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<p>126. <i>L. pachycarpa</i>, Duf.
 (sub <i>Biatora</i>.)
 2, 3. Sw., Hepp 234, 1857.
 5. Thallus, olive-green.</p> <p>127. <i>L. elata</i>, Sch.
 (sub <i>Biatora</i>.)
 2, 3. Sw., Hepp 256, 1857.
 5. Thallus (white, thick, crustaceous); greenish-yellow.</p> <p>128. <i>Arthonia pruinosa</i>, Ach.
 (<i>impolita</i>, Ach.)
 2, 3. Sw., Hepp 535, 1860.
 5. Thallus (white, mealy, crust-</p> | <p><i>Arthonia pruinosa</i>, Ach.
 taceous); deep lemon-yellow.</p> <p>129. <i>A. cinnabarina</i>, Fr.
 (<i>Coniocarpon gregarium</i>, Sch.)
 2, 3. Sw., Hepp 162, 1853.
 5. Natural crimson of both apothecia and thallus intensified.</p> <p>130. <i>Lecanactis illecebrosa</i>, Duf.
 2, 3. Sw., Hepp 533, 1860.
 5. Thallus, lemon-yellow.</p> |
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II. Notice of a Trip from Deyrah Dhoon to Jumnotri.

Part I. By MR WILLIAM BELL.

Having some leisure time in October last (1868), it occurred to me that I could not spend it more pleasantly or more profitably than in visiting the famous boiling springs on the hills at Jumnotri. Accordingly, accompanied by Mr Nelson of the Saharunpore Botanic Garden, I left Deyrah Dhoon about the 1st October, and reached Jumnotri in seven or eight days. Being rather pushed for time, we walked double marches both there and back. Our difficulties were increased by food being both scarce and bad. We expected that, after getting over the third range, and away from Mussoorie, game would be tolerably plentiful; in this we were sadly mistaken. In every village we passed through, however, we found one or two men who made a living by the gun. Collecting pheasants' (chiefly Monaul) skins, and musk, gives employment to a great many. We heard of a Mr Wilson who has amassed a large fortune from the proceeds of the skins and musk which he sends to the London market. For the purpose of collecting these he is said to employ no fewer than eighty men. Mussoorie is tolerably well supplied during the summer season with game, which is brought from a great distance. Many gentlemen employ men for the sole purpose of supplying their tables with birds, and these men spare neither age nor sex; and what makes matters worse is, that the time when game is in greatest demand, and of course the greatest quantity killed, is during the breeding season. Such being the case, it is not surprising that some of the fine Himalayan pheasants in that district are fast becoming extinct.

The same class of men, both on the hills and on the plains (who are thus destroying the game), have not a little to do with that pernicious system of forest burning which has already done so much towards the ruining of the Indian forests. The northern slopes of the first, second, and third ranges are pretty well covered with oak and rhododendron, while the southern slopes of the second and third ranges are extremely bare, with only here and there a few starved-looking Euphorbias, Viburnums, &c. In some of the large ravines there are a few stunted trees and scrub. These ranges have all apparently, at one time, been cultivated to their very summits, by a system of terracing; but the terraces are generally so badly constructed that the soil gets washed down. Many of the fields now in cultivation have exactly the appearance of a newly metalled road, the soil having all been washed away, and only the stones left—the whole presenting an appearance very similar to that of a mixture of sharp gravel and road-metal. Land in such a state seems quite unfitted for rice or wheat, which is generally cultivated on soils, close to the villages, better levelled and better manured. For rice cultivation, the villagers are much more careful in terracing, levelling, and constructing water-courses, than for cultivation of any other kind. On those fields where the soil has been partially—in some cases it might be said wholly—washed off, Panicum, Phaseolus, and Amaranthus (several varieties or species), thrive most surprisingly. All of them are remarkably handsome, particularly an Amaranthus, of a deep purplish colour, with pendant spikes $1\frac{1}{2}$ to 2 feet in length. On the third and fourth ranges patches of forest of considerable size are cleared for its cultivation. Its peculiar colour attracts notice at a considerable distance, contrasting markedly with the green all around. Still further back, and at higher altitudes, the common buckwheat, and also a Chenopodium, are extensively cultivated. The leaves as well as the seed of the latter are used. What its specific name is, I have no means of ascertaining. Much has been said lately about the great advantages likely to be derived from the introduction of *Chenopodium Quinoa*, a South American food-plant. It is a matter for surprise, that those gentlemen who expect such great things from the introduction

of the American species have given no statement of its value as compared with the Indian species. It seems strange that the Indian one should be extensively cultivated on the ranges just under the snow, and no notice taken of it by those who speak of the supposed advantages to the hill districts of the American plant. If the latter plant possesses all the qualities attributed to it, its introduction would be a great advantage, at least for cattle-feeding. In many of the villages they have nothing during snow-storms for that purpose, except oak and mulberry twigs, and the leaves of a *Ferula*? A stem of the latter, that had been broken about the middle of an internode, presented a remarkable appearance. The break was about five inches above a leaf, and as much beneath one, and from the broken surface (not from the axil of the leaf beneath) arose a great number of buds, some having two or three minute leaves on them. It looked exactly as if they had sprung from the ends of the broken vessels.

The further back one goes, the more steep do the southern faces of the ranges seem. This is most observable where the rock is quartzose. They are also drier, as the strata all dip north or north-east; and the northern slopes become flatter, better wooded, and better watered. Some of the precipices along the course of the Jumna look really frightful; being almost perpendicular walls of rock, probably more than 1000 feet high. The waterfalls, too, must be striking during the rainy season. Although there cannot be any great body of water rushing over them, still their great height will always render them marked objects to the tourist. Some of them have, perhaps, not less than 500 feet of an uninterrupted fall.

It is not until after crossing the third and fourth ranges that the *Deodar*, *Abies Morinda*, and *Pinus excelsa* are observed. *Pinus longifolia* covers some of the slopes exclusively. It also occurs on the Sewalick range, and likewise does well on the plains. In those districts where it occurs, the collecting of resin from the growing trees, by barking and charring them, seems to form no inconsiderable branch of industry. On most of them the foliage acquires a yellow colour after the bark has been stripped off at the base, for about one-half the circumference of the tree, and

a fire applied. Judging from the great number of trees on the ground, such a practice seems to be highly injurious to their health and longevity. At one place on the banks of Jumna a considerable deal of felling had been done, and, judging from the great length of the stumps left standing, that must be rather difficult work. The fellers do not seem to have troubled themselves much about the direction in which the trees came down. In accordance with native ideas, it seems entirely left to fate;—whether they smash other trees in their fall, or get smashed themselves, is equally a matter of indifference to them. They seem to think that it is not in their power to prevent a tree from falling in one direction rather than another, even over a precipice, and that there is no need for care in this respect, as there are plenty trees in the forest.

It has been already remarked that, on account of the steepness of the slopes, where terraces were badly constructed, the soil soon gets washed away. In many places terraces are not constructed at all, and where such is the case, cultivation is carried on for two or three years, and then a fresh piece of forest cleared. The system of clearing practised is to girdle the trees, lop off the branches, and allow the trunks to remain standing. These operations are generally performed the year previous to breaking up. Oak seems to stand such hard usage much better than pines. The former sometimes recovers from such treatment, while the pines never do. After the oaks have been headed over and girdled, an insect—I cannot say whether a beetle or a grub—attacks them most vigorously. Handfuls of gnawed wood, resembling sawdust, may be gathered round the roots of the tree. Under such a vicious system, it is not a matter for surprise that large tracts of forest are fast disappearing. Did seedlings come up and occupy their place, the case would be quite different, but such is not the case. Only scrub succeeds cultivation; indeed the very cause—want of soil—that rendered these cleared tracts unfit for cultivation also renders them unfit for again supporting forest trees. There is something melancholy in the appearance which these headless, branchless trunks present to the stranger. Trunks which had lately been fine symmetrical trees of *Abies Morinda*, 100 to 150 feet high, and

as straight as an arrow, are seen standing without a branch, partly denuded of bark, and as dry as tinder. Thus they remain until the roots become so rotten that they will no longer support the trunk, and then these princes of the forest, which have withstood many blasts, fall, and lie until they crumble to dust.

From many of the localities now alluded to, the timber could not be floated; from others, it perhaps might, although only with great difficulty, as the streams are very rapid, and their courses crooked and rocky; and until timber sells at a much higher price than it now does, it would not pay to transport it by coolies. However, prices seem to be still rising, and good timber year by year is becoming scarcer. Some enterprising Yankee may yet make a fortune by shipping pine from Vancouver Island or British Columbia for the use of the public works department in India. If these magnificent trees were only valuable as timber, it might be of comparatively small importance whether they were growing or rotting, but if they are subservient to other valuable ends in the economy of nature, they cannot be too carefully preserved. As to whether or not they in any way affect the rainfall of a district, there is some difference of opinion, but none regarding the influence they exercise over the regularity and abundance of the flow of the springs in a district. Every drop of the upper waters of both the Ganges and Jumna is taken up during the hot season for irrigation purposes, and they are far too little for the wants of the districts through which the canals pass. Until the minimum supply be increased, general irrigation cannot be extended. That system of wholesale destruction of forests now in operation, only for the purpose of keeping alive a wretched system of cultivation—of which laziness is the parent, and, if report be true, misrule the supporter—is fast making the districts in which it is practised treeless wastes, or, at best, only partially covered with scrub such as *Prinsepia*, *Berberis*, *Indigofera*, &c., which will tend to diminish, not to increase, the water supply for hot-weather irrigation.

I may remark, for the benefit of those who are not well acquainted with Indian geography, that the forest tracts now spoken of lie in western Ghurwal, which is under the

benign rule of the Teera Rajah ; but whether they are under the supervision of the Government forest officers or not, I cannot say. I have heard that some of them are. Near Byratt, there seems to be a considerable deal of timber felled, and under the supervision of qualified forest officers, felling seems to be done promiscuously. The young trees are taken as well as the old—at least I infer so, from the fact that no young trees worth speaking of are to be seen on tracts that had lately been cleared of old timber. There may have been none to leave in that district ; still, as a rule, where there are old trees, there are also young ones. Perhaps the idea may have occurred that it was better to make a clean sweep at once, and thus save the cultivators the trouble of clearing.

III. *Remarks on some Deep-Sea Dredgings, transmitted by*
Captain WILLIAM CHIMMO. By Professor DICKIE.

The dredgings, which were taken by Captain Chimmo from great depths in the Atlantic, immediately under the Gulf Stream, at 2000 fathoms, in latitude $47^{\circ} 3'$ north ; longitude, $23^{\circ} 21'$ west, and at 600 fathoms in latitude $45^{\circ} 42'$ north, and longitude. $47^{\circ} 39'$ west, had been minutely examined by Professor Dickie. He found that in the matter from 2000 fathoms there were two Diatoms—one identical with *Coscinodiscus minor*, and the other a species of *Cocconeis*, which he had not yet determined. He had treated some of the material with weak acid, in order to judge, from the amount of sarcode left, whether the foraminifera (which were abundant) were living, or merely the shells after death and decay. He had come to the conclusion that they were living, but whether the Diatoms mentioned were so he could not say. Among the sarcode he found several species of *Polycystina*, mostly in fragments. Specimens of the dredgings were shown under the microscope.