fication in form would be quite natural on the supposition that the freshwater beds of Auvergne were referable to the Miocene epoch. The *Melanopsis* associated with the *Melania* in the hill of Gergovia is more allied to the *M. Dufourii* than to *M. buccinoides*; the *Unio* seems peculiar at present to the locality. In regard to the age of the Auvergne beds generally, I have not yet seen sufficient reason, whether from the nature of the mammalian, reptilian, conchological or vegetable remains imbedded in them, to abandon the idea of their being Eocene, although it is true that they exhibit some characters in common with the Miocene period.

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2. *Geological Position of the BITUMEN used in ASPHALTE PAVEMENTS.* By S. P. PRATT, Esq., F.R.S., F.G.S. &c.

THE bitumen which has been so extensively used for pavements, &c. is found in considerable abundance, and of the best description, at Bastenne, a small village in the south of France, about fifteen miles north of Orthez. The geological circumstances connected with its appearance being somewhat interesting, a short account of them may be desirable.

The country about Bastenne is formed of numerous small conical hills two or three hundred feet high, separated from each other by deep narrow valleys or ravines; they are chiefly composed of a coarse sandy limestone, which M. de Fresnoy places in the cretaceous system; their upper part consists of variously coloured sands and clays from fifty to sixty feet in thickness, the whole being covered by gravel and sand, which extends for many miles in every direction. The sands and clays are usually horizontal, but are occasionally much disturbed and highly inclined; whenever this occurs it is evidently owing to the protrusion of igneous matter, which is then found in connexion with them. The bitumen is worked in three localities near to each other, and the following section was made at the principal mine:—

Gravel.

12 feet of yellow sand, consisting of numerous thin layers, varying in colour—red, yellow and white.

2 feet of red and green clay.

24 feet of coloured sands as before.

1 foot of clay.

6 feet of sands as before.

4 feet of blackish sand containing a small quantity of bitumen.

5 to 15 feet of bitumen which varies much in character, the upper part consisting of looser and coarser sand, with a less proportion of the bitumen, while the lower part is more compact, containing finer sand, and being chiefly composed of bitumen.

10 or 15 feet of sand without bitumen occurs in some places, although where the bituminous sand is found of the greatest thickness, it then rests upon the sandy limestone, which forms the chief part of the surrounding country.

This section was taken on the side of the hill where the bitumen crops out, the upper beds being cut through to expose the bed; its extent is about 2000 feet by 900; it terminates suddenly in one direction, as the horizontal strata are cut off by a fault, by which the beds are elevated to an angle of 70° or 80° .

In the sands and clays no fossil remains have been met with except occasionally small pieces of lignite, and the bitumen is generally free from any extraneous matters, except in two localities, where numerous marine shells are found, which may be referred to the miocene period. In one of these, where the bed of bitumen is from ten to twelve feet thick, the shells are disposed in numerous layers at a few inches' distance from each other,—the shells of the same kind generally forming distinct layers, although occasionally, where the layer is thicker, many species occur together: where the mass has been cut through vertically, the appearance is very striking, bright white lines appearing on the black bed of bitumen. The shells are not broken or disturbed, nor are the valves separated from each other; they are, on the contrary, perfectly preserved, the most minute markings appearing upon them when freshly dug up, but (in consequence of the loss of the animal matter) they fall into powder upon being exposed to the air. Notwithstanding this, perfect casts may be readily procured, as they easily separate from the sandy mass. The bitumen has evidently been forced into them in a soft or liquid state, as the smallest cavities are filled, and this must have taken place after their deposition in the sands in which the animals lived. The date of this formation (as indicated by the numerous species which have been determined) may be referred to the miocene era; and as the eruption of bitumen is evidently connected with the appearance of the *ophite*, an igneous rock, which has produced such great changes in the Pyrenees, a limit may thus be obtained for these changes. The bitumen worked in the other localities appears under similar circumstances, except that no shells have been found in it; the bed is nearly horizontal, dipping slightly towards the centre, where it becomes of greater thickness; indeed it is said the depth has not been reached in one part where it is generally supposed to have risen from beneath. The bitumen is easily cut when first exposed, but in a few days it hardens so much as to become incapable of purification; the purification is effected by boiling the sandy mixture in a large quantity of water two or three times, when by continued and careful stirring the sand gradually settles to the bottom, while the pure bitumen rises to the surface and is taken off.

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3. *On the Occurrence of COAL in FORMOSA.* By — COOPER, Esq.

Specimens of this coal were exhibited to the meeting, but it did not appear from the notice under what geological conditions the coal existed.