

# ***Jurassic Seas and Anjou Wines: A journey through the Toarcian of Thouars (Deux-Sèvres, France)***

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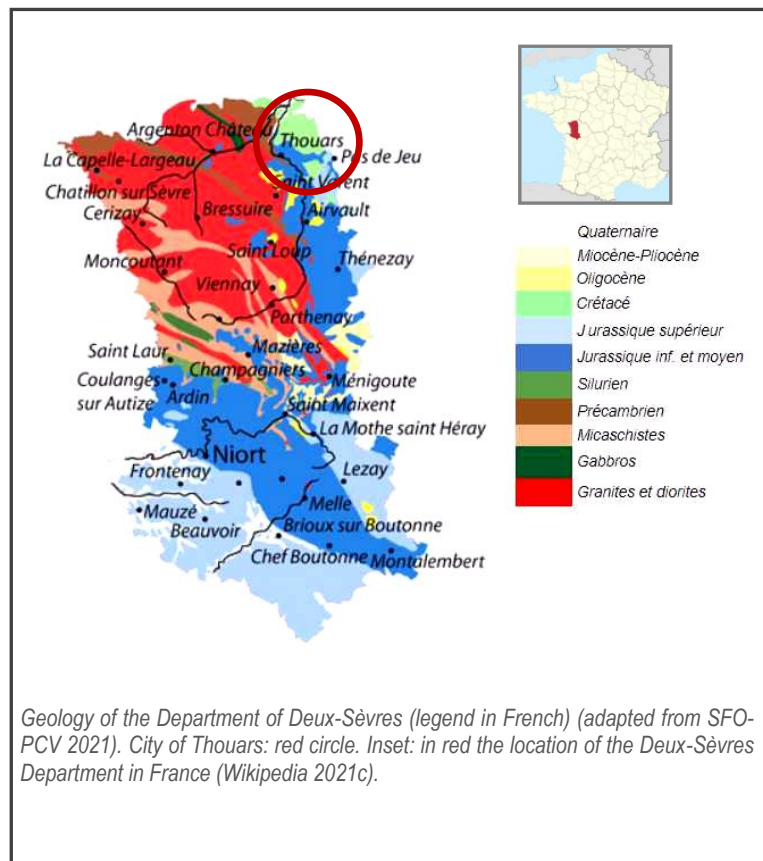
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Small ammonite fossils in a fine-grained bioclastic limestone at the second site of the Toarcian stratotype outcrops (Lower Jurassic) near the town of Thouars (Deux-Sèvres Department, France).

The stratotype of the Toarcian (a stage of the Lower Jurassic) is located near the city of Thouars (Deux-Sèvres, France) (Poncet 2015; Thomas 2019). A stratotype is a geological term that names the physical location or outcrop of a particular reference exposure of a stratigraphic sequence or stratigraphic boundary (Wikipedia 2021a). In turn, the Toarcian (183-174 Ma) (Wikipedia 2021b) is the last stage of the Lower Jurassic. The site is located about 3 km northwest of Thouars near the suburb of Vrines, and the place is well indicated. There are two outcrops and to access the first one you have to ask for a key at the Thouars town hall.

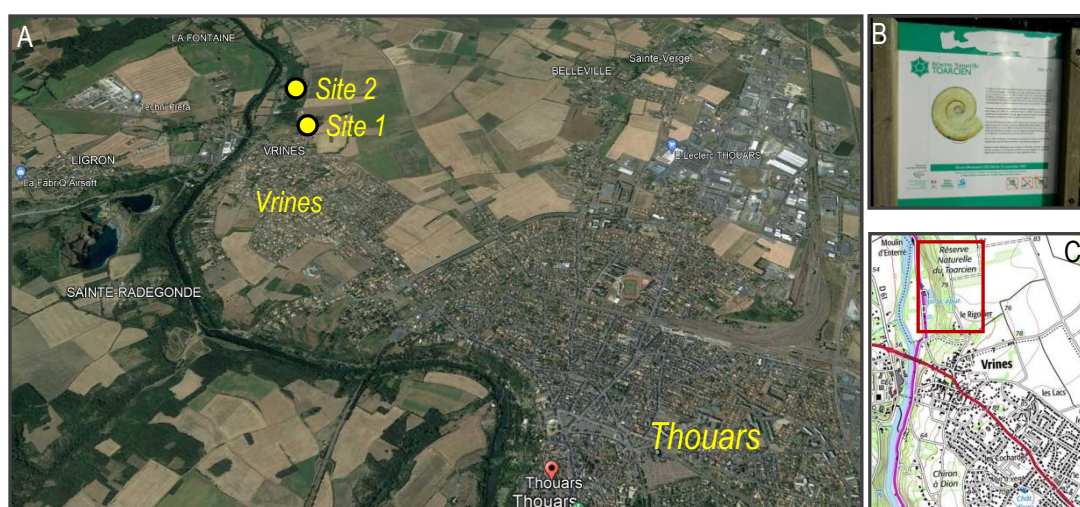
The Toarcian stratotype was proposed in 1849 by the famous French naturalist Alcide d'Orbigny, and its name is derived from the Roman name of the town of Thouars: Toarcium (Legendre et al. 1989).



The attention paid by the *Communauté des Communes du Thouarsais* to the maintenance of the Toarcian stratotype outcrops is striking and gratifying, because it means that there is a genuine interest in preserving this wonderful scientific and historical heritage. For this reason alone the site is worth a visit; but also the city of Thouars is a historical monument in itself, and as if this were not enough, there are the vineyards which belong to the *Vignobles d'Anjou et Saumur* sector of the Loire Valley wine region (Wikipedia 2021d). We shall return to this last topic later.

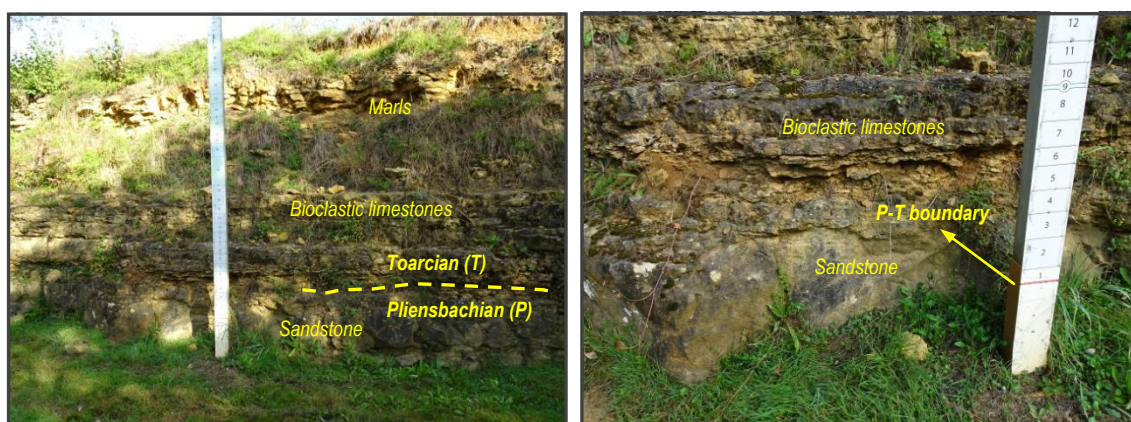
### The two outcrops of the stratotype

The outcrops of the Toarcian stratotype are found in two old limestone quarries that were mined for construction stone, Site 1 corresponds to the so-called “Hauts Coteaux” quarry, whereas Site 2 is known as the “Rigollier” (or “des Groies”) quarry; the entire sector is legally protected at present as the *Réserve Naturelle Nationale du Toarcien* (RNN91) (*Toarcian National Nature Reserve*) (Thomas 2019).



A: Slightly tilted Google Earth image of the area, showing the approximate location of the two outcrops of the stratotype. B: Explanatory panel of Site 1. C: Map of the sector, the rectangle marks the Toarcian National Nature Reserve.

At Site 1 the passage from a Pliensbachian sandstone to a Toarcian bioclastic limestone can be easily observed, marking the beginning of the marine sedimentation corresponding to this latter age. The Pliensbachian sandstone is made up of quartz grains cemented by carbonate and iron oxides.



On the left, the outcrop of Site 1, showing the transition from the Pliensbachian (P) sandstones to the Toarcian (T) bioclastic carbonate facies, and marls. On the right a detail of the P-T boundary.



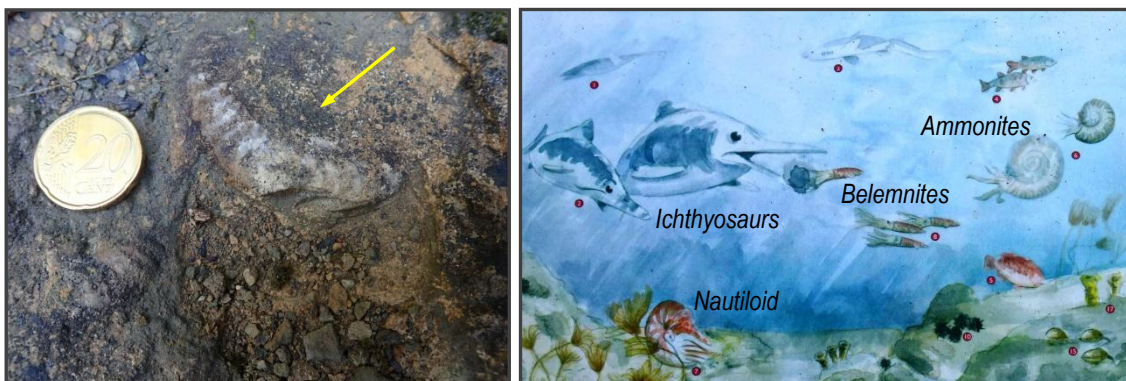
On the other hand, the bioclastic limestones are made up of small fragments of pelecipods, gastropods and oololiths. The Toarcian is rich in fossils here, mainly ammonites and belemnites. It should be noted, as expected, that you are not allowed to take samples from the outcrops, therefore the use of a geological hammer is forbidden. The same applies to fallen samples.



Ammonite (left) and belemnite (right) fossils at Site 1.




Site 2, where you can observe the transition from the Toarcian to the Aalenian. However, as Thomas (2019) indicates: it is unfortunate that the correlation between the two quarries (and in particular between the two “scales”) is not clearly established in the panels.



Left, ammonite fossil at Site 2. Right, representation of the tropical Jurassic Sea (Sea of Tethys) around Thouars about 183-174 million years ago, note the presence of ichthyosaurs, ammonites, belemnites and nautiloids. Adapted from an explanatory panel in the Toarcian National Nature Reserve (Communauté des Communes du Thouarsais).



Series/Epoch	Stage/Age	Million years	Site 1
Early Cretaceous	Berriasian	~145	
Upper/Late Jurassic	Tithonian	152.1 ±0.9	
	Kimmeridgian	157.3 ±1.0	
	Oxfordian	163.5 ±1.0	
Middle Jurassic	Callovian	166.1 ±1.2	
	Bathonian	168.3 ±1.3	
	Bajocian	170.3 ±1.4	
	Aalenian	174.1 ±1.0	
Lower/Early Jurassic	Toarcian	182.7 ±0.7	
	Pliensbachian	190.8 ±1.0	
	Sinemurian	199.3 ±0.3	
	Hettangian	201.3 ±0.2	

The Period/System Jurassic (Wikipedia 2021e). In chronostratigraphy, a stage (such as the Toarcian) is a succession of rock strata laid down in a single age on the geologic timescale, which usually represents millions of years of deposition; a given stage of rock and the corresponding age of time will by convention have the same name, and the same boundaries (Wikipedia 2021f). On the right, the actual rock column at Site 1.

### Plants in Sites 1 y 2

The Sites 1 and 2 are located on the Eastern bank of the river Thouet. The river constitutes the approximate limit between two contrasting landscape entities (Poncet & Remerand 2010): 1) the “Bocage de Bressuire”, to the west, a landscape composed of small irregular parcels separated from each other by a more or less dense mesh of living hedges, that bound natural meadows used for raising livestock and for farmland; and 2) the “Haut-Poitou Plain”, to the east, a vast plain of open fields dedicated to the production of cereals and oilseeds, marked by the presence of numerous plots planted with vineyards (*Vignobles d’Anjou et Saumur*), but also by scattered scrubs and forests on clay and/or stony soils. Around the two outcrops, important maintenance work has been carried out to clear the area of the vegetation that covered them, but there are still some representative plants of the area, which on the date of the visit (29th of Septembre 2021) were mostly in fruit. The common oak (*Quercus robur*), the field maple (*Acer campestre*) and the English walnut (*Juglans regia*) stand out among other species.



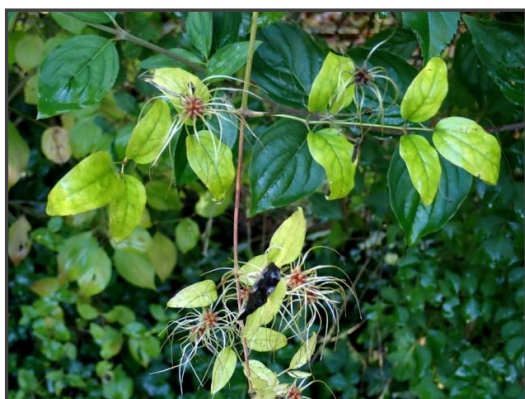
On the left, an oak (*Quercus robur*) that has sprung up in the bush. On the right, leaves of a field maple (*Acer campestre*) with its typical lobes.

Shrubs such as the hawthorn (*Crataegus monogyna*) and the blackthorn (*Prunus spinosa*) also grow in this sector, with red and black fruits respectively. The young branches of the latter are used to produce the *vin d'épine* or *trouspinette*, a tasteful French aperitif.



On the left, detail of a hawthorn (*Crataegus monogyna*) with 2 to 4 cm long, deeply lobed leaves and small, oval, dark red fruits reminiscent of a cherry, although they are structurally a pome with a single seed. On the right, a blackthorn (*Prunus spinosa*) with dark blue drupes.

Climbing plants are also common in the area, among them the traveller's-joy (*Clematis vitalba*), a climbing shrub with striking feathery fruits, and the ubiquitous ivy (*Hedera helix*) that climbs on trees, poles and walls. Colonies of cyanobacteria (*Nostoc* sp.) grow on the soil and damped rocks, wrapped by a mucilaginous envelope, which when wet is greenish-brown in color, and becomes black and more brittle as it dries.



Detail of the traveller's-joy (*Clematis vitalba*) with numerous fruits that are pubescent achenes prolonged in a long, feathery style.



On the left, a detail of an ivy (*Hedera helix*), with closed flowers and fruits grouped in umbels. On the right, the macroscopic aspect of *Nostoc*, a cyanobacterium that forms mucilaginous green sheets when wet.

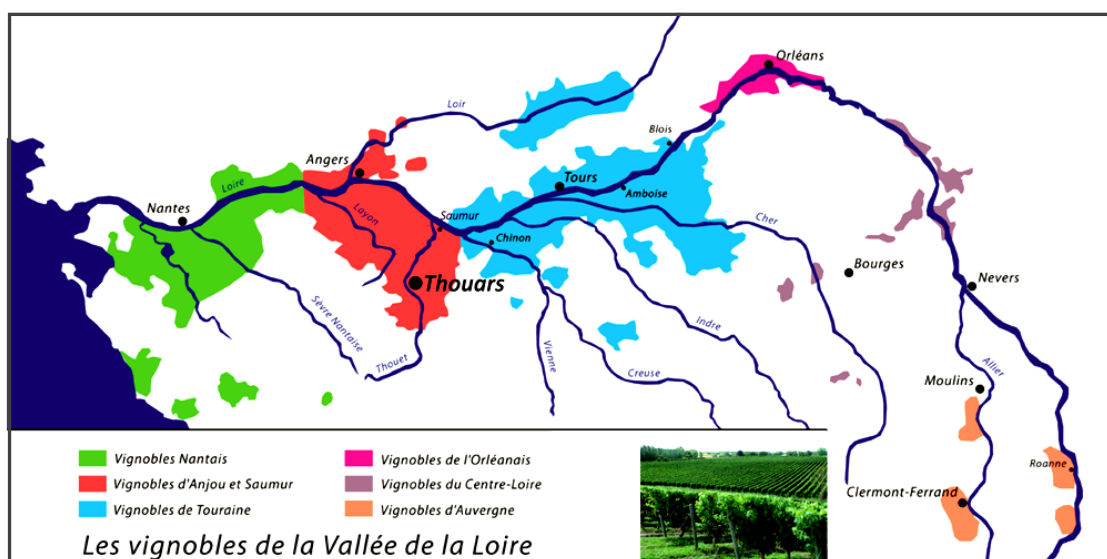


## The vineyards

Visiting Thouars and not tasting the excellent local wines is not an option. Thouars is part of the wine-growing region of the Loire Valley Vineyards (*Vignobles de la Vallée de la Loire*), specifically of the “sub-province” of Anjou and Saumur (*Vignobles d’Anjou et Saumur*) (Wikipedia 2021d).



A vineyard in front of Site 2. This area is located in the wine sub-province of Anjou et Saumur (see below) and the grapes must correspond to the Cabernet Franc or Cabernet Sauvignon variety from which the Anjou-Villages (AOC) wines are made.



Vineyards of the Loire Valley and wine producing “sub-provinces”. Adapted from Cyril5555 (2009). The vineyard (photo) is from the Thouars area (Maison du Thouarsais 2021).

This wine region has been a known place for wine since the Middle Ages, and peaked during the 16th and 17th centuries, but in the 20th century over-reliance on the disappointing *Rosé d’Anjou* wines somewhat tarnished its reputation; more recently, the situation has improved a lot with the excellent wines made from the Cabernet Franc variety (Vivino 2021). Spanning the Deux-Sèvres, Maine-et-Loire and Vienne departments, the generic denomination Anjou AOC (*Appellation d’Origine Contrôlée*) and its various sub-denominations encompass vineyards in more than 151 townships.

For most of its history, dry red wines have accounted for a small percentage of Anjou's winemaking, however in recent years the number has steadily increased, helped in part by the establishment in 1987 of the AOC designation “Anjou-Villages” for red wines, that can be made only with Cabernet Sauvignon and Cabernet Franc (Wikipedia 2021d), such as the excellent Anjou Demon wine (*made with Cabernet Franc*) that these authors were able to taste at Thouars.



The Cabernet Franc grape (Wikipedia 2021g) and a bottle of Anjou Demon (Wine Searcher 2021) produced with this variety.

### Last comments

Whatever the reason for visiting the Department of Deux-Sèvres (see *Deux-Sèvres Tourism 2021a*), and specifically Thouars (see *Deux-Sèvres Tourism 2021b*), you can be sure that its historical, geological and botanical heritage will not leave you indifferent. The best proposal is to start with the capital of the Department: Niort (see *Niort - Marais Poitevin 2021*), and from there go visiting the many unforgettable places that you will find.

For the end we have left the words of Alcide d'Orbigny when the Toarcian stratotype was defined some 170 years ago ...



Alcide d'Orbigny (1802-1857) (Wikipedia 2021h)

*"It is with the aim of returning things to their true horizon that, for a few years, we have designated this floor as Upper Lias and we believe that we should, today, replace it with Toarcian stage, for the city of Thouars, Toarcium (Deux Sèvres), having offered in its environment such a beautiful and rich development, that this point can be considered, from then on, as a standard, as a standard point."*

*Alcide d'Orbigny (1852)*

*Text (in French) in: Poncelet (2015)*

## References

- Cyril5555 (2009) Carte vignoble vallée de la Loire.png. Wikimedia Commons, [https://commons.wikimedia.org/wiki/File:Carte\\_vignoble\\_vallee\\_de\\_la\\_loire.png](https://commons.wikimedia.org/wiki/File:Carte_vignoble_vallee_de_la_loire.png)
- Deux-Sèvres Tourism (2021a) Escapades in Deux-Sèvres. <https://www.tourism-deux-sevres.com/>
- Deux-Sèvres Tourism (2021b) Getaway in the vines and the skies. <https://www.tourism-deux-sevres.com/getaway-vines-and-skies>
- L. Legendre, M. Dhoste & L. Coubès (1989) Notice explicative de la feuille Thouars a 1: 50.000. Éditions du BRGM - BP 6009 - 45060 Orléans Cedex 2· France, <http://ficheinfoterre.brgm.fr/Notices/0539N.pdf>
- Niort – Marais Poitevin (2021) Niort and Marais Poitevin. <https://www.niortmaraispoitevin.co.uk/>
- D. Poncet (2015) La Coupe-Type de l'Étage Toarcien (Sainte-Verge, Deux-Sèvres). Réserve Naturelle Toarcienne, Communauté des Communes du Thouarsais, MACE, Thouars, 36 pp.
- D. Poncet & S. Remerand (2010) Réserve naturelle nationale du Toarcien (Sainte-Verge). [https://www.reserves-naturelles.org/sites/default/files/reserves/rnn91-plaquette\\_toarcien.pdf](https://www.reserves-naturelles.org/sites/default/files/reserves/rnn91-plaquette_toarcien.pdf)
- SFO-PCV (2021) Carte géologique simplifiée (d'après la carte de France à 1/250 000 ème). <http://www.orchidee-poitou-charentes.org/spip.php?article1064>
- P. Thomas (2019) Le stratotype du Toarcien à Sainte-Verge, banlieue de Thouars (Deux-Sèvres). Ressources scientifiques pour l'enseignement des sciences de la Terre et de l'Univers; ENS de Lyon; <https://planet-terre.ens-lyon.fr/ressource/lmg643-2019-06-03.xml>
- Tripadvisor (2021) Deux-Sèvres: les meilleures activités. [https://www.tripadvisor.fr/Attractions-g2321991-Activities-Deux\\_Sevres\\_Nouvelle\\_Aquitaine.html](https://www.tripadvisor.fr/Attractions-g2321991-Activities-Deux_Sevres_Nouvelle_Aquitaine.html)
- Vivino (2021) Región Anjou, Middle Loire, Loire Valley, Francia. <https://www.vivino.com/wine-regions/anjou>
- Wikipedia (2021a) Stratotype. <https://en.wikipedia.org/wiki/Stratotype>
- Wikipedia (2021b) Toarcian. <https://en.wikipedia.org/wiki/Toarcian>
- Wikipedia (2021c) Deux-Sèvres. <https://en.wikipedia.org/wiki/Deux-S%C3%A8vres>
- Wikipedia (2021d) Anjou wine. [https://en.wikipedia.org/wiki/Anjou\\_wine](https://en.wikipedia.org/wiki/Anjou_wine)
- Wikipedia (2021e) Jurassic. <https://en.wikipedia.org/wiki/Jurassic>
- Wikipedia (2021f) Stage (stratigraphy). [https://en.wikipedia.org/wiki/Stage\\_\(stratigraphy\)](https://en.wikipedia.org/wiki/Stage_(stratigraphy))
- Wikipedia (2021g) Cabernet Franc. [https://en.wikipedia.org/wiki/Cabernet\\_Franc](https://en.wikipedia.org/wiki/Cabernet_Franc)
- Wikipedia (2021h) Alcide d'Orbigny. [https://en.wikipedia.org/wiki/Alcide\\_d%27Orbigny](https://en.wikipedia.org/wiki/Alcide_d%27Orbigny)
- Wine Searcher (2021) Domaine des Terres Blanches Anjou 'Demon' Rouge. <https://www.wine-searcher.com/find/dom+de+terre+blanche+demon+rouge+anjou+loire+france>