Maps 'searchbar'.

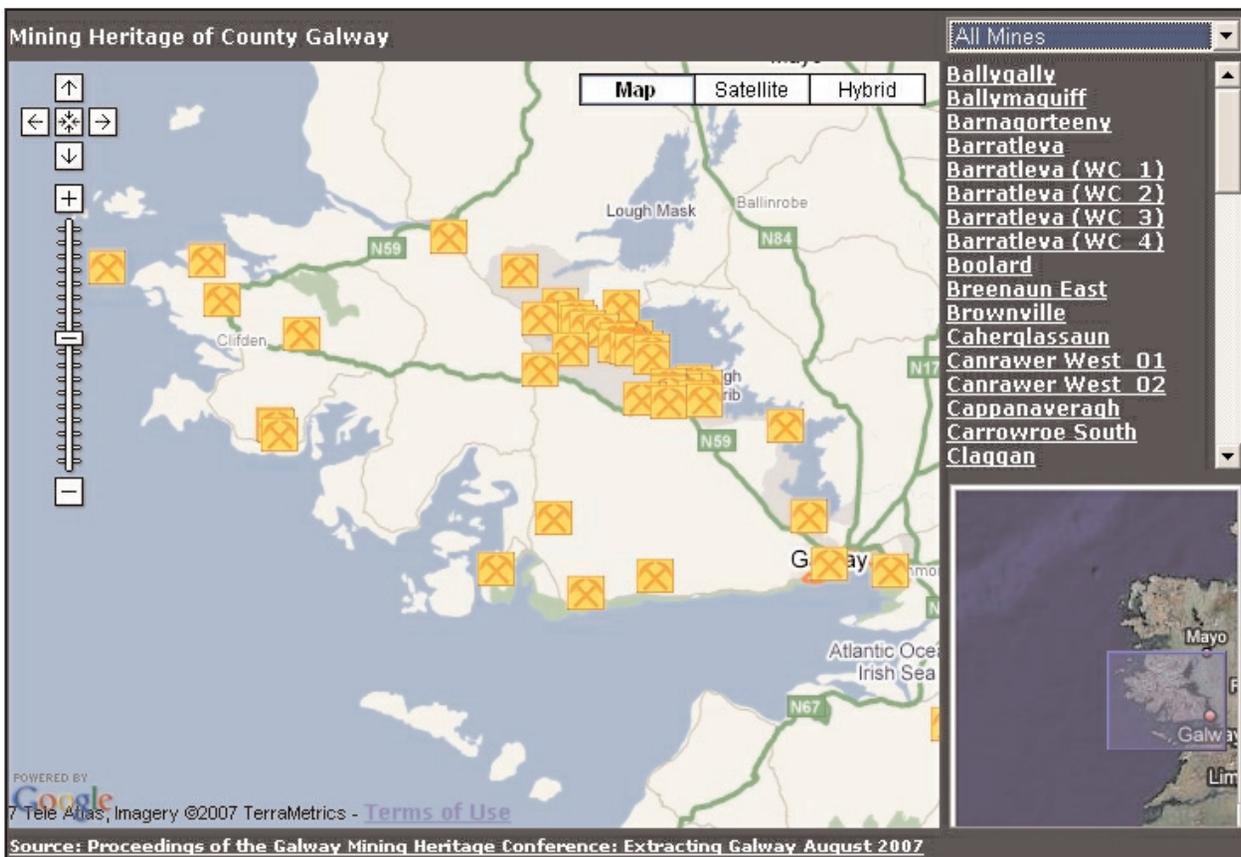


Figure 1: Screenshot of the Mining Heritage of County Galway Google Map page (map view) showing the distribution of mine locations through west County Galway. The sidebar (right) presents a georeferenced list of some of the 58 mine locations accessible on the Mining Heritage Google Map, with a regional overview map at foot of the sidebar.

WEB 2.0: IMPLICATIONS FOR MINING HERITAGE ON THE WEB

The emergence of the 'next generation' Web, or Web 2.0, has enabled everyday Internet users to become active publishers

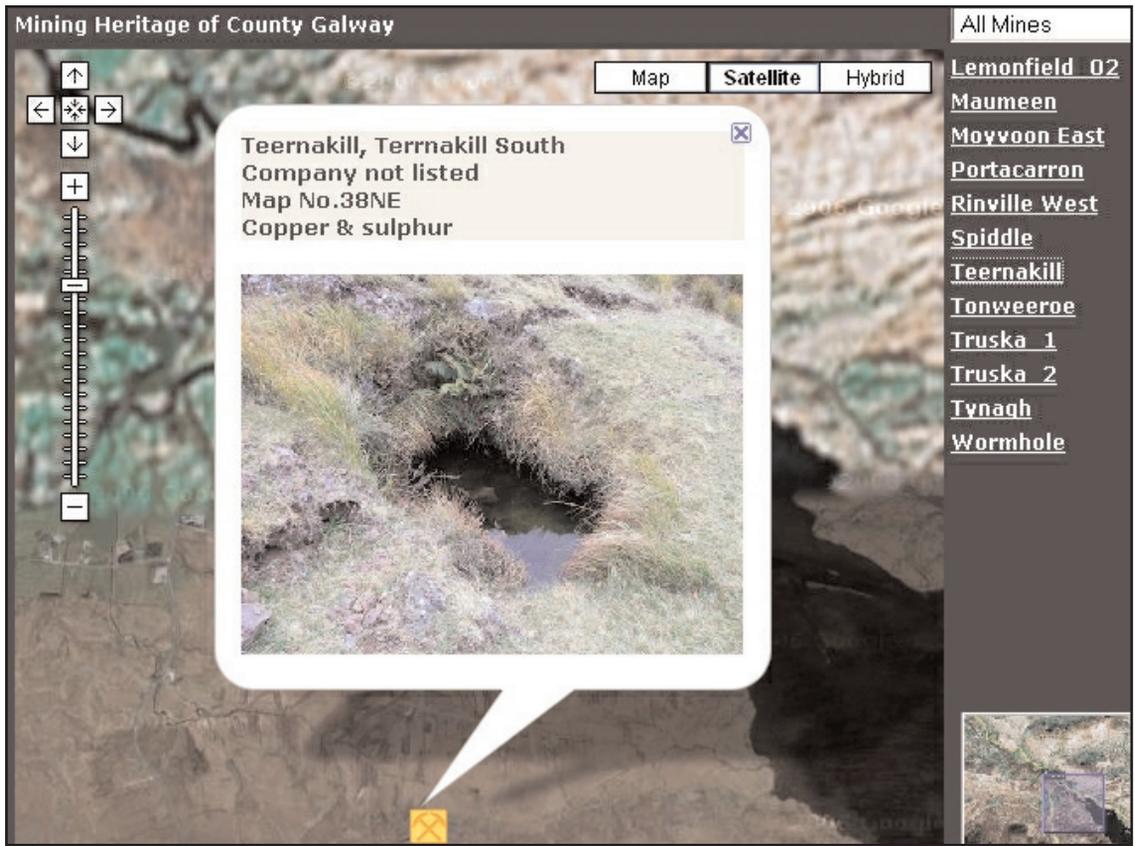


Figure 2: Screenshot of the Mining Heritage of County Galway Google Map page (satellite view). This image shows a pop-up information window for Teernakill Copper and Sulphur Mine, with associated mine inventory information and photography.



Figure 3: Screenshot of the Mining Heritage of County Galway Google Earth KML file viewed in Google Earth. This oblique perspective, looking northwest from Galway Bay towards Killary Harbour, shows the distribution of some of the mines through Connemara (see Figure 1 for Google Map plan view). Some locations are automatically obscured relative to this perspective to reduce the effect of overlapping labels.

and contributors of a variety of digital content. The proliferation of wikis, blogs, photo-sharing sites, social-networking sites, and content management systems (CMS) attest to the success of user generated content on the Web. Through the use of

these free and open access technologies, information on mining heritage can be compiled and shared in quantities hitherto unimaginable. At present, the MHTI Wikipedia page provides a limited amount of information. However, the potential for such



Figure 4: Screenshot of the Teernakill Copper and Sulphur Mine in Google Earth. This oblique perspective looks west-southwest towards the Corcogemore/Maunturk Mountains from Lough Corrib. (The route of the Teernakill Mine Tramway is visible in the satellite imagery, running eastwards from the mine to the shore of Lough Corrib).

a site to provide a repository for information on mining heritage in Ireland is great. The value of such a site would be in the ability for any interested person to contribute information, a task that is restricted in traditional websites, such as the MHTI site. As demonstrated here, the ability to publish geospatial mining information freely on the Web, using interactive map applications, presents an exciting and resourceful approach to the dissemination of mining heritage information.

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REFERENCES

- Claughton, P. (2001). "Mining History and the Internet." *Mining History: Peak District Mining Heritage Society Bulletin* 14(6).
- Critchley, M. (1999). "The Mining Heritage Society of Ireland Mine Site Inventory." *Biology and Environment: Proceedings of the Royal Irish Academy* 99B(1): 73-74.
- Farlang. (2007a). "Agricola: De Re Metallica." Retrieved 11/09, 2007, from http://www.farlang.com/gemstones/agricola-metallica/page_001.
- Farlang. (2007b). "Agricola: Textbook of Mineralogy." from http://www.farlang.com/gemstones/agricola_textbook_of_mineralogy/page_001.
- Fewer, G. (1997). "Irish Mining History and the World Wide Web." *Mining Heritage Trust of Ireland Newsletter* 5, 6-8.
- Galway County Council (2004). Galway County Heritage Plan - A Strategic Plan for County Galway' Heritage. Galway, Galway County Council.
- Google. (2007a). "Google Maps Homepage." from <http://maps.google.com/maps>.
- Google. (2007b). "Google Earth Homepage." from <http://www.earth.google.com/>.
- GSI. (2007). "Mining Heritage." Retrieved 10/09, 2007, from <http://www.gsi.ie/Programmes/Heritage/Projects/Mining+Heritage.htm>.
- MHTI (2006). Proceedings of the Galway Mining Heritage Conference. Galway's Mining Heritage: Extracting Galway, Oughterard, Co. Galway.
- Morris, J. (2001). "Mining History on the Internet - An Update." *Mining Heritage Trust of Ireland Newsletter* 16, 10-11.
- Russ, K. and A. Wetherelt (1999). "Large-scale mine visualization using VRML." *Computer Graphics and Applications, IEEE* 19(2): 39-44.
- The Archimedes Project. (2007). "Georgius Agricola: De re metallica 1556." Retrieved 11/09, 2007, from http://archimedes.mpiwg-berlin.mpg.de/cgi-bin/toc/toc.cgi?dir=agric_remet_001_la_1556;step=thumb.