# The Outstanding Value of Spur Point
# to
# Guernsey Heritage


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## Preamble

I am a geologist from Jersey who has a background of a body of work within the Channel Islands and adjacent Armorica covering both the older hard rock geology as well as the more recent sea-level and climatic changes. I have (1) advised archaeologists over the past fifty years on the geological issues they have met with on site in both bailiwicks and in France and (2) written scientific articles on geology within the Channel Islands and wider afield.

In writing this report I wish to demonstrate that the coverage of the geological site of Spur Point within the RoyalHaskoningDHV's Longue Hougue South Environmental Impact Assessment (2019) verges on the cursory and, not only misses major aspects of geological importance within the site itself, but makes no reference to its wider importance and value both inside and outside the Bailiwick, indeed denying that there is any (§10.6.10).

## Contents



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Note : blue text = quotes from the Environmental Impact Assessment

green texts = quotes from different sources chosen by JR

# Chapter 1 : The detailed geology of Spur Point and its wider island context

## *1.1 Significant Geological references and their content in the EIA*

Significant Geological references and their content in the Royal HaskoningDHV EIA (2019a & b) are noted here with following comments as relevant.

> 7.4.4 This section provides an overview of the key information from the assessment of the existing coastal and marine processes environment. The approach taken has been to review existing relevant data and reports from Guernsey and formulate an understanding of the baseline physical and sedimentary environments using expert- based assessment and judgement supported by the hydrodynamic modelling.
>
> Bedrock Geology
>
> 7.4.5 Geologically, Guernsey can be divided into two parts. The southern part, known as the Southern Metamorphic Complex comprises predominantly Precambrian gneisses about 2,000 million years old. The northern part, known as the Northern Igneous Complex (and containing the Project) is largely composed of igneous rocks dating between 550 and 700 million years old (Topley et al., 1990). The Project is located on the northern part of the Precambrian St. Peter Port Gabbro, which outcrops south to St. Peter Port (Guernsey Renewable Energy, 2011; Hawley, 2017, adapted from Roach et al., 1991) (Figure 7-2 and Figure 7-3). To the north of St. Sampson Port, the Bordeaux Diorite Complex is exposed and to the south of St. Peter Port, the Castle Cornet Gneiss and then Icart Gneiss outcrop. Offshore into the Little Russel Channel, the L'Ancresse Granodiorite outcrops.
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> 7.4.6 The St. Peter Port Gabbro outcrops as a shore platform along the east coast of Guernsey between St. Sampson and St. Peter Port, including Longue Hougue South (Topley et al., 1990) (Figure 7-4 and Figure 7-5). Natural exposure of the St. Peter Port Gabbro is limited to the shore platform.

*Comment* : The references given in §7.4.5 & 7.4.6 relate essentially to the geology of Guernsey as it was known in the late 1980s early 1990s and, while this gives a fully acceptable summary, it may be questioned as to why the archaeological thesis of Donovan Hawley is used as a major source rather than the original work by Roach *et al*. (1991). This does not inspire confidence and is further undermined by the absence, among others, from the EIA of :

- the vital paper by Topley and de Pomerai in the Report and Transactions of the Société Guernesiaise (1987) :*The geology of Guernsey : Unique in the British Isles*;
- any direct quotes concerning the St Peter Port Gabbro from the Roach *et al*. 1991 *Outline and Guide to the Geology of Guernsey*.

*1.2 Geology in the EIA*

Under the rubric of Land Use, Land Quality, Soil Quality, Geology and Hydrogeology, the report reads:

> 10.1.3 The study area for geology (as a designation) only includes the land being considered for the proposed development. This is based on the rationale that these receptors will only be potentially affected by activities taking place within the footprint of the receptor.

then, under Section 5.2. *Characterisation of the Existing Environment,* Geology is identified as a *Receptor* (Table 5.3) with a *Zone of Influence* extending out 250 metres. Such *Receptors* are then assessed and assigned to an *Impact Significance Matrix* (Table 5.1) with the following range of choices :

> **Sensitivity** : High, Medium, Lowor Negligible each further assigned to a different **Magnitude** using the sale, i.e. High, Medium, Low or Negligible.

Thus the focus of the Report, insofar as Geology is concerned, is narrowed down to the site and a zone of 250 metres around it. It is difficult to square the statement in § 10.1.3 with any consideration of impacts on the Receptor (Geology) from external factors though the statements in Section 5.3 are clearly meant to include them—see in particular §5.3.3 which reads :

> 5.3.3 Receptor value considers whether, for example, the receptor is rare; has protected or threatened status; its importance at local, regional, national or international scale; and, in the case of biological receptors, whether the receptor has a key role in the ecosystem function. These considerations are balanced against the properties of the receptor under consideration.

*Summary comment :* It is not possible to make any meaningful assessment of Spur Point as a geological site without putting all the site issues—which are significantly more than those considered in the main EIA—into the wider island (local), Channel Islands (regional) and national + international contexts, none of which has been attempted, let alone usefully addressed, by the Report's authors. §10.6.10 in this conext reads :

> CONSTRUCTION IMPACT 10.2: Disturbance to Geological Sites
>
> 10.6.10 There are no designated sites of international, national or local geological significance that have been identified within the study area. The Project will result in the direct loss of the St. Peter Port Gabbro exposures at Spur Point.

and is particularly revealing in the absence of reference to the Topley & de Pomerai paper (1987) and to Roach *et al. 1991 p. 45* which includes the following:

> The St. Peter Port Gabbro is an extremely unusual intrusion which, to the authors' knowledge, does not have a direct equivalent anywhere in the world. It consists broadly of several types of hornblende-bearing gabbro and shows a pronounced layering on various scales. Geochemically, the intrusion is calc-alkaline in nature, whereas most layered basic igneous intrusions are tholeiitic. Study of the gabbro

yields important information about the processes which occurred during its formation and, to this extent, the St. Peter Port Gabbro may be used as a model for the crystallisation behaviour of calcalkaline magmas in general.

### *1.3 The Geology of Spur Point beyond the EIA*

1.3.1 The outcrops of the St Peter Port Gabbro at Spur Point (Fig. 1) can be assigned for geological purposes to three categories :

- (Cat. 1) beach to north of descent : beach cobbles and beach boulders;
- (Cat. 2) beach to north of descent : wave smoothed *in situ* outcrops of gabbro on beach bosses rising to heights up to about 1.5 m and
- (Cat. 3) *in situ* area of layered gabbro forming the shore platform to the southeast of the point of the headland with superb surfaces of the mineral bojite.

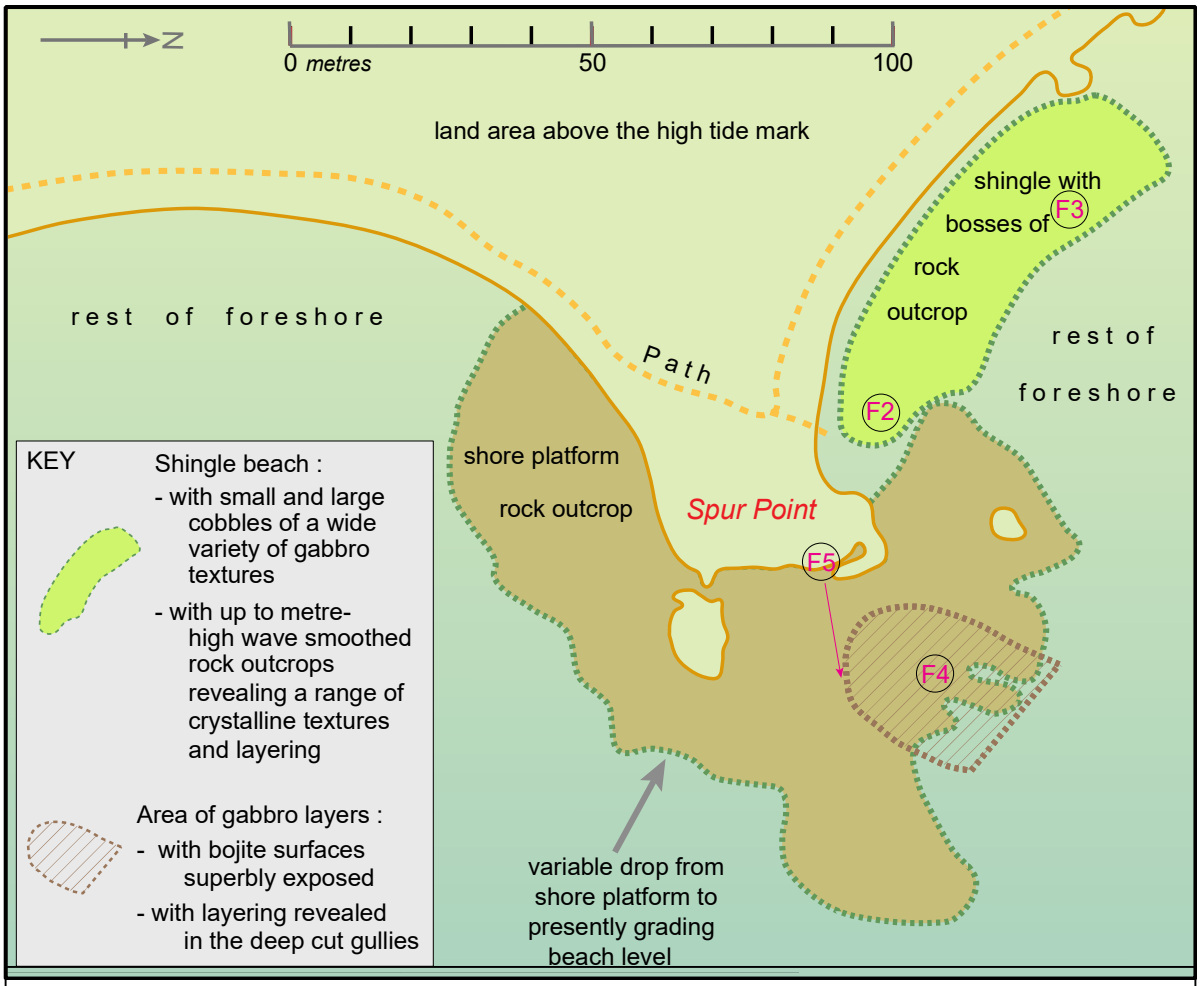


Fig. 01. The outstanding value of Spur Point as a geological site of major significance to both the geology of Guernsey and to the wider community of specialist geologists

Fig. 02. (At F2, Fig. 01)) A mixture of boulders and *in situ* exposures of the layered gabbro revealing at once the very high quality of detail shown on the wave smoothed surfaces. The group visit illustrated here is of a group of museum curators being hosted by Alan Howell of the Guernsey Museum seen on the extreme right. This is a clear demonstration, if one were needed, of the almost artistic value of this geology that can appeal to geologists and non-geologists alike.

1.3.2 The only geology that is seriously considered in the EIA is that of Cat. 1, i.e. the beach boulders with layering and 'bird's eye' texture (Fig. 2). Mention of the mineral bojite, the mineral that has such an importance far beyond the confines of Guernsey, is not to be found in the EIA text and occurs only incidentally, even accidentally, in Figure 10.4 of the EIA. Bojite does occur in Cat 1 and Cat. 2 outcrops (Figs 2 & 3) but is not that easy to find and in no way compares with the occurrences in the vital layering context of the shore platform of Cat. 3 (Figs 4 & 5).

1.3..3 The accessibility and quality of the Spur Point gabbros is an important consideration that does not receive a mention in the EIA except to record that, because there are other examples of the layering of the gabbros to be found at several places in Belle Grève Bay, the importance of preserving the Spur Point occurrences is much reduced. However, this overlooks the vital need of the access offered uniquely by Spur Point to geological groups visiting the St Peter Port Gabbro (Fig. 6).

Fig. 03. (At F3, Fig. 01) A similar photograph to the preceding one taken further along the Spur Point beach to the north but emphasising here the fact that most of the layered gabbro at this locality is *in situ* so enabling specialist geologists to make essential observations not possible from boulders alone.


Fig. 04. (At F4, Fig. 01) Photograph A is of a specialist geologist examining the nature of the gabbroic textural variations shown by the layering at this locality while B is a very fine example indeed of an exposed layer surface of bojite nearby.

Fig. 05. (At F5, Fig. 01). A view out over the shore platform gabbros where the layering can be inspected in deep gully sections up to nearly 2 metres in height.


Fig. 06. A visiting group of French geologists from the Société Géologique et Minéralogique de Bretagne. At Spur Point (B – right)) with the leader, John Renouf, (A) wearing his Breton casque. At right the whole party at Fort Grey : the gentleman at left in red anorak is Professor Max Jonin, a leader in Geopark matters from the University at Brest while the person in the yellow top at right is Jean-Pierre Lefort who has written extensively on the geology of the Normanno-Breton Gulf and wider afield.

If you are a geologist researching gabbros and are using the St Peter Port Gabbro and its layering in your work, then it is true that the exposures in the rest of Belle Grève Bay—in particular Hougue à la Perre and the tidal expanses east and south of it—are adequate because you will be obliged anyway to use the tide tables all the time to maximise access. But this is not the case with Spur Point where almost all visiting groups will wish to go because (1) the tidal access is good from near mid-tide downwards and (2) the layering structures and the famed 'bird's eye' gabbro are visible to all members of the party at an easy level of appreciation on the shingle beach and, to the more qualified geologist, also on the adjacent shore platform.

I can say with many years experience of taking geological groups around Guernsey that I have only ever used Spur Point; visits with a small specialist geological group are another matter and the other exposures of Belle Grève Bay become a must. Therefore the loss of Spur Point would severely limit the value of the gabbro to visiting groups in no way replaced by inspection of a number of boulders placed onshore which, inevitably, will be overgrown with mosses and lichens after a short time—not to be compared with the striking wave smoothed surfaces that exist on the beach. It could be said that if one set out to create the most favourable gabbro outcrops in all senses, then it would be hard to improve on those of Spur Point. Bearing all this in mind, one has to pose the question : **What is the point of having a first class geological site of international importance to the Guernsey people and ideal for anyone to visit, whatever their level of interest or geological knowledge, only to destroy it?**

### *1.4 The Importance of Spur Point Geology within the whole Guernsey context*

1.4.1 Colleagues of mine in Guernsey in the fields of, for example, geology, archaeology, natural history, environment, have continually bemoaned the absence of any statutory/legal protection for the island's geology. While it is true that the EIA does take account of statutory powers of a wider nature than geology :

p. 215

> 10.2.3 The State of Guernsey has no direct legislation relating to Land Quality and the assessment of contaminated land or on the protection of geological sites. However, the relevant legislative context for Land Use, Soil Quality, Geology, and Hydrogeology are:
>
> - The Environmental Pollution (waste control and disposal) ordinance – 2010;
>
> - The Environmental Pollution (Guernsey) – 2004;
>
> - The (Guernsey) building regulations – 2012;
>
> - The Land Planning and Development (Guernsey) Law – 2005; and
>
> - The Island Development Plan - Policy GP17 Public Safety and Hazardous Development.

the absence of a legal status for the Spur Point site must severely limit the ability of any person or organisation opposing the development and it is significant that the EIA itself limits its efforts to narrowly defined geology, in essence confining its review to its stated area of interest, i.e. to the site and a 250 m buffer zone :

> Land Use

10.3.2 The Project is located offshore and, in an area designated as foreshore (see Figure 10-1). A search of the Island Development Plan for the State of Guernsey (States of Guernsey, 2018) and satellite imagery on google earth shows that the study area (a buffer zone of 250m beyond the boundary of the site) . . .

Fig. 07. A 1971 group of research geologists from Rennes university in Guernsey—not Spur Point—led by Dr Robert Roach, distinctive even from the rear (blue T-shirt. Professor Jean Cogné of Rennes top right in light coloured jumper.

1.4.2 Field excursions by groups from university geology departments, from local and national and international geological societies and visits linked to environmental and natural history bodies, have taken place during the past two hundred years. Also to be included are the many specialist geologists and small groups (e.g. Figs 6 & 7) who have contributed to the detailed and fascinating geological story that the island has to offer. I leave this matter here for I develop the issues in Chapters 2 and 3 that follow. Here though, to underline the potential for visitors, it is valuable to quote (1) from the paper by Medland *et al.* 1997 :

Although laboratory research makes most of the running in such areas eg. Belle Grève Bay, there will always be the need to validate new theories by field observation. It would be a tragedy if the coastal outcrops of the gabbro were lost beneath a reclamation project. Although plenty of gabbro can be seen in walls, this is not the same as being able to see the actual rock in situ and to follow the variations

> across the outcrop. There will also always be the need to educate new generations of scientists and easily accessible coastal sections are particularly useful for teaching. There is a steady stream of education parties which come to study Guernsey geology. There is a potential for specialist holiday groups to study Guernsey geology and scenery at a variety of levels, though who might organise such events is not clear. Occasionally outside geological groups do visit, from societies like the Geologists Association or the Geological Society.

and (2) from that by Topley & de Pomerai 1987 where de Pomerai writes :

> Whilst it has only been possible in this account to sketch out the main points in Dr. Topley's argument, it must be clear that the significance of Guernsey geology, and that of the St. Peter Port Gabbro in particular, to geologists worldwide is considerable - especially if it is borne in mind that layered intrusions (though not our own) contain some of the world's most important metalliferous deposits. Furthermore, this lecture provided a fascinating insight into the development of scientific theory and, as was also clearly pointed out by Dr. Topley, Guernsey holds several more geological conundrums 123/124] awaiting explanation by future researchers - indeed our island is quite unique!

1.4.3 There is no publication of which I am aware that has as its intention to highlight the place of geology within a Guernsey heritage context. Yet geology has a truly fundamental role to play in such a context. I propose to demonstrate this in the following chapters of this report as I follow up the ideas in the paragraphs above before returning to the specific Spur Point issue in Chapter 4 to underline how it should be assessed, i.e. not by the criteria used in the EIA.

# Chapter 2 : Guernsey Heritage : The St Peter Port Gabbro in its Channel Islands setting and its place within the Armorican Massif

### *2.1.1 The Historical Background*

In the de Pomerai quote at the close of the last chapter, I wish to single out two issues for consideration here :

1. . . . this lecture provided a fascinating insight into the development of scientific theory

and

2. . . . the significance of Guernsey geology, and that of the St. Peter Port Gabbro in particular, to geologists worldwide

2.1.2 The historical development of geology in Guernsey within the wider framework of geology in general and of the Channel Islands in particular

In this chapter I begin by listing a number of topics and/or themes that can be followed in the various geological publications on the island :

- Theme 1 : Geologists of importance beyond the boundaries of Guernsey;
- Theme 2 : Geological themes that can be traced through a series of geological publications related to Guernsey.

In the first category, I select out the Guernseymen John MacCulloch 1773-1835 and Frederick Corbin Lukis 1788-1881. The second category is illustrated here by the theme concerned with the recognition of the existence of magmas and research on the origin and differentiation of those magmas. Important geologists from outside the island as well as those from within it played a part in the development of understanding of this phenomenon at national and international levels over more than 150 years.

It needs emphasising that the two examples from Theme 1 that follow represent only two out of many that characterise Guernsey geology. They are singled out here because they have early links to the St Peter Port Gabbro. In chapter 3 the wider significance of the matters dealt with in this chapter, i.e. chapter 2, is examined in some depth concluding with a statement on Spur Point.

### 2.1.2.1 From Theme 1 : Distinguished Guernsey geologists

John MacCulloch

John MacCulloch was born in Guernsey in 1773 and died in Cornwall in 1935—see the vignette below—after a distinguished career in geology.

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John MacCulloch : A vignette

An unusul and tragic ending to his life

He married, in the summer of 1835, Miss White, whose family at one time resided near Addiscombe. He was with her in Cornwall, on a visit to his old friend, the Rev. John Buller, of St. Just, when the accident occurred which led to his death, on the 21st August, 1835. He was thrown out of a pony phaeton, by which, in addition to other injuries, his right leg was so shattered that amputation became necessary. The firmness and calmness of his mind, and his entire resignation to the will of God, were manifested during the operation. From time to time he asked questions of the surgeons, and even gave them directions. He, however, only survived the operation a few hours. He was buried in the churchyard of Gulval, a village near Penzance, in which his father had resided, at one period of his life, for some years.

*Extract From Duncan (1841)*

==========

The Geological Society of London's publications have been at the forefront of national and international geological research achievements from the beginning and are renowned throughout the world. It was the very first national geological society (Founded in 1807) and, lo and behold, the society's very first publication in 1811 was by a Guernseyman, John MacCulloch ( with the title :

*John MacCulloch - Account of Guernsey and the other Channel Islands.*

The article contains the first published geological map of Guernsey (Fig. 8 ) and shows the location of spot finds; there is no attempt at showing mappable zones or formations. The *Black Granitel* by St Samson is his rendering of the Gabbro. There is nothing outstanding about this geological work though it was the first to make the distinction between the northern and southern divisions of the island. Also, from Guernsey's point of view, it needs to be remembered that MacCulloch went on to an illustrious career in geology being particularly noted for his work on the Scotland and the Scottish Highlands. He published extensively and produced an early text book on geology (Fig. 9).

Frederick Corbin Lukis

Frederick Corbin Lukis is a very well known figure in Guernsey's archaeological story but it is less well appreciated that some of his earliest studies and inclinations were in geology. During the early 1830s he was giving talks on geology at the Mechanics' Institute during which he was making use of the volumes of Charles Lyell the pre-eminent geologist of the times demonstrating that he was fully aware of the most recent nationally accepted views on geology. He drew up a coloured geological map of the island—never actually published (Fig. 10)—that highlights the north south divide of the rocks but which also marks the first attempt to identify and subdivide the rocks of northern Guernsey; he does not succeed in isolating the St Peter Port

Gabbro from the diorites to the north. However, in his nomenclature key of the northern rocks he clearly identifies the plutonic rocks that form this part of the island.

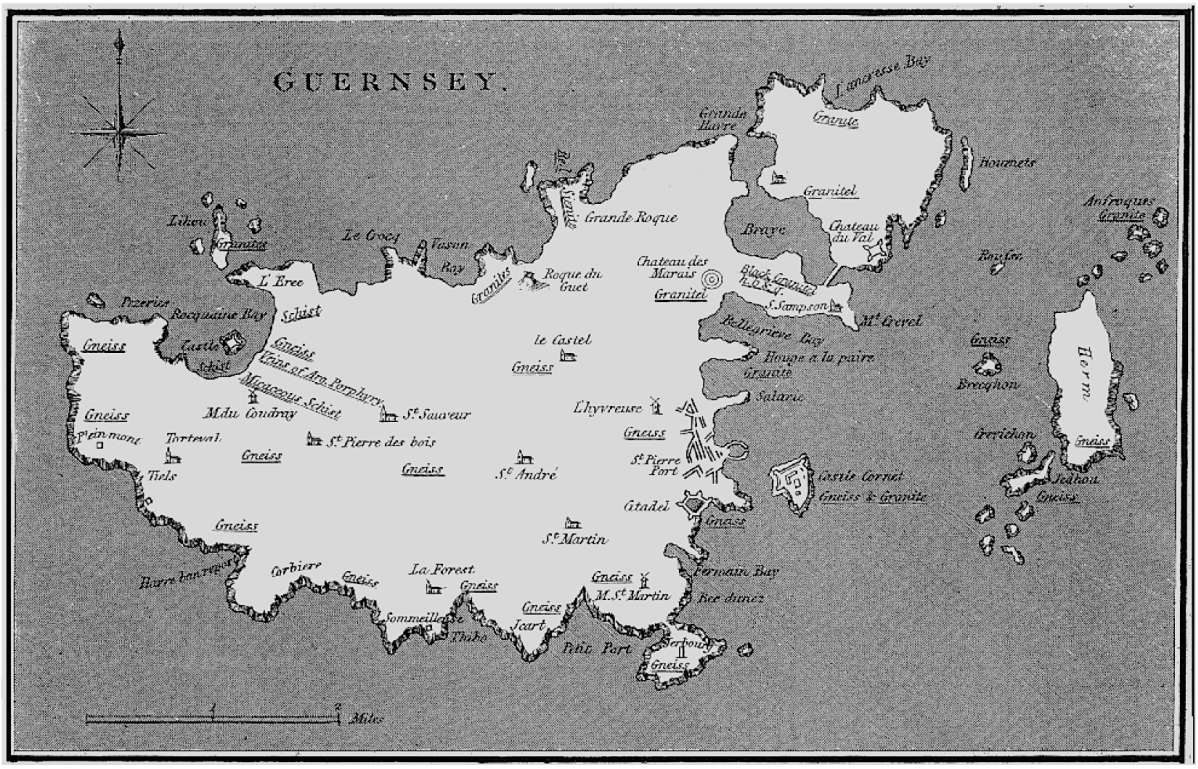



Fig. 08. The Guernseyman John MacCulloch produced the first geological map of Guernsey in the very first geological publication of the Geological Society of London in 1811. The St Peter Port Gabbro is marked by the spot find at St Samson labelled *Black Granitel*. MacCulloch went on to become a highly respected national geologist particularly noted for his mapping of Scotland.

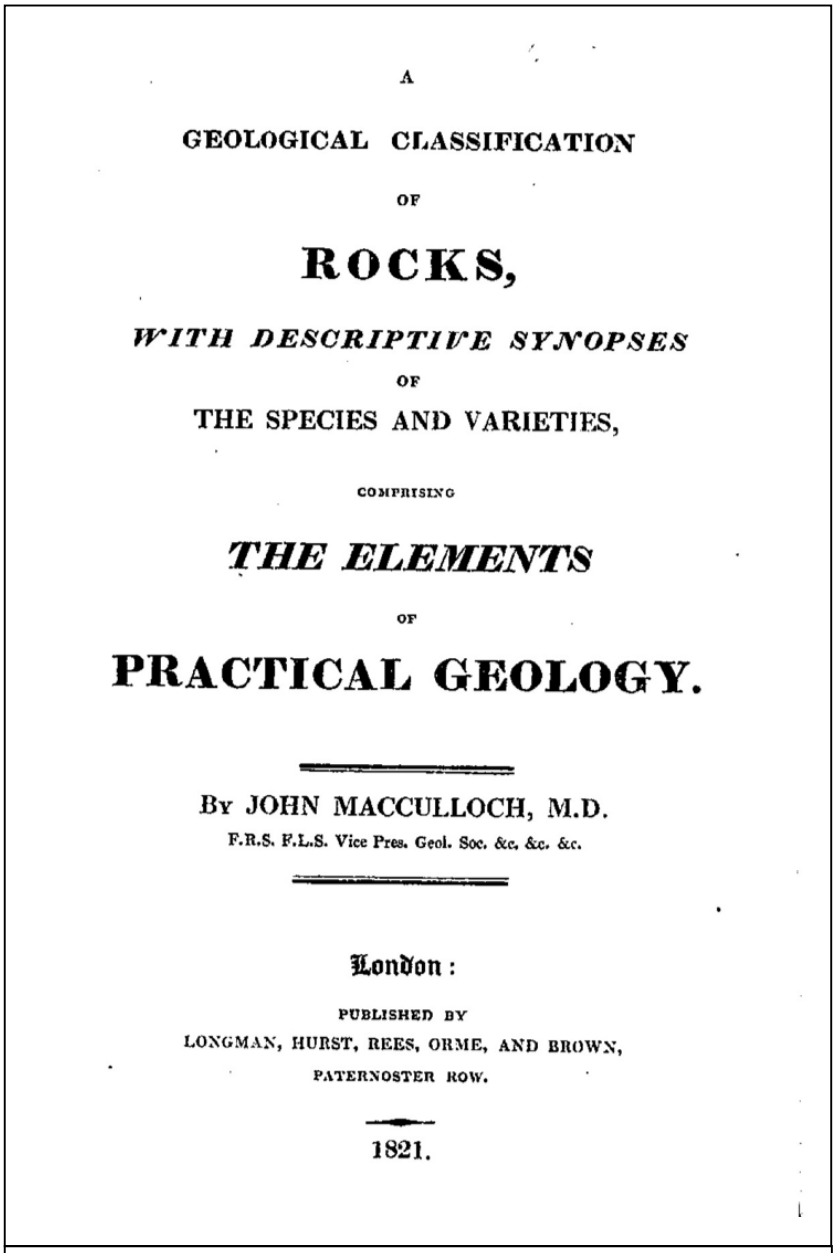
### 2.1.2.2 From Theme 2 : Understanding the origin and differentiation of the igneous rocks

Edwin Hill, Thomas Bonney, John Parkinson, Alfred Kingsley Wells, Sidney William Wooldridge, Clive Bishop, Stan Salmon

With Edwin Hill (Hill & Bonney 1884) the foundations of modern geology in Guernsey are unambiguously set out. He identifies the northern rocks of Guernsey as of igneous origin thus moving away from their earlier designation as porphyries but goes much further as the map published with the paper shows. It includes the recognition of granites, diorites and hornblende gabbro with bird's eye texture, this last to become known as the St Peter Port Gabbro. The boundaries shown are recognisably akin to those of the modern geological map.

The written description of both authors—Bonney was the petrologist, the expert on the minerals and textures while Bonney was the field geologist—indicates full awareness of the advances of mineralogy of the time, i.e. the outstanding book by Rutley (1879) and the recognition that these rocks of northern Guernsey had solidified from a liquid melt, a magma.

A French flavour enters Channel Islands geology at about this time with the early publications of Alexandre Bigot (e.g. 1890) who later could be considered a doyen of Normandy geology. His two relevant works can be matched to Hill's map and his explanations do not advance beyond those of Hill. However, the involvement of French geologists is of considerable interest to the development of later understanding of the geological history of Armorica where there was a considerable tension between the school of the dominantly British geologists and those from the continent. This tension can be traced right through to the emergence of the plate tectonics paradigm of the late 1960s and afterwards.



A

GEOLOGICAL CLASSIFICATION

OF

ROCKS,

*WITH DESCRIPTIVE SYNOPSES*

OF

THE SPECIES AND VARIETIES,

COMPRISING

*THE ELEMENTS*

OF

PRACTICAL GEOLOGY.

By JOHN MACCULLOCH, M.D.

F.R.S. F.L.S. Vice Pres. Geol. Soc. &c. &c. &c.

London:

PUBLISHED BY

LONGMAN, HURST, REES, ORME, AND BROWN,

PATERNOSTER ROW.

1821.

Fig. 09. An unusual product for a Channel Islander, a national geological text book of early date written by the Guernseyman John MacCulloch and published in 1821.

The importance though, of the Hill & Bonney paper (1884), goes far beyond the mere bones described above for it is the first step in the Channel Islands of the elucidation of magmatic understanding that runs as a thread thread through a series of publications using Channel Islands plutonic rocks as examples. The works of John Parkinson (e.g. 1907) on both Jersey and Guernsey at the opening of the 20th century took up the tale and made important advances. Then in the later 1920s and 1930s two eminent British geologists, A.K. Wells & S.W. Wooldridge studied rocks at Sorel Point in Jersey (cf. Salmon 1998) .The prevailing view was now clear, magmas could, and did, differentiate during their formation/cooling leading to the emergergence of rocks of different compositions ranging from acid (granitic) through intermediate ( dioritic) to basic (gabbros).

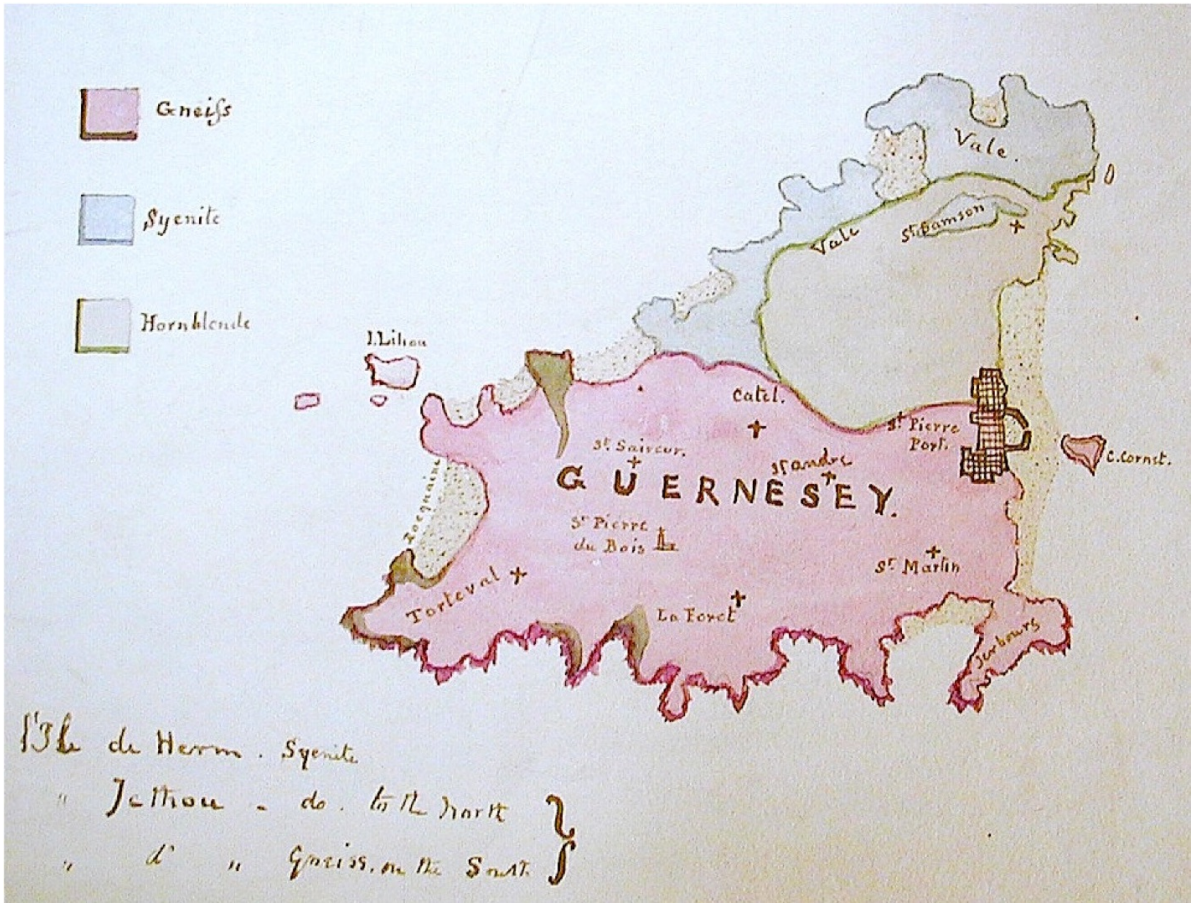



Fig. 10. The unpublished early geological map of Guernsey by the geologist and archaeologisy Frederick Corbin Lukis.

## Robert Roach and others

The elucidation of the virtually endless permutations on the basic idea of differentiation may have begun with Hill & Bonney (1884) in Guernsey but it has run as a continuous thread through to post-Second World War research where publications by a number of well known British geologists and doctoral researchers, e.g Clive Bishop and Stan Salmon mentioned above, have advanced understanding in major ways. For Guernsey the outstanding research of Robert Roach who began his doctoral research in the island during the 1950s (1957) and laid the foundations of the modern geological map. He published in 1971 a brief paper, a first study specifically devoted to laayering in the St Peter Port Gabbro. But during the 1970s in both Guernsey and Jersey and elsewhere a strong case was made for the role of metasomatism in the occurrence of a range of granitic, dioritic and gabbroic rocks—quite a competitive atmosphere developed though during the later 1980s before the differentiation theme, along with the new understandings of magma mixing and intermingling, emerged as the dominant one.

Subsequently, with a wide range of authors, a whole succession of important papers involving the fruits of advanced research in and around the Normanno-Breton Gulf culiminated in presentations at the defining conference of 1988 on the Cadomian Orogeny, a mountain building episode set into a plate tectonic framework. The results of this meeting were published in 1990 in book form as a Special Publication of the Geological Society of London (*see* Topley *et al.* 1990 for full reference). It covers not only the geology of the Armorican Massif but ranges wider afield into associated regions all linked by plate tectonics one way or another. But it also contains a wealth of detailed information on the geology of Guernsey including the paper by Topley *et al.* (1990) devoted to the Northern Igneous Complex of Guernsey. In this paper there are important observations and conclusions on the St Peter Port Gabbro and of the place of bojite:

> The St Peter Port Gabbro is calc-alkaline in nature and this is likely to mean that it crystallised under progressively increasing water pressure. In contrast, most well documented layered intrusions are tholeiitic and crystallised under 'dry' conditions. In the latter, the mafic minerals tend to form in a fairly well documented order, namely: olivine, orthopyroxene; clinopyroxene; and perhaps in the very late stages, amphibole and biotite. The situation is less well known for 'wet' magmas but the experimental work that exists indicates a probable order of: olivine; clinopyroxene + orthopyroxene; reaction of the previous three to produce amphibole; extensive amphibole crystallization; biotite and perhaps muscovite. With the exception of the muscovite, this is exactly the order seen in the St Peter Port Gabbro, and the textures seen can be interpreted in favour of the amphibole forming first by reaction and later by direct subtractive crystallization. There is no requirement to argue that the amphibole is secondary as has been proposed by Bishop & French (1984).
>
> The overall phase layering in the gabbro is consistent with a crystallisation history reflecting a progressive increase in water content and, on a smaller scale, the gradual change from hornblende gabbro upwards into bojite in the exposed section can be explained in the same way. It is significant that in such transitions the amphibole changes from being interstitial in the gabbro to become euhedral and acicular in the bojite. The reversal back to hornblende gabbro is, however, sharp and in some cases marked discordance of the fine-scale layering occurs, probably indicating a new local influx of magma.

### 2.1.3 A conclusion to be drawn from these historical accounts

The outstanding *Outline and Guide to the Geology of Guernsey* by Roach, Topley, Brown, Bland and d'Lemos (1991) incorporated all the recent thinking on the rocks of Guernsey and some detailed consideration of the St Peter Port Gabbro was also included in the itineraries dealing with it, together with a section on Spur Point.

The journey from MacCulloch (2011) through Lukis, Hill & Bonney, Parkinson, Wells & Wooldridge, Bishop, to Salmon, Roach, Topley and others was a long one but one in which Guernsey was always deeply involved and which, for this account in particular, the story of the

St Peter Port Gabbro has emerged as rather special in that it is shown to play an important role in the development and understanding of gabbros. It is against the background of this latest point that the importance of the gabbro should be evaluated and the specific outcrops of Spur Point be judged. **It is not enough to say that there are other exposures of the layered gabbro that can substitute for those of Spur Point because, as will be shown in Chapter 3 following, at issue is access for a whole range of different categories of people to this vital outcrop of Guernsey's geological heritage.**

# Chapter 3 : Guernsey' geological heritage within the modern world of Geoparks and Geotourism

## 3.1 The setting

So far in this account, the accent has been on the intrinsic geological value of Spur Point and the need for access plus its importance to Guernsey geology as a whole. In this chapter the focus widens and looks at the emerging and emergent promotion of geology as the foundation of an area's cultural, natural, historical and economic heritage finishing with special comment on Spur Point. This theme is one that runs on every scale from the parish/local area through to—in the case of Guernsey—the island, then its embedment in the Channel Islands, the larger area of the Normanno-Breton Gulf that embraces the surrounding French regions of Lower Normandy and northern Brittany, i.e. northern Armorica.

### *3.1.1 The historical background to the creation of Geoparks*

The following is an extract from a colleague explaining the development of the Geopark concept.

> The Geopark concept arose in the mid-1990s as a response to the need to conserve and enhance the value of areas of geological significance in Earth history identified in the declaration of the First International Symposium on the Conservation of our Geological Heritage organised in Digne-les-Bains in 1991 by ProGEO (the European Association for the Conservation of the Geological Heritage) under the patronage of UNESCO. During the late 1990s, in direct response to the Digne declaration, UNESCO facilitated efforts to create an official programme promoting a global network of sites with special geological features. This led to the establishment of the European Geoparks Network in 2000 with the Réserve Géologique de Haute-Provence being one of four founding members. In 2004 the 17 EGN members joined with eight Chinese Geoparks to create the Global Geoparks Network (GGN) under the auspices of UNESCO.

It is helpful to add in here a glossary of the more important terminology (Fig. 11). Geology can then be presented in terms of its links with a whole series of topics (Fig. 12) that represent the sudden opening up of a subject which has for far too long been lost as a specialist subject only of interest to the scientist or perhaps miners and quarry masters. The value of such a topic diagram is to remind everyone in a simple fashion of how geology impacts on everyone in some way or another. The challenge is to make of these links more than just a list on paper but instead something which can be attractive enough to encourage anyone, whatever their level of knowledge, to take part in specially tailored activities of all sorts set out within the framework of Geotourism and the Geopark.

The journey from the first stirrings of the notion of the Geopark as set out above can be tailored to show how the Channel Islands might become involved, indeed more than that because Jersey

SOME DEFINITIONS

GEOLOGY

Geology is concerned with the physical development of the earth including life
It has expression in :

- minerals rocks and fossils;
- the nature and interactions of the solid, liquid and atmorspheric parts of the earth;
- the successions of climates through time and their relationships with the flora and fauna;
- the resources it provides to the made environments including quarried materials and fossil fuels;
- expressly geological activities including scientific study, archiving of geological materials and their presentation to the public.

GEODIVERSITY

Whereas geology—whether as a stand alone concept or subsumed into the earth sciences—can be readily perceived as a scientific discpline, the notion of geodiversity carries nuances of social dimensions relating to values and, in particular, to those associated with an environment :

- physical characteristics,
- heritage significance,
- cultural setting,
- well-being of its living components (human, animal and vegetational),
- potentials for tourism (geotourism).

GEOTOURISM

Geotourism represents the development of an area's geology, mediated by the value filters built into the concept of geodiversity, to the point where an action programme is put into effect to provide concrete experiences of different aspects of the geology for the public, whether local inhabitants or visitors of whatever kind.

GEOPARK

The notion of the geopark has arisen largely as one of the ways in which both geodiversity and geotourism can be brought together in a naturally occurring homogenous area by focusing on the development of the necessary resources to explain the area to the visiting public. This is intended to embrace

- geological research and its embedment in the biotopes of the area,
- the production of published documentation geared to popular—or at least not too technical—explanation
- the devising of itineraries,
- the training of personnel to act as guides and reservoirs of knowledge,
- the organisation of guided tours and other interactive productions,
- Geosites are smaller entities devoted to particular localities.

*JTR : 2019*

Fig. 11. This figure features definitions of some of the important terms relating to the Geopark concept including that of the Geosite.

already has a programme well underway to make the island a Geopark. A geological inventory is presently being researched and prepared and will be used to underpin an application for Geopark status.

Focusing on the developments in France, the sequence of events shown in Figure 13 reveals clearly how far the concept of the Geopark has moved from initial high level meetings (1991 to 2007) to become an action , for instance, in Normandy from 2007 to 2011 when a regional inventory of geology was produced. It goes further because during the last five to ten years initiatives at more local levels have advanced to create a small Geosite of the old Fresville Quarry near Carentan (*See* Fig. 15 for location) and where others are being actively considered, e.g. La Hague in the Cotentin : See Jacques Avoine (2014).

The embracing intentions of a Geopark and of associated initiatives is to involve 'the people' by showing them the many ways in which geology plays a part in their lives (Fig. 12).

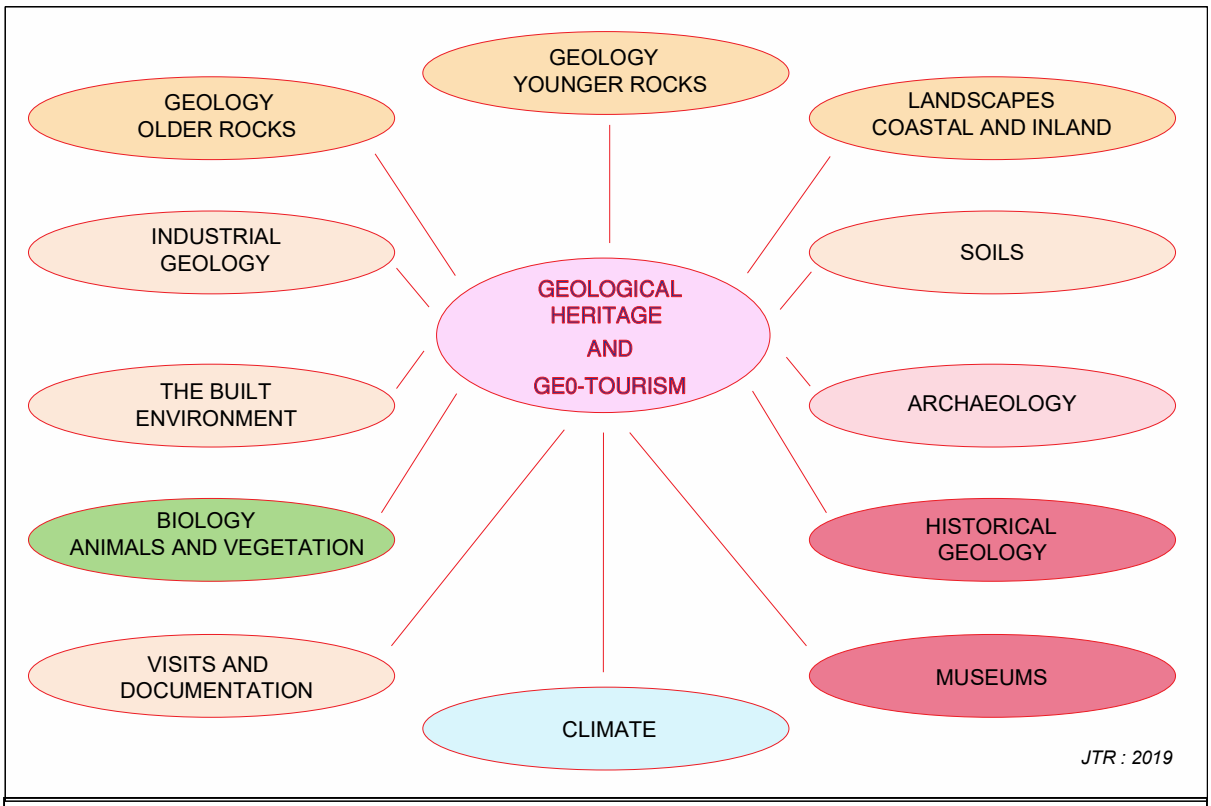



Fig. 12. The development of the Geopark concept with particular reference to France, Normandy and Jersey.

To promote the ideas inherent in the concept a range of acivities are envisaged which seek to make evident in actual visits the links between the rocks, the natural and the built environments and other heritage areas. For examples, a ramble may take in a locality such as Petit Bôt :

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Nestled at the bottom of a narrow valley on Guernsey's south coast there is much geology to be explored and related to the history of the area. A dominating feature is the Guernsey tower of Napoleonic times. Its masonry is dominated by the dark coloured Perelle Gneiss a very hard and resistant rock which would have had to be brought from much further afield than the local Icart Gneiss. The latter is seriously weakened by the planar structure given it by its metamorphic foliation and so is not widely used in the construction of buildings. However, this negative aspect of the gneiss is countered by the very positive nature of its age. The rock is approaching 2000 million years in age and that is only some 700 million years short of the half the age of the earth. Fully described by Robert Roach in his 1957 thesis and later publications the Icart Gneiss is now taken as an international type locality for the Icartian. The St Peter Port Gabbro joins it as the two rock groups in Guernsey having international recognition.

Built into the nearby walls surrounding the old mill, itself full of historical associations there are a scattering of stones having a 'gruyère' like texture. These are the surviving remnants of broken millstones—called burrstones—orginating from the Paris Basin in Medieval times and later. The particular rock from which the millstones were shaped are of Oligocene age some 30 million years old and they are composed of silica (cf glass, quartz, flint) hence very hard and ideal for grinding purposes. Any self respecting miller

would always have had at least one pair of the burrstones for the grinding of white flour rather than other less worthy stones used for producing meals of various lesser qualities.

There are other features that can be discussed here including how the steep sided valley originated.

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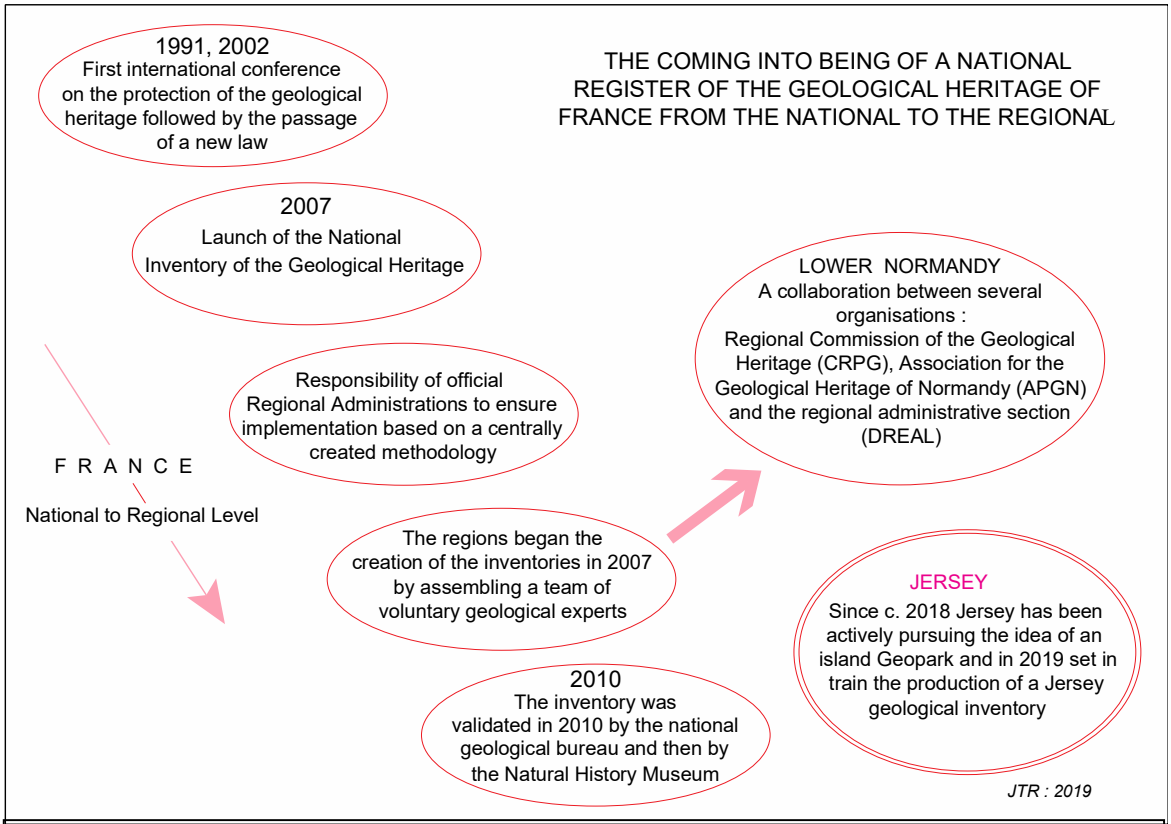


Fig. 13. The development of the Geopark concept with particular reference to France, Normandy and Jersey.

The intention and the ideal is to take a mixed group with different levels of expertise and knowledge and to entertain them with sound science embedded in the heritage and local history or the area.

Other visits might be to a centuries old house where the granite used has social implications to do with both economics and aesthetics (cf Renouf 2002); there may be a particular flower or grouping of plants which are found where they are because of the characteristics of the soil which itself derives from the underlying geology; an abandoned quarry may reflect not just the local geology—quite often spectacular—but will also tell of both past and present economic activites (consider the several Vale quarries used as reservoirs and the unique Beaucette former quarry deliberately breached to the sea to create a marina, and so it goes on . . .

A visit to Spur Point is a good locality to begin a geological field trip in Guernsey because it is a spot which combines great igneous rock petrology—the St Peter Port Gabbro—for the specialist with fine mineralogy in the form of the attractively displayed minerals bojite and

'bird's eye' hornblende. The fact that the gabbro is unusual in its international value is also something which anyone, geologist or not, can relate to. If you are a geologist leading the trip, then you will probably mention in second place the occurrence of the Atlantic Scaly Cricket, point out its rarity and say something about its life cycle and the habitat it accidentally shares with the bojite. If it were another naturalist leading the group the cricket might come first!

As part of the promotion of the Geopark concept the production of guide books is actively encouraged as are training programmes to qualify local guides. In Normandy and adjacent Brittany the creation of attractive guide books is well under way (Fig. 14). These though, it must be admitted still favour those with quite a bit of geological knowledge. Guernsey and Jersey have both technical and more user friendly guides though these are aimed unapologetically at geologists and those with a special interest in geology.


Fig. 14. A selection of the new range of attractively presented and richly colourful Geotourism guides from Brittany plus one of several from Normandy (Manche).

The training of guides and the running of interest activities are all very much part of the Geopark notion and their implementation need not depend on the creation of a Geopark: the endeavour and its results are quite enough to justify them in their own right.

### *3.2 The applicability of the Geopark concept to Guernsey*

The first question that will have been circulating in the minds of those reading this report will be, in one form or another, what value has the concept of Geopark Guernsey to the island. I followed in a desultory and haphazard way the development of the Jurassic Coast Geopark and associated ideas in Devon, Dorset and Hampshire as an outcome of listening to many geological presentations and geological visits over the years to different parts of it. For many years it seemed to remain a grand notion but lacking in the will and wherewithal to finance its realisation. But jump to the here and now and the Geopark is recognised as a major economic boon to the whole region with an almost unimaginable range of valuable spin-off effects just illustrating the power of the associated Geo-Tourism..

I have been arguing consistently over the past decade that the Channel Islands as a whole are ideally suited to be developed into a Geopark with the concept also embracing, at the very least, liaison with the adjacent Cotentin peninsula of Normandy and at the best, close collaboration. It is not incidental that the founding United Nations deliberations rated cooperation between adjacent regions having common interests as particularly noteworthy and should be built into Geopark plans wherever possible; this should encourage those who seek to build closer ties between the Channel Islands and adjacent Normandy/Brittany, ties which are being actively promoted already with various twinnings and the needed links in law enforcement, fishing, trading, etc.

As to why the Channel Islands as a whole rather than each island separately, there are sound geological reasons. In Chapter 2 I demonstrated a variety of themes which have run through the past two hundred years of geological research. Through virtually every one there runs one common factor: Each of the islands has its own particular contribution to make to the whole. Sticking with the story of the origin and differentiation of igneous rock magmas, Guernsey contributes (1) its rare type of gabbro with its mineral bojite worthy of special mention and (2) the range of dioritic rocks, granodiorite and granite in the north. Alderney has the interesting assemblage of igneous rocks centered around Roselle Point well known for its beautiful orbicular diorites. Jersey contributes a vast range of granitic, dioritic rocks and gabbros which illustrate an unsurpassed range of magmatic interactions. The adjacent coasts of Normandy and Brittany, by way of contrasst, are strangely lacking in these igneous rocks while having a whole range of rocks which have no counterparts in the islands—another piece of complementarity. There is a world of geological comparisons and contrasts between the islands and adjacent parts of France that go way beyond the igneous intrusions singled out for the purposes of this report.

> ***"Giving point to what has just been written, the indisputable fact is that the Channel Islands and adjacent France offer a complementary geology which can be simply framed within the notion of the Normanno-Breton Gulf —a cross frontier region ."*** JTR

While geology has been uniquely singled out in this report for obvious reasons, it absolutely needs underlining that the Normanno-Breton Gulf has but one history, one heritage, that combines the story of the islands with that of their French neighbour. It is not so strange perhaps that for someone of Channel Islands' origin most of the books and research detailing their history are dominated by an islands' centered content and where, when 'the other side', i.e. France, is discussed it is usually within the context of 'opposed sides'. In the present

millennium, Brexit notwithstanding, indeed specially because of it, there is need to foster all the cooperation possible between the islands and the international community. The idea of a Geopark of the Normanno-Breton Gulf would represent a significant step in the right direction and would have the potential for significant economic possibilities. Jersey's island branding as 'Ice Age Island', stemming from the popularity of a narrative involving our relatives, the Neandertalers, is an initiative which brings economic value. At the present the island's development of a Geopark embraces the Ice Age Island story and embeds it into the wider Geopark concept with all the possibilities inherent in the topic relationships shown in Figure 12.

It may not yet be the time for Guernsey to venture directly to the Geopark idea but there are geological initiatives that should be embraced as soon as possible. The first is to produce an inventory of the island's geology to provide the informed basis from which (2) a law can be drafted that will give its geological sites legal protection. This map (Fig. 15) of Armorica, the Normanno-Breton Gulf and Southwest England reveals that Guernsey is the only jurisdiction/political entity that has no legal protection for any of its geological sites.

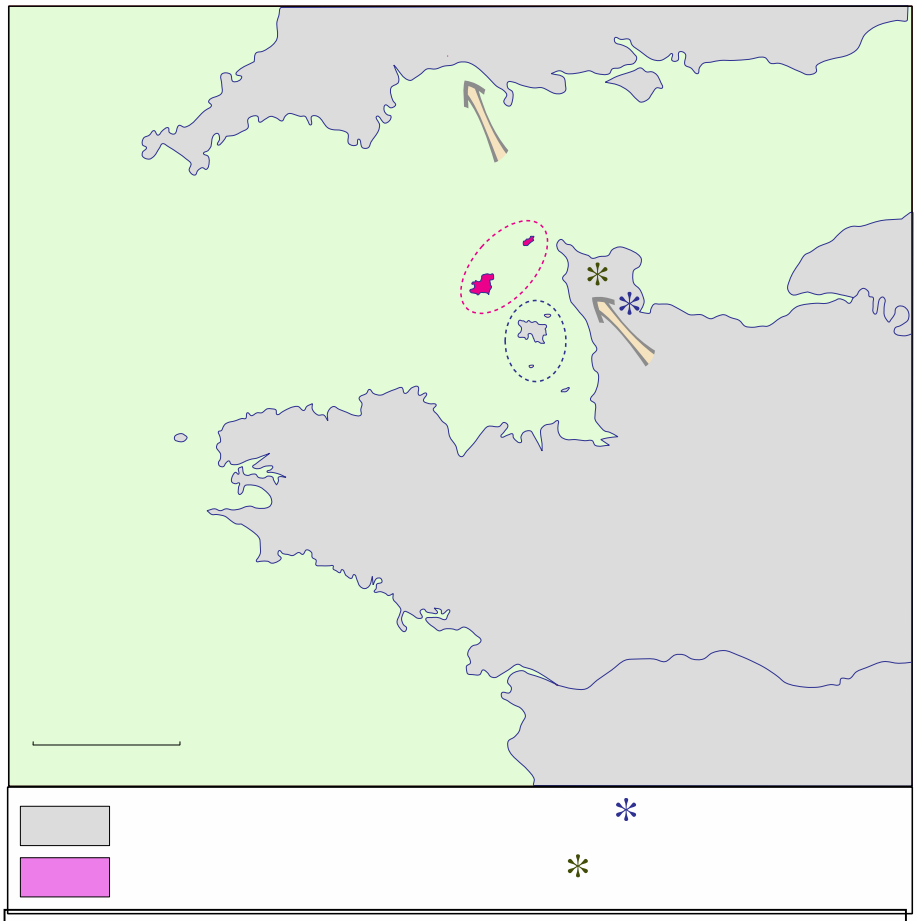

Fig. 15. The map shows those generalised jurisdictions in northwest France and southern England where there is active promotion of the Geopark concept. It is regrettable that Guernsey figures as the odd one out with no formal support for geology.

# Chapter 4 The real importance and significance of Spur Point to a forward looking Guernsey

## *4.1 The contexts to be used in assessing the value of Spur Point*

In the preceding chapters I have set out the various elements within which Spur Point finds a home. These can be listed and variously commented upon as set out here.

- the geology of Spur Point
  - St Peter Port Gabbro, layering, bojite;
- accessibility
  - importance for geological groups including university and like groups
  - not essential for the specialist geologist;
- significance of Spur Point to Guernsey's geological heritage
  - easy accessibility is a vital feature of the Spur Point site;
  - the tidal access is good—mid-tide upward;
- the geology on display at Spur Point could hardly be bettered
  - the wave smoothed rocks offer exceptionally clear examples of the different gabbroic lithologies
  - these lithologies can be appreciated at all levels of geological knowledge or none
  - no other gabbro localities come near those at Spur Point for their beauty and clarity;
- geological importance
  - the St Peter Port Gabbro is considered to be a rare example of its kind, a designation that puts it into the category of an importance beyond the bounds of Guernsey and identifies it as of international value;
  - as part of Guernsey's geological heritage the best access should be retained as visiting groups from both within and outside the island will mostly comprise various non-specialist geologists
  - specialist geologists will always be willing to fit themselves in with the more demanding tide schedules of the rest of Belle Grève Bay;
- the EIA notes its awareness of the lack of Spur Point legal protection but nonetheless does give it some geological value;

- the geological research evident in the EIA leaves much to be desired and two aspects of this are truly regrettable, (1) the denial of any significance of the gabbro more than to Guernsey itself when its international importance is made clear in important geological publications available to the team assembling the EIA and (2) confusing accessibility with geological content;
- there is no mention of any of the island's geology having an importance beyond the confines of 'pure geology' to Guernsey's heritage

### *4.2 The need to embrace a wider perspective on Guernsey's geology*

I have tried to set out as briefly as possible how geology should be viewed in terms of an enlightened vision of the geological heritage of an area, region, jurisdiction—call it what you will. Only by an understanding of this modern approach can the need for a coherent policy for the conservation and promotion of the island's geology be recognised and from this the development of the wider ideas inherent in the Geopark concepts relating them to the embedment of geology within the framework of policies for action in all areas of heritage.

Yes, this account spreads a net far wider than Spur Point alone but in order to make the case for its preservation it has proved necessary to venture into the territories associated with geoheritge which is a rapidly evolving subject in the jurisdictions around Guernsey. From this perspective the case for the preservation of Spur Point is of the strongest since it is a prime example of a geological site that has three crucial assets :

- accessibility and geologically visible quality of the wave smoothed rocks;
- excellent geology with an underpinning of international worth;
- an importance stemming from the above two qualities to lift it into the top bracket of places to visit.

### *4.3 Concluding observations*

I assert with some certainty that all succeeding generations of geologists and those aware in a more general way of geoheritage within Guernsey and the planning of field excursions would lament the loss of Spur Point.

That loss would also be regretted by those outside Guernsey in other areas of the Normanno-Breton Gulf and certainly in the world wide community of specialists in igneous rock formation. The loss will essentially be directed towards the loss of accessibility to a site of exceptional quality capable of appreciation for the natural beauty of its distinctive mineral assemblages. The specialists will always find access to exposures of the same rocks and minerals in other areas of the coast but even they will keep on coming back to Spur Point for its ease of access and sheer variety of wave polished sections.

The loss would also be felt in what will almost certainly develop, over the decades to come, as geoheritage is taken up in both bailiwicks of the Channel Islands. How could it be otherwise when Spur Point Point, as the finest representation of the St Peter Port Gabbro, must be seen as perhaps the most important geological single site in the Channel Islands bearing in mind its international significance and accessibility (Fig. 16).

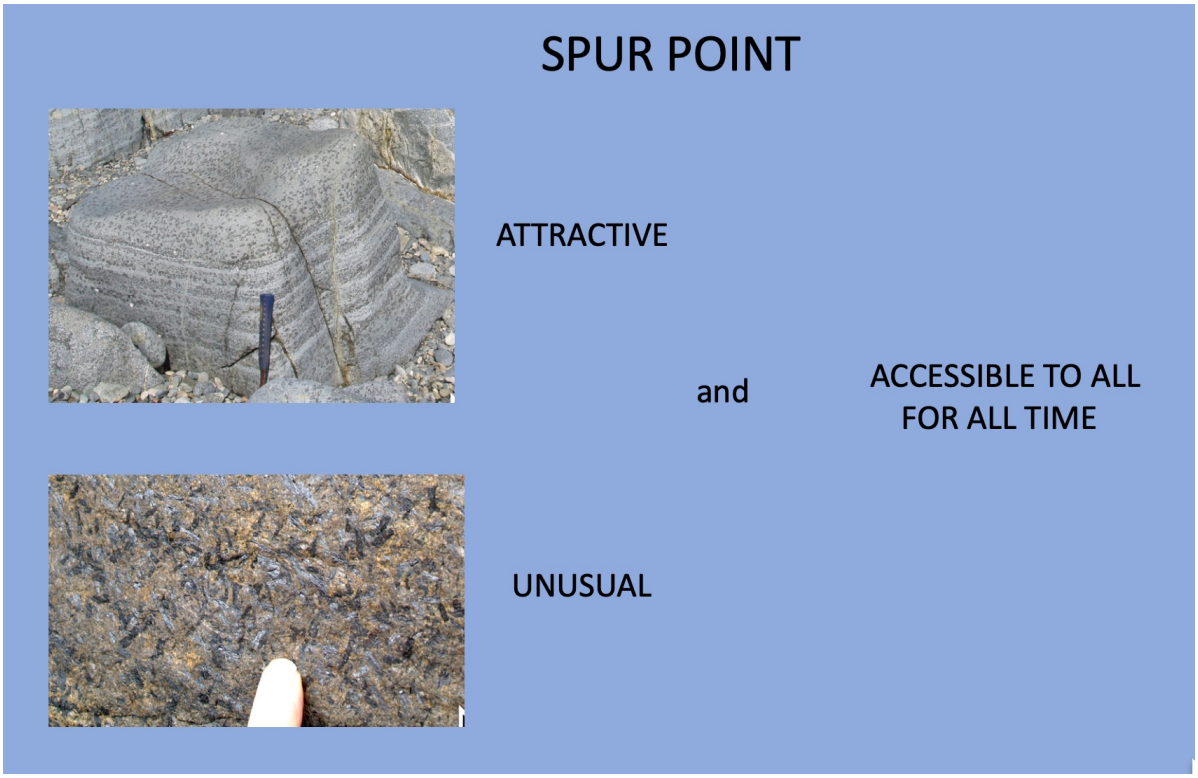


Fig. 16. How Spur Point should be preserved to figure in Guernsey's geological heritage.

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## References

Avoine, J. 2014. Projet de Géoparc dans le Nord-Cotentin. *See web site : <<Projet de géoparc d I N dC t ti dans le Nord Cotentin>>*

Bigot, A. 1890. *L'Archéen et le Cambrien dans le nord du Massif breton et leurs équivalents dans le Pays de Galles*. *Thèse*. 179 pp.

Bishop, A.C. & French, W.J. 1984. Nature and origin of meladiorite layes in northern Guernsey, Channel Islands. *Mineralogical Magazine*, **46** : 301-321.

Duncan, J. 1841. *The history of Guernsey with occasional notices of Jersey, Alderney and Sark and biographical sketches.* Longman, Brown, Green and Longman. London. xvi + 656 pp.

Guernsey Renewable Energy Team. 2011. *Chapter 4 Guernsey Regional Environmental Assessment of Marine Energy*. Online : 27-92.

Hawley, D.W. 2017. *Lithics, Landscape and People : Life beyond the monuments in Guernsey.* Unpublished PhD Thesis University of Southampton, (Faculty of Humanities, Department of Archaeology) : 291 pp.

Hill, E. & Bonney, T.G. 1884. The rocks of Guernsey : With an appendix on the rocks referred to, by T.G. Bonney. *Quarterly Journal of the Geological Society of London*, **40** : 404-430.

MacCulloch, J. 1811. An account of Jersey and the other Channel Islands. *Transactions of the Geological Society of London,* (1), **1**, 1-22.

MacCulloch, J. 1821. *A geological classification of rocks etc. etc.* Longman, Rees, Orme, and Brown, London : 655 pp.

Medland, J., David, C., Hocart, R., De Lisle, D. & Howell, A. 1997. Belle Grève Bay - An environmental appraisal. *Report and Transactions, Société Guernesiaise*, **24**, 1 : 165-168.

Parkinson, J. 1907. The rocks of northern Guernsey. *Geological Magazine*, (N.S.), **4**, 512 : 74-78.

Renouf, J.T. 2002. The age of house facades in Jersey, Channel Islands, from masonry style and rock type with other observations on rocks used and their sources. *Geoscience in south-west England*, **10** : 329-335.

Roach, R.A. 1957. *The geology of the metamorphic complex of South and Central Guernsey.* Unpublished PhD Thesis, University of Nottingham.

Roach, R.A. 1971. The layered structure of the St Peter Port Gabbro, Guernsey, Channel Islands. (Abstract). In : *Proceedings of the Geological Society* of London, **127** : 295.

Roach, R.A., C.G. , M. Brown, A.M. Bland & R.S. D'Lemos. 1991. *Outline and Guide to the Geology of Guernsey.* Monograph No. 3, Guernsey Museum & Art Gallery. St Peter Port, Guernsey. 102 pp.

Royal HaskoningDHV. 2019a. *Longue Hougue South EIA : Environmental Statement* [for States of Guernsey] States of Guernsey : 1-859.

Royal HaskoningDHV. 2019b. *Longue Hougue South EIA : Non-Technical Summary* [for States of Guernsey]. States of Guernsey : 1-35.

Rutley, F. 1879. *The study of rocks : An elementary text-book of petrology.* Longman, Green, and Co., London. 319 pp.

Salmon, S. 1998. *The plutonic igneous complex at Sorel Point, Jersey, Channel Islands : a high level assemblage. Geological Journal,* **33** : 17-35.

Topley, C. G., Brown, M., D'Lemos, R. S., Power, G. M. & Roach, R. A. 1990. The Northern Igneous Complex of Guernsey, Channel Islands : 245-259. In : D'Lemos, R.S., R.A. Strachan & C.G. Topley *(Eds)*. 1990.The Cadomian Orogeny. *Special Publications Geological Society of London*, **51** : 423 pp.

Topley, C. & de Pomerai, M. 1987. The geology of Guernsey : Unique in the British Isles. *Report and Transactions, Société Guernesiaise*, **22**, 1 : 118-124.

Wells, A.K. & S.W. Wooldridge. 1931. The rocks groups of Jersey with special reference to intrusive phenomena at Ronez. *Proceedings of the Geologists' Association,* **42**, 2 : 178-215.