limestone of some recent geological period, and No. 39 consists of an aggregation of pebbles and gravel. The pebbles are of black siliceous slate, which are represented as forming a conglomerate with the limestone fragments just mentioned. The limestone specimens are probably broken fragments from some stratum *in situ* in the same vicinity, and the conglomerate is one of very recent formation. The slate pebbles are from a rock of much older date, and worn very round and smooth, while the limestone bears little evidence of attrition.

The gray siliceous limestone specimens contain a species of turritella, and a small bivalve shell. (See descriptions and figures.)

Longitude 115½°, latitude 43½°.—The two specimens from this locality are of volcanic origin. No. 46 is a reddish compact trap or lava, with small nodules or cavities filled with analcime and stilbite. No. 52 is a coarse and porous trap, or ancient lava.

Longitude 116°, latitude 43½°.—The single specimen from this place is a white feldspathic granite, with a small proportion of quartz, and black mica in small scales. The specimen contains a single garnet. The structure is somewhat slaty, and from appearances it is rapidly destructible from atmospheric agency.

Longitude 117°, latitude 44½°.—These specimens, from Brulé River, are numbered 4, 19, 41, and 48.

No. 4 is a slaty limestone, partially altered, probably from the proximity of igneous rocks.

No. 41 is of similar character, very thinly laminated, and of a dark color.

No. 19 is of similar character, but more altered, and partially crystalline. The lines of deposition are, however, preserved.

No. 48 has the appearance of a compact, gray feldspathic lava; but there are some apparent lines of deposition still visible, which incline me to the opinion that it is an altered sedimentary rock.

Longitude 117½°, latitude 45°.—The specimen is a compact, dark-colored basalt, showing a tendency to desquamate upon the exposed surfaces. This rock forms the mountains of Brulé River.

Longitude 117½°, latitude 45½°.—The specimen No. 110 is a fine-grained basalt or trap, with a few small cells filled with analcime. This is of the rock forming the Blue Mountain.

Longitude 118°, latitude 45°.—The single specimen (No. 43) from this locality is apparently an altered siliceous slate. It is marked by what appear to be lines of deposition, the thin laminæ being separated by layers of mica.

Longitude 119°, latitude 38½°.—The specimens Nos. 14, 23, 45, and 51, are all from this locality.

No. 14 appears to be a decomposed feldspar, having a slightly porous structure; it is very light, and adheres strongly to the tongue.

No. 23. A friable, argillaceous sandstone, somewhat porous upon the exposed surfaces.

No. 45. A compact lava of a sienitic structure, containing obsidian. This specimen appears much like some of the porous portions of trap dikes which cut through the sienitic rocks of New England.

No. 51. Feldspar, with a little black mica. The specimen is probably from a granite rock, though its structure is that of compact feldspar.

Longitude 120°, latitude 45½°.—The single specimen (No. 20) from this locality is a compact, fine-grained trap, or basalt, with a few round cavities of the size of peas.

Longitude 120½°, latitude 38½°.—The specimens are numbered 91, 109, and 117.

No. 91 has the appearance of a porous trap, or basalt, though possibly the production of a modern volcano. It is thickly spotted with crystals of analcime, some apparently segregated from the mass, and others filling vesicular cavities.

No. 117 is a compact basalt, the specimen exhibiting the character of the basalt of the Hudson and Connecticut River valleys.

No. 109 is a fine-grained granite, consisting of white quartz and feldspar, with black mica. Captain Frémont remarks that this rock forms the eastern part of the main California Mountain. From its granular and rather loose structure, it is to be inferred that it would undergo rapid decomposition in a climate like ours.

Longitude 121°, latitude 44½°.—The specimens from this locality are numbered 53, 54, 55, 56, 57, 58, 59, 60, and 61. These are characteristic specimens of the strata composing a bluff seven hundred feet high, and are numbered in the descending order.

The specimens 59, 60, and 61, are three specimens of what appears to be very fine clay, perfectly free from carbonate of lime, and nearly as white as ordinary chalk. These three specimens, which are understood to be from three distinct strata, vary but slightly in their characters—No. 61 being of the lightest color.

No. 58 is a specimen of grayish volcanic breccia, the larger portion consisting of volcanic sand or ashes.

Nos. 55, 56, and 57, are of the same character, being, however, nearly free from fragments or pebbles, and composed of light volcanic sand, or scoria, with an apparently large admixture of clay from the strata below. The whole is not acted on by acids, and, so far as can be judged, is of volcanic origin.

No. 58 is of similar character to the preceding three specimens, but contains more fragments, and has a generally coarser aspect.*

Longitude 121°, latitude 45°.—These specimens are numbered 7, 35, 40, 47, and 49.

No. 7 is a siliceous sinter, coated externally with hydrate of iron.

No. 35. A reddish, rather compact lava. The color is owing to the presence of iron, which hastens its decomposition on exposure.

No. 40. A reddish brecciated feldspathic lava, embracing fragments of light-colored siliceous sandstone or lava.

No. 47. Compact trap, or basalt, with a few rounded cavities. This specimen is precisely like No. 20, longitude 120°; and, from the description given, appears to be a prevailing rock along the valley of the Columbia River.

* The specimens Nos. 59, 60, and 61, which are from three different but contiguous strata, have since been examined by Professor J. W. Bailey, of West Point, who finds them charged with fluviatile infusoria of remarkable forms.

Below are descriptions (accompanied by a plate) of some of the most interesting forms, which were sketched by him with a camera-lucida attached to his microscope. It has not been considered necessary to distinguish, particularly, to which of the strata the individuals figured belong, as no species occur in one, which are not present in the others. They are evidently deposits of the same epoch, and differ very slightly in their characters.

Figs. 3, 2, and 4. Side views of *Eunotia librile* of Ehrenberg. The species is figured and described by Ehrenberg, who received it from Real del Monte, Mexico. It resembles *Eunotia Westermanni* (Ehr.), but differs in its granulations. The three figures are from individuals of different age.

Figs. 8 and 9. *Eunotia gibba* (Ehr.).—Identical with a common fresh-water species now living at West Point.

Fig. 10. *Pinnularia pachyptera?* (Ehr.).—Ehrenberg's figure of P. pachyptera from Labrador is very similar to the Oregon species here represented.

Figs. 12, 15, and 17. *Cocconema cymbiforme?* (Ehr.).—These are probably merely varieties of the same species. Fig. 8 is rather larger than C. cymbiforme usually grows at West Point.

Fig. 19. *Gomphonema clavatum?* (Ehr.).—Front view.

Fig. 20. *Gomphonema clavatum?* (Ehr.).—Side view.

Fig. 25. *Gomphonema minutissimum* (Ehr.).—A cosmopolite species.

Fig. 1. *Gallionella* (*new species*, *a*).—This is evidently identical with a large species which I have described and figured as occurring at Dana's locality. (See Silliman's Journal for April, 1845.)

Figs. 5 and 7. *Gallionella, new species?* δ (*a*—edge view; *b*—side view).—This species presents remarkably compressed frustules, which are marked on their circular bases with radiant lines. It is particularly abundant in Nos. 59 and 61.

Fig. 11. *Gallionella distans?*—This very minute species constitutes the chief mass of No. 60, but also abounds in Nos. 59 and 61.

Figs. 14 and 13. *Cocconeis prætexta* (Ehr.).—Appears to agree with a species from Mexico figured by Ehrenberg.

Fig. 16. *Fragillaria* ——.

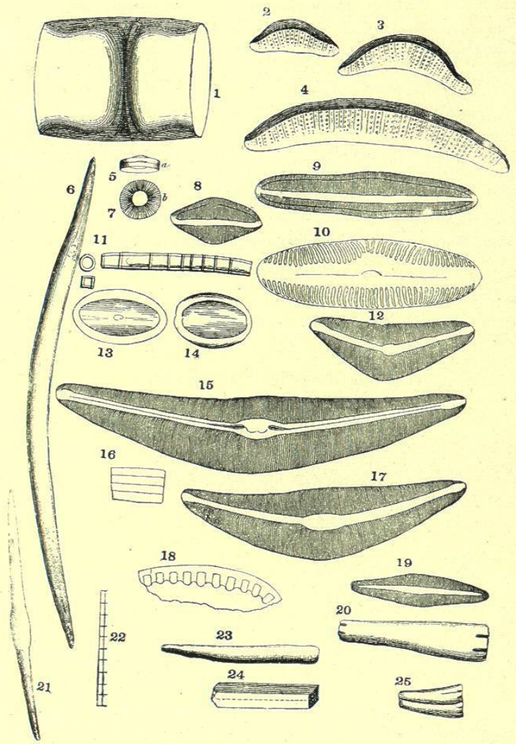
Fig. 18. *Surirella* ——.—A fragment only. I have seen several fragments of beautiful Surirellæ, but have not yet found a perfect specimen to figure.

Fig. 23. *Fragillaria rhabdosoma?*—Fragment.

Figs. 6 and 21. *Spiculæ of fresh-water sponges.*—Spongilla.

Fig. 24. Four-sided crystal of—— ?

Fig. 22. Scale=10-100ths of millimetre magnified equally with the drawings.



FOSSIL FRESH WATER INFUSORIA FROM OREGON.

No. 49. An imperfect striped agate, with the centre of siliceous sinter. This, with Nos. 7 and 40, is doubtless associated with the basalt, No. 47, which is the prevailing rock.

Longitude 122°, latitude 45½°; *Cascades of the Columbia River.*—From this place are the specimens numbered 9, 10, 13, 17, 18, 22, 24, 25, 27, 30, 36, 37, 38, and 44.

Of these specimens, Nos. 13 and 24 are indurated clay, with impressions of leaves of dicotyledonous plants.

No. 17 is a fine argillaceous sandstone, with stems and leaves, which still retain their fibrous structure.

No. 30 is a specimen of dicotyledonous wood, partially replaced by stony matter, and a portion still retaining the fibrous structure and consistency of partially carbonized wood.

Nos. 10, 25, 27, and 38 are specimens of coal from the same locality. (For further information of these, see analysis of specimens appended.)

No. 22. Carbonaceous earth, with pebbles, evidently a part of the formation to which the previous specimens are referred.

No. 18 is a compact trap, apparently having a stratified structure.

No. 36. A porous basaltic lava, with crystals of analcime, etc.

No. 37. Two specimens—one a porous or rather scoriaceous lava of a reddish color; and the other a compact gray lava, with a few small cavities.

No. 44. A brown scoriaceous lava.

No. 44*a*. A small specimen of compact lava.

Miscellaneous Specimens.

No. 62. A coral in soft limestone; the structure too much obliterated to decide its character. (From the dividing ridge between Bear Creek and Bear River, at a point 8,200 feet above tide-water.)

No. 71. Calcareous tufa, containing the remains of grasses, twigs, moss, etc.

No. 81. Calcareous tufa stained with iron.

No. 98. Ferruginous calcareous tufa, containing remains of twigs, etc.

These three last-named specimens are evidently the calcareous deposits from springs holding carbonate of lime in solution.

B—Organic Remains.

Descriptions of organic remains collected by Captain J. C. Frémont, in the geographical survey of Oregon and North California: by James Hall, palæontologist to the State of New York.

Plates I. and II.

Fossil Ferns, etc.

The specimens here described are all from one locality, in longitude 111°, latitude 41½°. They occur in a light-gray indurated clay, which is entirely free from calcareous matter, very brittle, and having a very imperfect slaty structure. Nearly all the species differ from any described in Brongniart's "*Hist. Veg. Foss.*," in Goppert's "*Systema Filicum Fossilium*," or in Phillips' "*Geology of Yorkshire*."

1. Sphenopteris Fremontii. Pl. 2, figs. 3, 3*a*. (No. 118 of collection.) Compare *sphenopteris crenulata;* Brong. Hist. Veg. Foss., i., p. 187, t. 56, f. 3.

Description.—Frond bipinnate (or tripinnate?); rachis moderately strong, striated; pinnæ oblique to the rachis, rigid, moderately approximate, alternate; pinnules subovate, somewhat decurrent at the base, about three-or four-lobed; fructification very distinct in round dots (capsules) of carbonaceous matter upon the margins of the pinnules; *3a*, a portion twice magnified.

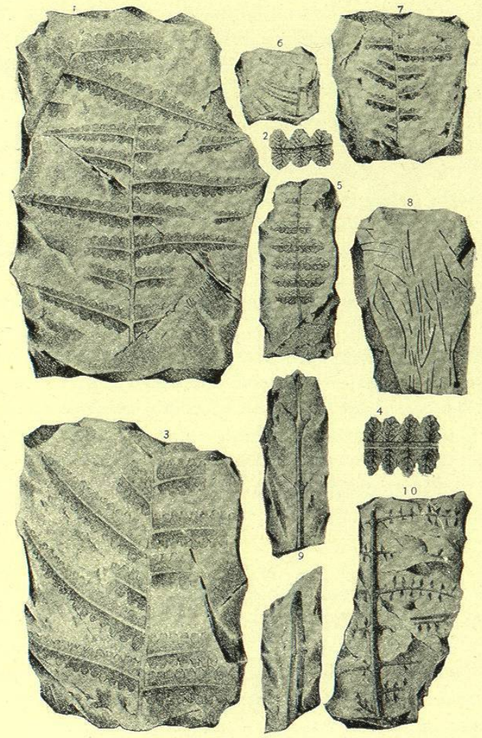
I have named this beautiful and unique species in honor of Captain Frémont, and as a testimony of the benefits that science has derived from his valuable explorations on the west of the Rocky Mountains.

2. Sphenopteris triloba. Pl. 1, fig. 10. (Nos. 65, 79, and 80 of collection.)

Description.—Frond bipinnate, or tripinnate; rachis slender, flexuous; pinnæ long, flexuous, distant, opposite, perpendicular to the rachis; pinnules oblong, subtrilobate, opposite or alternate, narrow at base, distant, perpendicular.

The distant, long, and flexuous pinnæ, with the small trilobate pinnules, distinguish this species. In general features it approaches somewhat the *sphenopteris rigida* (Brong.), but differs essentially in the smaller pinnules, which are usually nearly opposite, and in never being more than sub-trilobate, while in *S. rigida* they are often deeply five-lobed.

3. Sphenopteris (?) paucifolia. Pl. 2, figs. 1, 1*a*, 1*b*, 1*c*, 1*d*. (No. 118 of collection.)



FOSSIL FERNS.

Description.—Frond tripinnate; rachis rather slender, with long, lateral, straight branches, which are slightly oblique; pinnæ slender, nearly at right angles, alternate and opposite; pinnules minute, oval-ovate, somewhat distant, opposite or alternate, expanded or attenuate at base, sometimes deeply bilobed or digitate; midrib not apparent.

This species was evidently a beautiful fern of large size, with slender, sparse foliage, giving it a peculiarly delicate appearance. In some of its varieties (as fig. 1*b*) it resembles *Sphenopteris digitata;* Phillips' Geol. Yorkshire, p. 147, pl. 8, figs. 6 and 7; *Sphen. Williamsonii*, Brong., Hist. Veg. Foss., i., p. 177, t. 49, figs. 6, 7, 8. The fossil under consideration, however, is quite a different species. In the fig. 1*a*, the branches and pinnules are more lax; fig. 1*d* is a magnified portion.

In its general aspect this fossil resembles the genus *Pachypteris*, to which I had been inclined to refer it, but for the digitate character of the pinnules manifested by some specimens.

4. Sphenopteris (?) trifoliata. Pl. 2, figs. 2, 2*a*. (No. 86 of collection.)

Description.—Frond bipinnate; pinnæ trifoliate; pinnules elliptic, narrowing at the base; rachis slender, flexuous; fructification terminal, raceme-like, from the pinnules gradually becoming single and fructiferous.

Fig. 2*a*. Part of the fructiferous portion enlarged, showing the capsules, apparently immersed in a thickened pinnule. This is a most beautiful and graceful species, approaching in some respects to the *S. paucifolia* just described.

5. Glossopteris Phillipsii (?). Pl. 2, figs. 5, 5*a*, 5*b*, 5*c*. (Nos. 69, 82, and 86 of the collection.) Compare *Glossopteris Phillipsii*, Brong., Hist. Veg. Foss., p. 225, t. 61 bis, fig. 2; *Pecopteris paucifolia*, Phillips' Geol. Yorkshire, p. 119, pl. viii., fig. 8.

Description.—"Leaves linear lanceolate, narrow, narrowing toward the base and apex; nervules oblique, dichotomous, lax, scarcely distinct, subimmersed in the thick parenchyma." Brong., *ut sup.*, p. 225.

The specimen fig. 5 corresponds precisely with the figure of Brongniart, pl. 61 bis, fig. 5, both in form of the leaf and arrangement of the nervules, so as to leave little doubt of their identity. Fig. 5 is a nearly perfect leaf of this species; fig. 5*a* is the base of another specimen, having a long foot-stalk; fig. 5*b* is the base of another leaf with fructification (?); fig. 5*c*, the same magnified. This structure is so partial, that it can only with doubt be referred to the fructification of the plant; and it is not improbable that the same may be some parasitic body, or the eggs of an insect which have been deposited upon the leaf. Whatever this may have been,