J. B. TYRRELL ON THREE

was driven below the base of the sandstone and the water pumped out of it, the water from the sides worked under the bottom of the pipes, and, washing in, carried sand along with it, filling the well to a height of 70 feet.

In the sandstone some little particles of coal were said to have been struck.

Nos. 28, 29 and 30.—No specimens were obtained, but No 28 was described as a rotten grey shale, very soft and sticky when cut up by the drill; No. 29 as gritty, strong, black shale, and No. 30 grey shale, similar to No. 28. All through this shale were little bands of sandstone from three to six inches in thickness, and some of the shale was very similar to that overlying the sandstone. The beds evidently represent the base of the Dakota formation, which, in its typical area on the Missouri River, consists of alternating beds of shale and sandstone.

No. 31.—Six specimens of the drillings were kept to represent this 38 feet of rock, numbered in order from above downwards, but whether they represent the whole or only a part of the series is quite uncertain. The record as received gives a red shale similar throughout, from 412 to 440 feet; at 455 feet thin beds of grey shale begin to make their appearance, and lower down this is also stated to be intercalated with thin beds of limestone. The specimens were stated to be characteristic of the whole thickness of beds, and are as follows : No. 1 is a light bluish-grey, soft, argillaceous limestone, with a few grains of well-rounded, clear quartz sand. No. 2, the same, mixed with some red shale. No. 3, a brick-red calcareous clay in a finely divided condition. No. 4, a mixture of light-blue argillaceous limestone and red clay, pieces of soft white sandstone, and aggregations of small cubical crystals of pyrite. Among the washed material are some fragments of a hard, grey, even-grained limestone, large and small rounded grains of clear quartz, a fragment of whitish limestone very like the harder portion of the limestone at Grand Rapids near the mouth of the Saskatchewan river. No. 5, very similar to No. 3, but lighter in colour and not calcareous. No. 6, a mixture of red and blue clay, through which are scattered many little fragments of a hard, compact, light bluish-grey dolomitic limestone, a yellowish-white limestone containing a great number of grains of clear quartz sand, aggregations of grains of sand and crystals of pyrite, large but well-rounded grains of clear quartz, and a fine white and buff, well-rounded quartz sand.

No. 32.—A specimen labelled between 500 and 550 feet probably comes from this band. It is a soft, white, porous and apparently massive limestone, in which are a great number of small, flattened, sharply cut rectangular cavities, that have evidently been occupied by crystals of chloride of sodium. This rock contains no traces of organic remains, but small, clear crystals of quartz are quite plentiful.

No. 33.—This band is simply a downward continuation of the others, and several specimens were collected from it having the following characters :

- 505 feet.—A mixture of red and grey, very slightly calcarcous clay, with some small fragments of light brown sandstone.
- 509 feet —Similar clay, with fragments of limestone like No. 31. Also a whitish limestone, in which are fragments of cylindrical fossils like Colcolus, a fragment of a small shell like Pterinea, with other indistinguishable fragments of shells.
- 514 feet.—A mixture of light grey and red sandy clay, effervescing freely in H.Ol. Otherwise much like the last.

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