other, *P. xanthipes*, is rather smaller, and has a short but very thickly furred tail. It is yellowish grey above, becoming fulvous on the lateral membranes and feet. The body beneath is greyish.

Ruminants.—M. Fontanier brought from Pekin a stag equal to *C. elaphus* in stature, and resembling that species in its general characters. It is distinguished by the more elongate form of the head, the greyer colour of the coat, and by the great development of the ischiatic patch, which is yellow. Hence the author names this species *Cervus xanthopygus.*—*Ann. Sci. Nat.* sér. 5. tome viii. pp. 374–376.

Notes on some Algæ from a Californian Hot Spring. By Dr. H. C. Wood, Jun., Professor of Botany in the University of Pennsylvania.

Some time since, Prof. Leidy handed me for examination a number of dried Algæ, which he had received from Prof. Seidensticker, by whose sister, Mrs. Partz, they had been gathered in the "Benton Spring," which is situated in the extreme northern point of Owen's Valley, California, sixty miles south-west from the town of Aurora. Afterwards a number of similar specimens came to me directly from Mrs. Partz by mail. The subject of life in thermal springs is one of so much general interest, especially in connexion with that of spontaneous generation, as to induce me to make a very careful examination of the material and offer the results to the readers of this journal. In this connexion the following extract from a letter of Mrs. Partz to her brother is very relevant:—

"I send you a few samples of the singular vegetation developed in the hot springs of our valley. These springs rise from the earth in an area of about 80 square feet, which forms a basin or pond that pours its hot waters into a narrow creek. In the basin are produced the first forms, partly at a temperature of 124°–135° F. Gradually in the creek and to a distance of 100 yards from the springs are developed, at a temperature of 110°–120° F., the Algæ, some growing to a length of over 2 feet, and looking like bunches of waving hair of the most beautiful green. Below 100° F. these plants cease to grow, and give way to a slimy fungus growth, though likewise of a beautiful green, which, finally, as the temperature of the water decreases, also disappears. They are very difficult to preserve, being of so soft and pulpy a nature as not to bear the least handling, and must be carried in their native hot water to the house, very few at a time, and floated upon paper. After being taken from the water and allowed to cool, they become a black pulpy mass. But more strange than the vegetable are the animal organizations, whose germs, probably through modifications of successive generations, have finally become indigenous to these strange precincts. Mr. Partz and myself saw in the clear water of the basin a very sprightly spider-like creature running nimbly over the ground, where the water was 124° F., and on another occasion dipped out two tiny red worms."

In regard to the temperatures given, and the observation as to

the presence of animal life in the thermal waters, Mr. Wm. Gabb, of the State Geological Survey, states that he has visited the locality, knows Mrs. Partz very well, and that whatever she says may be relied on as accurate.

The colour of the dried specimen varies from a very elegant bluish green to a dirty greenish and fuscous brown. After somewhat prolonged soaking in hot water, the specimens regained apparently their original form and dimensions, and were found to be in very good condition for microscopical study.

The plant in its earliest stages appears to consist simply of cylindrical filaments, which are so small that they are resolved with some difficulty into their component cells by a first-class one-fifth objective. Fronds composed entirely of filaments of this description were received. Some of these were marked as "first forms," and as having grown in water at a temperature of 160° F. Probably these were collected immediately over the spot where the heated water bubbled up. At this temperature, if the collection made is to be relied on as the means of judging, the plant does not perfect itself. To the naked eye these "first forms" were simply membranous expansions, of a vivid green colour and indefinite size and shape, scarcely as thick as writing-paper, with their edges very deeply cut and running out into a long waving hair-like fringe. Other specimens, which grew at a much lower temperature, exactly simulated those just described, both in general appearance and microscopical characters.

These, I believe, were the immature plant.

The matured fronds, as obtained by the method of soaking above described, were "gelatinous membranous," of a dirty greenish or fuscous brown at their bases, and bright green at their marginal portions, where they were deeply incised and finally split up into innumerable hair-like processes. Proximally they were one or even two lines in thickness, distally they were scarcely as thick as tissue paper. Their bases were especially gelatinous, sometimes somewhat translucent, and under the microscope were found to have in them only a few distant filaments.

Two sets of filaments were very readily distinguished in the adult plant. The most abundant of these, and that especially found in the distal portions of the fronds, were composed of uniform cylindrical cells, often enclosed in a gelatinous sheath. The diameter of such filaments varies greatly; in the larger the sheaths are generally apparent, in the smaller they are frequently indistinguishable.

In certain places these filaments run more or less parallel side by side, and are glued together into a sort of membrane. It is only in these cylindrical filaments that I have been able to detect heterocysts, which are not very different from the other cells: they are about one-third or one-half broader, and are not vesicular, but have contents similar to those of the other cells. In one instance only was I able to detect hairs upon these heterocysts.

The larger filaments are found especially near the base and in the other older portions of the frond. Their cells are generally irregu-

larly elliptical or globose, rarely are they cylindrical. They are mostly of an orange-brown colour; and there exists a particular gelatinous coating to each cell rather than a common gelatinous sheath to the filament. These larger threads are apparently produced from the smaller filaments by a process of growth.

Near the base and in the under portions of the fronds, these filaments are scattered in the homogeneous jelly, in which they run infinitely diverse courses. In the upper portions of the frond, and at some little distance from the base, the adjoining cells are very close to one another, and pursue more or less parallel courses, with enough firm jelly between to unite them into a sort of membrane.

This plant certainly belongs to the Nostochaceæ, and seems a sort of connecting link between the genera *Hormosiphon* of Kützing and *Nostoc*.

The best algologists now refuse to recognize the former group as generically distinct; and the characters presented by this plant seem to corroborate that view.

The species appears to be an undescribed one; and I would propose for it the specific name *Caladarium*, which is suggested by its place of growth. There are several species of allied genera, which grow in the hot springs of Europe; but no true *Nostoc* has, I believe, been found before in thermal waters. The following is the technical description of the species;—

N. caladarium, sp. nov.

N. thallo maximo, indefinite expanso, aut membranaceo-coriaceo vel membranaceo-gelatinoso vel membranaceo, aut læte viridi vel sordide olivaceo-viridi vel olivaceo-brunneo, irregulariter profunde laciniato-sinuato, ultimo eleganter laciniato; trichomatibus inæqualibus, interdum flexuoso-curvatis, plerumque subrectis et arcte conjunctis, in formis duabus occurrentibus: forma altera parva, viridis, articulis cylindricis, cum cellulis perdurantibus hic illic interjectis, vaginis interdum obsoletis, sæpius diffluentibus, instructa; forma altera maxima, articulis globosis vel oblongis, aurantiaco-brunneis, cellulis perdurantibus ab ceteris haud diversis.

Diam. Cellulæ cylindricæ maximæ $\frac{1}{10000}$ unc.; cellulæ perdurantis $\frac{1}{6000}$ unc.

Diam. Formæ primæ articuli maximi $\frac{1}{10000}$ unc.; cellulæ perdurantis $\frac{1}{6000}$ unc. Formæ secundæ articuli oblongi longi $\frac{1}{2000}$–$\frac{1}{3000}$ unc., lati $\frac{1}{5000}$–$\frac{1}{6500}$, articuli globosi $\frac{1}{3500}$–$\frac{1}{4000}$ unc.

Adherent to, and often more or less imbedded in, the fronds of the Nostoc, were scattered frustules of several species of diatoms, none of which was I able to identify. In some of the fronds there were numerous unicellular Algæ, all of them representatives of a single species belonging to the genus *Chroococcus*, Nägeli. This genus contains the very lowest known organisms—simple cells without nuclei, multiplying, as far as known, only by cell-division. These cells are found single or associated in small families; and in certain species these families are united to form a sort of indeterminate gelatinous

stratum. In this species the families are composed of but very few cells, surrounded by a very large, more or less globular or elliptical mass of transparent firm jelly. The species is very closely allied to *Chroococcus turgidus*, var. *thermalis*, Rabenh., from which it differs in the outer jelly not being lamellated.

The following is the technical description of the species :—

C. thermophilus, sp. nov.

Ch. cellulis singulis aut geminis vel quadrigeminis et in familias consociatis, oblongis vel subglobosis, interdum angulosis, haud stratum mucosum formantibus; tegumento crassissimo, achroo, haud lamelloso, homogeneo; cytioplasmate viridi, interdum subtiliter granulato, interdum homogeneo.

Diam. Cellulæ singulæ sine tegumento longitudo maxima $\frac{1}{1500}''$, latitudo maxima $\frac{1}{2300}''$.—*Silliman's Journal*, July 1868.

Description of two Sacculinidæ. By M. Hesse.

The author remarks upon the importance of the habitat of parasitic Crustacea in ascertaining their identity, and states that, with but few exceptions, these animals are strictly confined to particular species of Crustacea or fishes. He describes two new species of *Sacculinidæ* parasitic upon crabs.

Sacculinidia Gibbsii.

Larger than the examples found on *Carcinus mœnas*, being 25 millims. in length, 20 in breadth, and 10 in thickness. Its form is rounded quadrate, slightly flattened laterally; the pedicle, which is short, presents on each side two rounded protuberances, reverted towards the upper part of the body. The position of the *anal orifice* varies in consequence of the contractions of the body; it is generally placed directly opposite to the pedicle. Its construction is exactly as in the parasite of *Carcinus mœnas*.

The skin is thin, showing through it the meanders of the oviferous tubes. It has a velvet-like appearance, and is very tense. The *ova* are large, oval, and contain only a single vitellus. The *eye* appears as a red spot; at the middle of the body laterally are two round black spots, which always occupy the same place. The colour of the body is very deep yellow, with a reddish-brown tinge.

The specimen was found, in January 1867, on the abdomen of an example of *Pisa Gibbsii*, where it was not protected by the carapace. M. Hesse remarks that it is singular that the *Pisa* had not freed itself from its parasite, which it could easily reach.

Sacculinidia Herbstia nodosa (!).

Measurements, $25 \times 15 \times 5$ millims. Resembles the parasite of *C. mœnas* in form, but presents laterally two horizontal expansions, one forming a cylindrical process, the extremity of which is curved downwards like a hook. Anal aperture placed at the middle of the