

THE TYPE SECTION OF THE AQUITANIAN.

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ABSTRACT. The Aquitanian Stage of the European Tertiary dates from 1853 and not 1857 (1858). According to the law of priority the type section is in the region of Ajoie, northwest Switzerland and not in the Aquitanian basin near Bordeaux, France. The Aquitanian was assigned to the Oligocene by Mayer in 1858.

THE Aquitanian Stage of the European Tertiary has been the subject of much discussion by many authors particularly as to whether or not it is Miocene or Oligocene, and whether it is younger than the Chattian Stage or equivalent to it, either in whole or in part. The answer to these questions is basically determined by the limits of the type section of the Aquitanian Stage.

Recently the present author had occasion to make an intensive study of the literature dealing with the Aquitanian and noted that all of the many papers² examined either assume or state that the type section is in the Aquitanian Basin near Bordeaux, France, and that the Aquitanian Stage was proposed and defined by Mayer in a paper presented in 1857 and published in 1858. No work examined refers to any earlier paper on the Aquitanian than that of Mayer (1858).

Nevertheless, the opening sentences of Mayer's 1858 paper in the section on the Aquitanian Stage indicate an earlier work. These sentences are as follows (freely translated):

There is no need to justify our division (in the year 1853) of the Aquitanian into two "Stages," the definite division of land and sea in Europe into the two epochs justifies our division. It would be more fitting to criticise our not having recognized this division previously.

Unfortunately Mayer does not list any paper in his bibliography for the year 1853, but his opening sentence leaves no doubt as to its existence.

After an extended search of the literature of that era the present author believes that a paper by Gressly (1853), entitled

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² Among the more important papers are: Alimen (1936), Dollfuss (1909), Vaughan (1924, pp. 713-714), and Munier-Chalmas and de Lapparent (1893, pp. 481-482, designation of the type section of the Aquitanian Stage as near Bordeaux, France).

"Nouvelles Données sur les Faunes Tertiaires D'Ajoie avec les déterminations de M. Mayer," is the paper referred to by Mayer. Other references to the Aquitanian Stage were found in the literature between the years 1853 and 1857, indicating that several contemporary geologists were familiar with Mayer's classification before 1857.

The title of Gressly's paper definitely shows that the age determinations are by Mayer and in the text it is indicated that the classification employed is Mayer's. Further, Gressly (1853, pp. 258-259) says (freely translated):

After examination of the faunas of subdivision F of the above terrains, the subdivision which in Ajoie is the most important in thickness and extent, Mayer believes it certain that that subdivision corresponds to his Moguntian [Stage], that is to say, to the Tongrian and Rupelian of Dumont. From which one arrives at the following classification, according to Mayer.

The beds A and B would represent the Helvetian with some doubt. The beds C and D would be the Aquitanian. The beds E and F the Moguntian . . .

Thus a definite set of beds are indicated as the Aquitanian. On pages 254-255 a description of the beds involved is given. Subdivision C is a micaceous "molasse" containing fragments of wood and confused leaf imprints and can be easily observed at Pappelmont, Courtemautruy and Plainmont-Dessous. Subdivision D is composed of marls and sands, usually unfossiliferous but containing marine fossils at Pappelmont and Courgenay where Mayer recognized *Lamna contortidens* Ag., *Anarrhicus*, *Balanus*, *Spondylus*, *Nerita funata* Duj., *Macra basteroti* May., *Lucina supina* (?), *L. divaricata* Lamk. Thus in Gressly's paper there is given a definite designation of certain beds as Aquitanian, and a description of those beds together with a list of the fossils found. That the beds are largely non-marine, and with the remaining marine beds but poorly fossiliferous, is unfortunate, but it does not remove them from consideration as a possible type section of the Aquitanian.

Further, Gressly's paper (1853, pp. 259-261) has attached to it an addendum by J. Thurmann (of the Swiss Geological "Bureau") saying, in effect, that as they were obliged to use Mayer's classification in the paper, he was presenting therewith Mayer's complete classification in order that the reader might better understand it. This table is as follows:

1. "Pedemontien," Mayer (upper Pliocene)—Represented in Switzerland by?
2. "Placentien" M. (lower Pliocene)—Oeningen? Kapfnach?
3. "Dertonien" M. (upper Miocene)—Upper fresh water "molasse" of the German-Swiss Basin.
4. "Helvetien" M. (middle Miocene)—Marine "molasse" and shell sandstone of the German-Swiss Basin.
5. "Aquitaniien" M. (lower Miocene)—Lower fresh water "molasse" of the German-Swiss Basin.
6. "Moguntien" M. (—? nob.) (Tongrian and Rupelian of Dumont)—Upper marine sands of Fontainebleau, Etampes, Mayence, Castel-Gonbert, etc.—Limestone of Ajoie, Bale, Lauffon, Delemont, etc.—"Diablerets" in the Bernese Alps with special fauna.
7. "Parisien" d'O. (upper Eocene)—"Calcaire grossier"; in Switzerland "Diablerets," St-Gall? Schwytz?
8. "Suessonian" d'O. (lower Eocene)—Sands of Soissonais; in Switzerland—?

This table cannot be interpreted as referring only to Switzerland for it refers to French and German sections as well as Swiss and it questions whether or not the "Pedemontien" and "Suessonien" are represented in Switzerland. Nevertheless, under "Aquitaniien" he refers only to the deposits in the German-Swiss Basin (the paper by Gressly deals with part of this basin) and does not list any in France. Thus it appears probable that the strata around Bordeaux, France had not yet been correlated with any part of Mayer's classification of the Tertiary.

That the name Aquitanian was used by Mayer for this particular stage is perhaps unfortunate for it immediately implies a connection with the Aquitanian Basin of France to most readers. That Mayer did not consider the deposits of the Aquitanian Basin of France as typical of his Aquitanian Stage is implied in his 1858 paper (p. 190) for he says (freely translated):

Concerning the synchronism of the four principal formations of the Aquitanian north zone, it remains only to say that this has long been recognized, and needs no further support.

and a few lines farther on,

In connection with the formations of the Aquitanian south zone, the so-called *Faluns* (that is: Mussel deposits) are in need of special discussion. We have investigated these *Faluns* during an eighteen month stay in the meadows of the South of France, and therefore we can give definite information on their conditions of deposition.

and then after some further statements he proceeds to give a detailed description of the *Faluns* as they occur in the Department of Gironde. It is this area which subsequent workers have considered as the type area of the Aquitanian Stage, yet in his 1858 paper it is clear that Mayer discusses the *Faluns* in great detail because of the confusion existing at that time as to their correlation and not with a view to establishing the *Faluns* as the type of his Aquitanian Stage (see p. 191, where he says: “. . . and here we will investigate the cause for the erroneous classification of Messrs. Delbos and Raulin.”)

Thus, in summary of the preceding, we find the following facts:

1. In 1858, Mayer refers to his 1853 division of the Aquitanian (a point overlooked by subsequent workers).
2. An 1853 paper by Gressly on the Tertiary of Ajoie, Switzerland, with determinations by Mayer (according to its title), appears to be the paper referred to by Mayer in 1858.
3. This 1853 paper has as an addendum a table showing Mayer's classification of the Tertiary. In this table the Aquitanian is listed only in the German-Swiss Basin.
4. In the text of this 1853 paper there is a two-fold division of strata which are designated as “the Aquitanian,” together with definite locality descriptions and faunal lists.
5. It is evident from the text of Mayer's 1858 paper that he only discussed the *Faluns* of the Aquitanian Basin of France in detail in order to show that the Aquitanian Stage was present there, and distinct from the Helvetian of that area.
6. Munier-Chalmas and de Lapparent did not designate the strata in the Aquitanian Basin as the type section of the Aquitanian Stage until 1893.

In consideration of the preceding six points, it appears to the present author that as long as we abide by the law of priority that the type locality of the Aquitanian Stage is not in the vicinity of Bordeaux, France, but in the vicinity of Paplemont, Courtemautruy, Plainmont-Dessous, and Courgenay, in northwest Switzerland, and includes the strata discussed by Gressly (1853) as beds “C” and “D.”

Whether or not these strata in the valley of Ajoie, Switzer-

land are exactly the same age as those near Bordeaux, France has not been investigated. The faunal lists given by Gressly are too small for a critical analysis. In this respect, European geologists should carefully investigate whether or not the Aquitanian of Ajoie is the same as the Chattian of Germany. It appears to the present author very probable that they are equivalent, in which case the name Aquitanian would take precedence over Chattian. If they are not equivalent, their exact relationships should be easily determinable.

With regard as to whether or not the Aquitanian is to be referred to the Oligocene or Miocene; it was referred to the lower Miocene in the 1853 paper (p. 259). At this time the Miocene included much of the strata subsequently referred to the Oligocene (which was not proposed and defined until 1854). However, in Mayer's 1858 paper (p. 171), he says

the fifth [Ligurian], sixth [Tongrian] and seventh [Aquitanian] stages are Beyrich's Oligocene.

Thus it appears that the Aquitanian as originally described by Mayer should be referred to the Oligocene.

The effect of this 1853 paper on other European Tertiary stage names should also be investigated. The terms "Moguntien," "Helvetien," "Dertonien" (? = Tortonian), "Placentien" (Plaisancian), and "Pedemontien" (? = Astian) are other names that are used for the first time.

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