

length about ninety, as it stretches away westwardly, towards the base of the gloomy and dark range of mountains known as the Black Hills. Its most depressed portion, three hundred feet below the general level of the surrouning country, is clothed with scanty grasses, and covered by a soil similar to that of the higher ground. To the surrounding country, however, the Mauvaises Terres present the most striking contrast. From the uniform, monotonous open prairie, the traveller suddenly descends one or two hundred feet, into a valley that looks as if it had sunk away from the surrounding world; leaving standing all over it, thousands of abrupt, irregular, prismatic, and columnar masses frequently capped with irregular pyramids, and stretching up to a height of from one to two hundred feet or more. So thickly are these natural towers studded over the surface of this extraordinary region, that the traveller threads his way through deep, confined, labyrinthine passages, not unlike the narrow, irregular streets of some quaint old town of the European continent. Viewed in the distance, indeed, these rocky piles, in their endless succession, assume the appearance of massive artificial structures, decked out with all the accessories of buttress and turret, arched doorway and clustered shaft, pinnacle and finial, and tapering spire. One might almost imagine oneself approaching some magnificent city of the dead, where the labour and the genius of forgotten nations, had left behind them a multitude of monuments of art and skill. On descending from the heights, however, and proceeding to thread this vast labyrinth, and inspect, in detail, its deep, intricate recesses, the realities of the scene soon dissipate the delusions of the distance. The castellated forms which fancy had conjured up have vanished; and around one on every side is bleak and barren desolation. Then, too, if the exploration be made in midsummer, this scorching rays of the sun pouring down in the hundred defiles that conduct the wayfarer through this pathless waste, are reflected back from the white or ash-coloured walls that rise around, unmitigated by a breath of air or the shelter of a solitary shrub. The drooping spirits of the scorched geologist are not permitted, however, to flag. The fossil treasures of the way well repay its sultriness and fatigue. At every step, objects of the highest interest present themselves.

Embedded in the debris lie strewn, in the greatest profusion, organic relics of extinct animals. All speak of a vast fresh water deposit of the early tertiary period, and disclose the former existence of most remarkable races, that roamed about in bygone ages high up in the valley of the Missouri, towards the sources of its western tributaries; where now pasture the big-horned *Ovis Montana*, the shaggy buffalo or American bison, and the elegant and slenderly constructed antelope. Every specimen as yet brought from the Bad Lands, prove to be of a species that became exterminated before the mammoth and mastodon lived, and differ in their specific character, not alone from all living animals, but also from all fossils obtained even from contemporaneous geological formations elsewhere. Along with a single existing genus, the rhinoceros, many new genera, never before known to science, have been discovered, and some, to us at this day, anomalous families, which combine in their anatomy structures now found only in different orders. They form, indeed, connecting links between different orders. For example, in one of the specimens from this strange locality, we find united characters belonging now to three orders. Another, the *Oreodon*, has grinding teeth, like the elk and deer, with canines resembling omnivorous, thick-skinned animals; being, in fact, a race which live both on flesh and vegetables, and yet chewed the cud like our cloven-footed grazers!

Associated with these extinct races, we behold also, in the Mauvaises Terres, abundant remains of fossil Pachydermata, of gigantic dimensions, and allied in their anatomy to that singular family of proboscideate animals, of which the Tapir may be taken as a living type. These form a connecting link between the tapir and rhinoceros; while in the structure of their grinders, they are intermediate between the damon and rhinoceros; by their canines and incisors they connect the tapir with the horse on the one hand, and the peccary and hog on the other. They belong to the same genus of which the labors of the great Cuvier first disclosed the history, under the name of *Palæotherium*, in publishing his description of the fossil bones exhumed from the gypsum quarries of Montmatre, near Paris, but are of distinct species; and one at least, of this genus, discovered on the Bad Lands, must have attained a larger size than any which the Paris basin afforded.

A nearly entire skeleton of this animal was discovered, which measured, as it lay imbedded, eighteen feet in length, and nine in height. Besides these various remains of singular forms of Mammifera, there were also discovered many turtles, one of which was estimated to weigh a ton. These turtles were chiefly observed in a portion of the Bad Lands, some five or six miles in extent, which has much the appearance of an ancient lake. At one of these lake-like expansions, hundreds of fossil turtles were discovered.—*Ohio Statesman*.

WHAT IS COAL?—A curious case relating to a mineral, has lately occurred in Scotland, in which the opinions of many scientific men of the highest repute have been arranged against one another. The

main question between the parties, however, was whether the substance was or was not coal. On the part of the plaintiffs, Professors Ansted, Anderson, Mr. Braude, the celebrated chemist, Mr. Alexander Rose, the Rev. Dr. Anderson, Dr. George Wilson, and Dr. J. T. Cooper, were examined. They decided that the mineral was not coal. On the part of the defendants, Prof. Johnson, of Durham, Prof. Ramsay, of London, Professor Hoffman, Chemist in the Government School of Mines, Professor Fyfe, Dr. Douglas MacLagan, Dr. Gregory, Professor Frankland, Mr. Dickinson Government Inspector of Coal Mines in England and a number of other scientific, practical and operative witnesses, were examined. The result of their evidence was, that it was a coal of the Cannel or Parrot kind, differing in no essential respect from that sort of coal, but agreeing geologically and chemically with it in all its characteristics—that its component parts were similar to those which composed coal, its ash contained the same ingredients, and its combustion agreed in character. After the jury had been addressed by most eminent counsel on both sides, the Lord President summed up. The jury were to determine whether the substance in question fell within the term whole coal in the demise, for it was not pretended that it came within any other term specified in it. On the one side there were four geologists, who gave it as their opinion that it was not coal, and five on the other side, who said it was coal, all speaking with perfect sincerity, according to what they as geologists, classed as coal. Men of the highest reputation in geology and chemistry had been examined, but they differed very much in opinion. On one side there were five of the most eminent chemists, who had applied all their skill and energy to find out whether it was coal or not, and who had expressed themselves as clearly of opinion that it was not coal, while ten equally eminent on the other side, were of a diametrically opposite opinion. Is this substance, then, a coal or not, in the ordinary language of those who deal in it, and of the country? because, to find a scientific solution of it, after what has been brought to light for the last five days would be, he said, indeed a difficult thing. The jury, after retiring for about five minutes, returned with a verdict for the defendants, thus establishing that in their opinion, the substance in question was, in effect, coal, and removing altogether from the company the slightest imputation of concealment or deceit.

ARTIFICIAL FUEL MANUFACTURE FROM COAL REFUSE.—In the first place, the coal dust is thoroughly washed in a tank, fitted with a horizontal perforated diaphragm, beneath which it communicates with a cylinder and solid plunger, which being set in action by any prime-mover, an alternate motion is thereby given to the water, the coal-dust thoroughly washed, and all earthly matter, pyrites, schist, &c., fall to the bottom of the tank, which may be taken out by a lateral opening, and the water removed. The coal-dust is then dried, and passed between two grooved rollers, to reduce it to a uniform size. The next operation is to mix it with seven or eight per cent. of pitch in a heated state which is accomplished in a peculiarly constructed furnace. The heated vapours and products of combustion from a common furnace grate are made to pass under and through a circular chamber, in which is a revolving cast iron receptacle, with proper openings or gratings to admit the vapour, over which is a fixed rake, secured by rods and bolts. The operation may be thus described:—The prepared coal-dust is introduced into the receptacle by a properly arranged door, which, by the rotation and the rake, is uniformly spread over it. When the temperature of the coal has reached 200° Fahrenheit the valve of a pitch boiler, constructed over the furnace fire, is opened, and the liquid descends by means of a pipe into a long vessel, placed over the rake, from which it is distributed in a very uniform manner amongst the coal. When sufficiently impregnated and mixed, it is by an arrangement of traps and fixed scrapers allowed to fall into a receptacle beneath. From thence, while still hot, it is placed in cast iron moulds, of any convenient size, for the formation of the fuel brick, and subjected to a hydrostatic pressure equal to 45,000 lbs., producing a compact and solid mass, exceedingly economical for stowage, and which may be broken up for use as required.

PISCICULTURE.—M. de Quatrefages has communicated to the Academy some important researches bearing on different points connected with the artificial fecundation of the eggs of fishes. Assisted by M. Millet, of whom we have spoken in our last communication, he has first shown that the temperature of the water for fecundation, is a point deserving especial attention. This temperature varies for each species, and it is well to ascertain it for each separately. In general, for the winter fish, as trout, it is between 6° and 8° C.; for the early spring fishes, as pike, 8° to 10°; for the later spring, as perch, 14° to 16° C.; and finally, for the fishes of summer, as the barbel, 20° to 25° C. The necessity of a specific temperature is connected also with the vitality of the spermatozooids of different species, which is of short duration, it not exceeding 8 minutes in the pike, whilst in man it lasts 8 hours. The maximum temperature for the spermatozooids of the pike has been obtained at +2° C.; a higher temperature destroys them rapidly. The spawn of the pike is kept perfectly well in ice-water, and the