

Europe and scientific organisations such as IGU, IUGS, ISSS and INQUA.

A new opportunity has recently been given to nature conservation through the possible cessation of farming on marginal agricultural land. In places where this occurs, an enlargement of the areas protected in the interests should be possible and in The Netherlands and in Denmark, for instance, initiatives have already been taken to transfer farmland which is to be abandoned into biological nature reserves. It was felt that this opportunity was also relevant to Earth-science conservation and that geologists also should take part in the discussions and planning for any such changes in land-use.

The Working Group intends to publish a Newsletter twice a year to give news of the latest meeting and of the programme for its successor along with news from individual member countries and reviews of books, legislation and of any other relevant developments.

A sub-committee was formed to look into the preparation of a manual for Earth-science conservation,

which was seen as being both a means of influencing authorities and of encouraging colleagues in other countries in addition to its long term aim of standardising methods. Such a manual should contain information on classification and inventory procedures, the selection, registration and management of sites, the role of conserved sites in education, the organisation of Earth-science conservation and other related topics. A draft is to be produced for discussion and ratification at the 1990 meeting and, when published, it is intended that it should be presented to the Council of Europe and widely circulated to interested organisations.

To follow up the manual, a European site list, comparable with that produced by the Corine project for biological sites, should be produced, having been selected by use of criteria developed from those outlined below by Dr. WILLIAM WIMBLETON. It is intended to take this matter further at the 1990 meeting to be held in Norway.

## 2. European Heritage Sites and Type Site Inventories

By WILLIAM A. WIMBLETON\*)

### 2.1. Introduction

All European countries have features of international interest to the Earth scientist. Landforms and rocks present evidence of past events and environments, and this evidence is not limited by national or regional boundaries. The Earth sciences are truly international in outlook, and the complex story of, for instance, volcanic episodes, of ice-ages and of sealevel changes and many other widespread events can be traced across the continent.

At its meeting in the Netherlands in 1988, the European Working Group on Earth-science conservation discussed the need for the compilation of lists of "type sites". A type site is here defined as follows: any site in the modern or historical type area for a rock or chronostratigraphic unit, or the site/area where rock, geomorphological/landscape or pedological phenomena were first defined or recognised. The label is not here-confined to stratigraphic sites alone.

At its second meeting in Bregenz further consideration was given to this difficult task. The author proposed that the exercise was worth doing because, by the labelling such localities or areas we could

- 1) add support to local or national initiatives to protect sites,
- 2) submit finalised European lists to the EEC, Council of Europe, UNESCO etc. for use in their work in the

wider protection of geological, geomorphological or landscape features,

- 3) gain added status for sites which are although already recognised locally deserve wider recognition, and
- 4) gain publicity for such labelled sites, which should heighten public and government awareness of all Earth-science sites, be they tiny fossil sites or enormous wilderness areas.

How to go about compiling lists of heritage/type sites.

### 2.2. Categories

Most European states have compiled or started to compile inventories of their earth-science localities. This does not, however, address the problem of priorities in an international setting. For instance it has been suggested that Britain has 100.000 "sites" of earth-science interest. Around 3100 of these are to receive protection under existing national legislation. Some hundreds of these might be considered as contender European type sites, but only a small percentage would be regarded as truly international heritage sites using present strongly anthropogenic criteria, even allowing for Britains unrivalled, rich and varied rock, fossil and landform record.

There are a number of possible ways in which sites may be categorised in attempts at putting together a European type site or type area list, all of which are used to a greater or lesser extent in prioritising site selection in local or national conservation schemes.

---

\*) Author's address: Dr. WILLIAM A. WIMBLETON, Nature Conservancy Council, Northminster House, PE 11UA Peterborough, Great Britain.

- Categories: 1) "Best" sites  
2) Unique sites  
3) Firsts  
4) Patterns.

### 2.2.1. "Best" sites

That is the best example of a particular category, for instance where are the best Little Ice Age moraines and associated features, perhaps in Norway? Many countries have features from this period but where are the best suites of them? Depending on the number of categories one uses (e. g. representative parts of the geological column, key fossil groups, landform or landscape types) there is much scope for division and subdivision.

Just thinking of geomorphological and landscape examples – Where are the best natural soft coast landforms, Ireland? Where is the best example of a major tombolo – Chesil beach? Should such sites be considered singly or in a suite of coastal features? Where are the best unmodified last glacial erosional features? There are many Weichselian cirque assemblages. Where are the best push-moraines? And so on ...

Categories and their possible divisions are many. Some nations are richly endowed with unmodified landscapes but others have next to no intact landforms but many important hard rock localities. One nation might even possess all the sites in, for instance, a single landscape category.

### 2.2.2. Unique sites

Localities with international renown for the nature of their geology, be it rocks, minerals, fossils or landforms. Obvious examples that come to mind are:

- Holzmaden with its Lower Jurassic marine reptiles.
- Stonesfield or Swanage with their Jurassic mammal faunas.
- Monte Bolca's Tertiary fish.
- Fjords landscapes of Norway or the bogs of Ireland.
- Pleistocene beaches and international standard sections in Calabria.

### 2.2.3. Firsts

The localities where the first recognition of a depositional or erosional process took place, where a major time unit was first defined, or an orogenic or stratigraphic event or a vital step in organic evolution was identified – these are all of the highest historical interest. They have a high social history value also.

The recognition of the significance of a natural phenomenon e. g. the sites in Switzerland where CHARPENTIER and VENETZ identified glacial erosional and depositional landforms as being the result of a previous catastrophic ice age fall into this category. The detailed later elucidation of such glacial features of the chronology of such features in a key area e. g. the Würm (Weichselian) limit in the Danube tributaries by PENCK & BÜCKNER might be equally important.

The realisation that ancient volcanoes had produced the igneous terrains of Europe, and the elucidation of the workings of ancient volcanoes may be attributed to early geologists such as DESMAREST at localities in the Auvergne. Such sites, and those where HUTTON first recognised the significance of unconformities for what they prove about past upheaval of the Earth's crust, would rate highly in the history of science and in this category.

There are many many type areas for time or rock units (e. g. Allerød, Tiglian, Bajocian, Wenlock, Danian, Kimmeridgian, etc.) but not all such localities may have a wider international significance although many do.

### 2.2.4. Patterns

The commonest category of sites in most classification systems, the sites which demonstrate the salient or significant features, be they hard or soft rock or landform, which occur in or typify an area, large or small.

There are related suites of features (coastal landforms, ice front features, erratic trains and their source areas, volcanic episodes and stratigraphic units) which cross frontiers; these may be a need to be assessed in a wider context. There are many areas and sites in the historical stratotype or type example category which will always be of international importance (using stratigraphic examples – e. g. the Barrandian, Downtonian and Devonian type areas). Such type examples figured strongly in the early years of the science or of the branches of geology and they are still key localities. The standardisation of stratigraphy or any other field of study are the definition of a mere handful of global types, standards or stratotypes does not alter the significance or the daily usage or usefulness of historical sites or areas.

## 2.3. Conclusions

In collaboration with local, national and international bodies, and individuals, we the EWGE-SC should set up a steering group to refine a standard set of criteria for judging such sites in a European context, and then set to the task of compiling a type site list for Europe.