



Organisation  
der Vereinten Nationen  
für Bildung, Wissenschaft  
und Kultur



Harz - Braunschweiger  
Land - Ostfalen  
UNESCO  
Global Geopark

Landmark **1**

# Hübichenstein



 **GEO PARK**<sup>®</sup>  
Harz . Braunschweiger Land . Ostfalen

**Harz**



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On the 17<sup>th</sup> of November, 2015, during the 38<sup>th</sup> UNESCO General Assembly, the 195 member states of the United Nations resolved to introduce a new title. As a result, Geoparks can

be distinguished as **UNESCO Global Geoparks**.

As early as 2004, 25 European and Chinese Geoparks had founded the Global Geoparks Network (GGN). In autumn of that year Geopark Harz · Braunschweiger Land · Ostfalen became part of the network. In addition, there are various regional networks, among them the European Geoparks Network (EGN). These coordinate international cooperation.



In the above overview map you can see the locations of all UNESCO Global Geoparks in Europe, including UNESCO Global Geopark Harz · Braunschweiger Land · Ostfalen and the borders of its parts.

UNESCO-Geoparks are clearly defined, unique areas, in which geosites and landscapes of international geological importance are found. The purpose of every UNESCO-Geopark is to protect the geological heritage and to promote environmental education and sustainable regional development. Actions which can inflict considerable damage on geosites are forbidden by law.

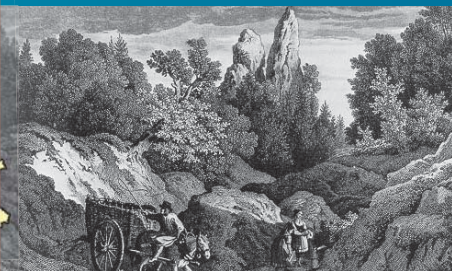


## 1

Coral Reef and Discovery Trail  
Hübichenstein Bad Grund

The Hübichenstein (448 meters a. s. l.) is located in close proximity to the federal road B 242 and rises approximately 50 meters above its surroundings. During his third trip to the Harz, JOHANN WOLFGANG VON GOETHE (1749 – 1832) visited this site. He was accompanied by the painter GEORG MELCHIOR KRAUS (1737 – 1806), who produced graphic documentation of this extraordinary geosite. GOETHE himself wrote on the 17<sup>th</sup> of August 1784: *“The Hübichenstein, calcareous cliff at the Iberg near the mining town of Bad Grund, actually a coral cliff...”*

According to a Harz saga, the medieval king of the dwarfs named Hübich ruled the Hübichenstein. He was, for the most part, a kindly man, ready to help others and offering generous gifts to needy persons, even golden fir-cones to the poor people. No one, however, was allowed to climb up the Hübichenstein. Hübich immediate-



Historical Engraving of the Hübichenstein



In the “World-Forest”

ly punished such frivolous behaviour. During the Thirty Years’ War (1618–1648), soldiers in an orgy of destruction devastated the summit of the Hübichenstein. Since this time, the dwarf king Hübich has never again been seen.

For many years now, an ascent of the Hübichenstein can be achieved by using steps which have been hewn into the cliff. The climb is rewarded by a magnificent view to the town of Bad Grund and the Winterberg quarry. At the end of the 19<sup>th</sup> century, a two meter long medaillon image of Emperor WILHELM I. was affixed to the cliff, a painting which fell victim to vandalism only two decades later. The monument commemorating the Emperor was crowned by a giant eagle erected on top of the cliff. Its wingspan is an imposing three meters.

Not far from the Hübichenstein, various thematic trails in the “WeltWald” (World-Forest) offer extended walks for visitors. Don’t worry: the wild animals are dummies.

**Gesundheitszentrum Bad Grund**

☎ 0049 5327-700710

[www.gesundheitszentrum-bad-grund.de](http://www.gesundheitszentrum-bad-grund.de)

## 2

## Stalactite Cave and Adventure Center Iberg

With a short 1.6 km drive on the federal road B 242 in the direction of Clausthal-Zellerfeld, the stalactite cave of the Iberg can be reached. In the “HöhlenErlebnisZentrum” (Cave Adventure Center) we are provided with information about the geology and mining history of the Iberg. Furthermore, an exhibition devoted to cave archaeology in the “Lichtenstein Höhle” (Landmark **11**, Geopoint **10**) has received international attention.

In the Iberg stalactite cave itself, a heavy stalagmite of more than 10 tons, the so-called “dwarf-organ” and a “petrified waterfall” with an age of perhaps 350,000 years can be admired. In the newly opened passages of the “Museum in the Mountain” and in the cave itself we directly can observe the calcareous deposits of a former reef lagoon. Ceiling potholes, dome-like cavi-



Cave Adventure Center



Dwarf King Hübich

ties in the walls and water level marks indicate that the caves of the Iberg developed in still groundwater. The unique evolutionary history of the Iberg caves began around 10 million years ago in connection with the last intense phase of uplift of the Harz in the late Tertiary. It is based on subterranean processes of chemical alteration of extended sparry iron ore formations which developed in fractures of the limestone deposits after the death of the reef and its descent into the area of calm groundwater. Through the reaction of iron with oxygen from the water, carbonic acid was formed. This acid was now able to dissolve the limestone around the deposit on a large scale. On the floors of the new cavities, this “rusted” iron was deposited as so-called ironstone with a percentage of up to 60 % iron. Since the beginning of the ice age two million years ago, the groundwater level sank around the Iberg and the caves progressively dried out. Marvellous stalactites and wall sinter cascades were formed.

**HöhlenErlebnisZentrum**

**Opening hours: Tuesday – Sunday 10 a.m. – 5 p.m.**

**☎ 0049 5327-829391**

**www.hoehlen-erlebnis-zentrum.de**

## 3

Late Devonian Reefs and Iron Smelting Plant  
Winterberg

A hike along the “Harzer Försterstieg” guides us from the “Schweinebraten” (Pork Roast) via the “Spinne” (Spider) and the “Keller” (Cellar) to the edge of the giant open-pit mine of reef limestones. At the observation point, information panels present details about archaeological investigations carried out in 2005 and 2006 prior to exploitation. Surprising facts were discovered. Sparry iron was precipitated within fractures and fault fissures of the reef limestone, which has been altered to brown iron in the course of millions of years. Pits and dumps mark the old mining shafts. They were, for the most part, founded along hollow structures resulting from karstification such as karst fissures and sink holes. Not only traces of mining activity were left behind. A long-term production of charcoal (probably from 1,000 BC up to the 19<sup>th</sup> century) which was necessary for smelting processes was also detected. In



At the Cement Factory Müncheshof



Winterberg Quarry

addition, the only iron smelting plant from the early Middle Ages (ca. 8<sup>th</sup> century) was excavated here.

The rigid reef complex of the Winterberg is bordered by tectonic fault zones along its sides and protrudes as a tectonic window from Carboniferous lithologies such as greywacke and slate. The pure reef limestones with a lime content of more than 96 % are of significant commercial value and have been excavated in the open-pit quarry since the 1930's.

The limestone processing works of Müncheshof, where the limestones have been processed since 1938, produce fired coarse quicklime lumps, fine white chalk and limestone and calcium hydroxide for the iron and steel industries as well as for the production of construction materials and for use by the chemical industry. Originally, the limestones were used as basic additions for melting point reduction in the metallurgical processing in the iron industry center of Salzgitter. Today, raw limestone material is also used as gravel and as fine-grained, crushed stone.



## 4

Communion-Oberharz, Preussag &amp; TUI

## Mining Museum Knesebeckschacht

Already in 1532, the little mining settlement of Grund received its town charter and thus became the first of seven mining towns in upper Harz. Prior to this event, thanks to his declaration of “Bergfreiheit” (special mining privileges), the Duke of Braunschweig-Wolfenbüttel moved workers from Franconia and Tyrol into his region of the Harz. Mining in Grund, Zellerfeld and Lautenthal rapidly began to flourish. It was not until 1554 that Duke ERNST III. (1518 – 1567) from the neighbouring duchy of Braunschweig-Grubenhagen issued a “Bergfreiheit” which permitted an advancement of the mining industry in Clausthal. The agreement of the different ducal lines of the house of Guelphs led to the founding of a joint administration. This “Communion-Vertrag” remained a valid contract until 1788, when Braunschweig gave up its shares and the entire mining industry in the Upper Harz was henceforth administra-



Mining Museum Knesebeckschacht



View of Bad Grund

ted by the kingdom of Hannover up to the time that it fell under the rule of Prussia in 1866. Soon, the advent of the industrial era resulted in modern shaft constructions in the mining district of Grund. But after mining throughout all of Prussia became unprofitable, the company “Preußische Bergwerks- und Hütten-AG” (Preussag) was founded by law on the 9<sup>th</sup> of October, 1923.

In Grund, mining was continued by this company until 1992. In the meantime, the Preussag AG has become the world’s largest tourism trust: the TUI.

The area of pits in the iron mine of Grund covers the southwestern portion of the ore vein district of the Upper Harz. The average metal content of the ore worth exploiting down to a depth of more than 700 meters was 10%. Altogether, 19 million tons of silver-bearing lead-zinc ores were excavated from the pits. More than 1 million tons of lead, about 700,000 tons of zinc and some 2,500 tons of silver were extracted from these ores.



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Bergwerk Rammelsberg, Altstadt  
von Goslar und Oberharz  
Wasserwirtschaft  
Welterbestätte seit 1992

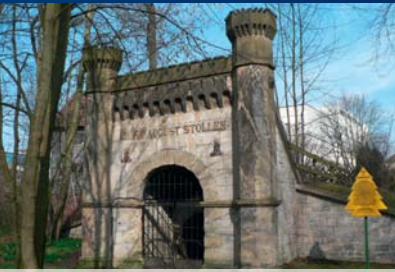
[www.knesebeckschacht.de](http://www.knesebeckschacht.de)

## 5

## The Solution to a Water Problem

## Ernst-August-Stollen Gittelde

The biggest problem of mining in the Upper Harz area was water seeping into the pits. Ore deposits close to the surface had already been excavated in the middle of the 18<sup>th</sup> century. In order to open new ore deposits, it was necessary to reach greater depths. The channeling and storage of rainfall as well as the maintenance and operation of water wheels and waterworks constituted a tremendous financial burden for the individual mines. The only remedy for these problems was the construction of a central deep tunnel for water transport serving all mines in the Upper Harz. The “Tiefer Georg-Stollen” (Deep George Tunnel), built 1777 – 1799, made it possible to develop new deposits. In 1803, the “Tiefe Wasserstrecke” (Deep Water Passage) was realized. It helped to collect waters pumped up from the deep pits and transport it up to the level of the “Tiefer Georg-Stollen”. In 1857, a new water trans-



*Adit Entrance in Gittelde*



*Hanover Borderstone near Teichhütte*

portation tunnel was begun on the level of the “Tiefe Wasserstrecke”, extending to the Harz margin near Gittelde. The actual construction of the tunnel was divided up into 18 tunnel divisions and carried out in alternate, opposing directions. It took 13 years to build. The “Knesebeck Schacht” was originally built as a daylight shaft. In combination with a side-track tunnel into the district of Bockswiese and Lautenthal which was finished in 1880, the “Ernst-August-Stollen” was 26 km long. As the private shareholders would no longer have been in a position to support continuous mining, the Kingdom of Hanover took over their shares in 1864. Because of its significance for the entire mining industry in the Upper Harz, the tunnel system was named after King ERNST AUGUST VON HANNOVER (1771–1851). The adit entrance was constructed as a portal in neo-Romanesque style with round side towers and parapets. It is located in a small park in the town of Gittelde.



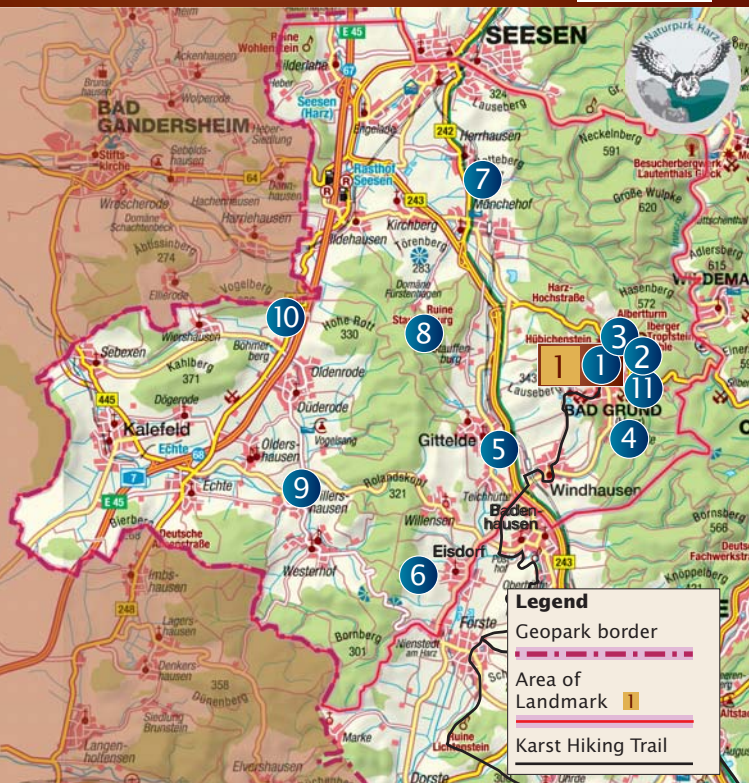
## Glossary

**Landmarks** are points in the landscape or actual localities which are highly visible and well-known. They serve as an initial orientation in one of the largest Geoparks worldwide and give the specific areas their names. Every landmark area is represented in a special leaflet.

**Geopoints** are points of particular interest. At these points, the geological history of the area or the evolution of the cultural landscape are evident and can be conveyed to visitors. Geopoints are numbered in sequence within the region of a Landmark. They can be combined to constitute an individual Geo-Route. The Geopoint No. ① is always the place which has given its name to the Landmark.

A completely individual **Geo-Route** can be planned with the help of the map of the Landmark ① area around the mountain town Grund, where the first spa center opened already on the 1<sup>st</sup> of May, 1855. Since the year 1946, the town has been officially named Bad Grund.

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[www.harzregion.de](http://www.harzregion.de)





## 6

Semi-dry Grassland & Panorama of the Harz Mountains  
Muschelkalk near Eisdorf

The limestones of the Muschelkalk period are the result of shallow marine deposition during middle Triassic times more than 235 million years ago. This formation does not belong to the lithologies of the Harz mountain range. These rocks have been completely eroded from the Harz since the Tertiary. West of the Gittelde Graben, however, which consists of a sub-sosion structure caused by dissolution of Zechstein salt in the underground, 100 meter thick Muschelkalk rocks are still preserved. They are typical for the formation of soils and morphologies of the hills of the Westerhof Forest. In the small quarry recommended as a site to visit, lower Muschelkalk limestones (Wellenkalk) in thinly bedded facies was excavated as material for road construction. The following rock types can be studied in the profile of the exposed wall: a layer of "Schaumkalk" as well as a slightly over-



*Muschelkalk exposure*



*On the rubble heap*

turned fold. This fold may be the result of an eastward gliding process of a local Muschelkalk plate into the gradually sinking Gittelde Graben structure.

The small quarry is located at the left-hand side of the "Roter Weg", which proceeds westward from the "Steinweg" in Eisdorf. On the opposite side of the "Roter Weg", at the edge of the forest, tables and benches invite visitors to pause for a picnic. On the rock dump of the former quarry, an interesting semi-dry grass vegetation has developed. With good visibility one can see the Winterberg quarry to the north. It is much more difficult to discern the Muschelkalk exposure of the tiny outcrop although it is only a few meters away. It is enclosed by deciduous trees and also obscured by tall vegetation on the rubble slope during the summer.

## 7

Saale Ice Age

## The "Glacierstone" Münchehof

In the Saale Ice Age, a single, immense ice sheet developed from Scandinavia to Münchehof. Moving across the Baltic Sea basin, the glaciers assembled great amounts of various rock material. Incorporated into the ice, erratic boulders were transported southward to the margin of the Harz. In a similar manner, Cretaceous flint stones were deposited in the area. Neanderthal humans and relatives of the much earlier *Homo erectus* collected flint material from the glacier deposits and formed tools from these sharp-edged and splintery rock nodules. These hand axes, scrapers, borers etc. were then carried southward.

Due to the fact that the area before the present-day Münchehof ascended southward, masses of melting water filled up the valley basin. Fine glacial substances were deposited in the natural reservoir, along with all the pebbles transported by the Harz creeks.



Glacial boulder (Findling)



In the "Tiefe Kuhle"

## 8

Sink Hole

## "Tiefe Kuhle" Fürstenhagen

Leaving Münchehof in the direction of Fürstenhagen, the unpaved road "Tiefe Kuhle Straße" branches off on the left-hand side to Stauffenburg, shortly before the domain of Fürstenhagen. This path ascends towards the foothills of the Westerhöfer Forest. The trail crosses all three layers of the Muschelkalk: the Ceratite limestone and the Trochite limestone, which contains numerous stem parts of sea lilies, which in turn constitutes the summit of the Grefenberg. The underground is composed of a 40 meter thick series of Middle Muschelkalk. Embedded here are relatively soft marls and marly limestones as well as gypsum deposits. Dissolution of gypsum and salt formations resulted in the origin of sink holes in this area. Decades ago, the "Tiefe Kuhle" was a waste dump for the remains of beet processing. On the ground of the depression, which has gradually been lifted several meters, a species-rich fen wood has grown up over the passage of time.

## 9

Fossil Deposit of Global Significance  
The Clay Pit of Willershausen

Signs welcoming visitors at the entrance of Willershausen contain a small silver shield with a cross positioned in a black and golden coat of arms. The latter recalls the long affiliation of the present-day portion of the municipality of Kalefeld to the monastery of Fulda. More intriguing are the fern-like leaves also represented in the coat of arms. These are leaves of a fern myrtle (genus *Comptonia*). The only present-day species of the genus is distributed in Northern America. In the Pliocene, fern myrtles also grew in Europe. Evidence of their presence was the discovery of the fossil leaf of the genus in the former clay pit not far from the edge of the village. From the 16<sup>th</sup> century up to the year 1977, sediments of a small lake that existed three million years ago (during the Pliocene) were excavated. The clay pit became famous after fossils from Willershausen were mentioned for the



In the Clay Pit



Fossil leaf

first time in 1914 in a PhD dissertation. In the 1920's, the Geological Institute of the University of Göttingen began conducting systematic research in Willershausen where more than 45,000 fossils were collected. Among these were the remains of the Mastodon named *Anancus*, which is a cousin of our present-day elephants. Many plant and animal species now distributed all over the world can be identified in the fossils.

In order to preserve the site, the clay pit only can be visited after prior notification of the local heritage association. In Willershausen, there is a little exhibition devoted to the clay pit in which fossils are also presented. Examples of the products of the brick factory "Schlange" – tiles of fired clay – can be found throughout the village. These tiles also served as construction material for the imposing rectory built in the neo-gothic style of the late 19<sup>th</sup> century.



Heimatverein Willershausen e. V.

☎ 0049 5553 - 4963

www.willershausen-harz.de

## 10

## Archeology

## The “Harzhorn” Wiershausen

In the eastern-most foothills of the Vogelsberg located east of Wiershausen, hobby archaeologists in search of a fabled knight's castle made the finding of their lives at the “Harzhorn” in the year 2000. The heritage authorities were not informed about this discovery until the year 2008. Detailed research indicated the site of a battle between the Romans and the Germans. Thanks to the alkaline environment in the thin soil layer which covers the limestone, arrowheads and spearheads, projectiles of catapults, nails of legionaries' sandals, wagon parts and metal fittings, silver denars and two coins were preserved. These coins were minted in 228 AD. It now seems probable that the emperor MAXIMUS I. penetrated deeply into German territory in the year 235 AD. Before the discovery of this battle field at the “Harzhorn”, historians had held such incursions by the Romans for impossible.



Harzhorn Visitor centre



In the Eisenstein Mining Shaft

## 11

## Cave Therapy

## Iron Stone Mine Bad Grund

At the end of our discovery tour through the area of Landmark 1, we return to Bad Grund. Here, in the “Teufelstal”, not far from the parking area of Geopoint 2, the adit entrance of the iron stone mine can be found. The tunnel, which was constructed from 1870 – 75 in the terminal phase of iron stone mining at the Iberg, now contains a therapy room for 50 persons. Climatically incorporated within the extensive cave system, temperature and air humidity undergo hardly any fluctuations. These values range between 6 to 7 °C at 100% air humidity. The sub-surface climatic therapy represents a medical treatment which can be carefully controlled and conducted without negative side-effects, also for people of advanced age. The therapy contributes in particular to the relief of symptoms connected to respiratory diseases. Normally, a therapy visit takes two hours. The treatment is offered weekdays and also on Sundays and holidays.







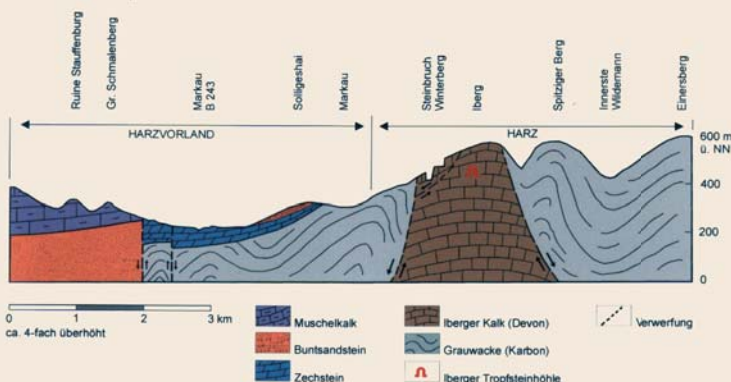
Origin

## Geological Development of the Area

Landmark **I** encompasses the entire relief of the western rim of the Harz, which descends abruptly into the lowlands extended before it. In this area, sediments of the Zechstein are covered by deposits of Quaternary age. To the west emerges the hilly landscape of the Westerhöfer Forest, characterized by Buntsandstein and Muschelkalk rocks.

The Variscan Orogeny was responsible for folding processes of older sandy and clayey marine sediments (greywacke and slate) in Carboniferous times about 300 million years ago. The folds, oriented to the northwest, extend in a southwest – northeast direction. At the end of the Paleozoic, after the folding processes, the Variscan Harz block was lifted up alongside the western margin of the mountain range. The mountains were modelled by the lift up movements and the subsequent erosion processes. During the Saale Ice Age about 200,000 years ago, the nordic continental ice reached the southern-most margin of the Harz near Münchehof. Only the relics of sediments from the Tertiary can be found, but they help us to understand the development of the landscape. Today, the area is characterized by numerous deposits exploited by man. For two decades now, the mining of lead, silver and iron has become history, but modern, open-pit mining still exists.

Parts of the area have a risk of subsidence. At the Iberg, and more intensively at the Winterberg near Bad Grund, karstification of the reef limestones and, consequently, the development of limonite ore deposits already occurred in the Tertiary. Older beds have been eroded. Independent of the age of the surface configuration, the ground water current continues flowing in the karst aquifers and drains the western Harz in a southern direction along the group of springs near Förste (Landmark **II**) and northward into the Nette valley.





Selected Points of Information

## Restaurants and accommodations



Hotel & Restaurant  
„Zur Altenburg“  
Oldershausen  
[www.hotelzuraltenburg.de](http://www.hotelzuraltenburg.de)  
☎ **0049 5553 - 855**



Gesundheitszentrum Bad Grund  
Bad Grund (Harz)  
[www.gesundheitszentrum-bad-grund.de](http://www.gesundheitszentrum-bad-grund.de)  
☎ **0049 5327 - 700710**



## REGIONALVERBAND HARZ E.V.

The Regionalverband Harz is a non-profit association. Its full members include the administrative districts of Goslar, Goettingen, Harz, Mansfeld-Suedharz and Nordhausen, as well as the World Heritage-listed city of Quedlinburg. The association's goals are the promotion of art and culture, the care and protection of historical monuments and environmental conservation and landscape management. It further aims to build tolerance in all areas of culture and foster international understanding among peoples and also to preserve local history and traditions. One way, among many, in which these goals are achieved is trusteeship of nature parks in the Harz region. The Regionalverband Harz, with the help of its 130 supporting members, is also responsible for the southern section of the UNESCO-Geopark, which covers an area of 6,202 km<sup>2</sup>.

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