MISCELLANEOUS, &c.

I.—*Notices of the Natural Productions and Agriculture of Cashmere.* From the Manuscript Papers of the late Mr. William Moorcroft.

Of bread corn, Cashmere produces wheat, barley, buck-wheat, millet, maize, pulse, amaranthus, and rice; but the latter being raised in great quantity may be considered as the staple.

Turnips, spinach, loose-leaved cabbages, lettuces of the same description, and other common vegetables, raised partly in the usual way, and partly by the ingenious, yet simple contrivances of platforms floating on lakes, with the fruits of the forest or deserted garden, as apricots, peaches, plums, cherries, apples, pears and grapes, along with the Singhara, or prickly water-nut,* constitute the principal support of the very numerous population of the lower classes, who unfortunately have little means of indulging in bread corn.

Sheep are plentiful in Cashmere, the fat being particularly white, the meat dark-coloured, well-flavoured, and might be sold very cheaply were it not for the tax laid upon butchers, and upon the mutton which is brought in for sale.

Cashmere has been formerly one immense lake, the subsidence of the waters of which is distinctly defined by horizontal lines on the face of the mountain. The nature of the composition of the highest and primitive mountains which form the great outer belt of Cashmere, is not thoroughly known to me; but the rocks of the interior line are of secondary formation, and consist, to a great extent, wholly of indurated clay. The bottom of the basin is covered with a deep coat of alluvial clay, which, in its progress towards the surface, is mixed with vegetable earth; and the latter, under very slight labour, breaks down into a rich and most productive mould, which, when neglected after having been cultivated, throws up a thickly matted sod of fiorin or doob grass, little mixed with rank herbage, except in the immediate vicinity of unreclaimed forests.

Many thousands of acres skirting the foot of the hills are covered with apple and pear trees, and vines in full bearing, but without owners.

No copper-mine is worked in Cashmere; but it is said that the

* The dhul or lake of Ooller yields annually from ninety-six to a hundred and twenty-eight thousand ass loads of this nut, of which Runjeet Singh's share, without any expense, realizes a lac of rupees.

existence of this metal is known to several individuals, although kept secret, lest it should become to the government an additional source of profitable oppression. Copper is now imported principally by the way of Lahour, partly of British and partly of Russian origin, and necessarily dear. The mountains of Mooz Tagh yield a copper ore under the form of a carbonate of malachite, which has given fifty per cent. of pure metal. But as no coal has been discovered, and there is but little wood, small portions of this ore are carried off by travellers merely as curiosities.

There are, at present, no lead-mines either worked in Cashmere; and as there is little demand for this metal, it is scarce and dear. However, there are rich veins in situations in Ladakh, where, contrary to the general character of this country, fuel abounds.

Iron is found in Cashmere in considerable quantity, but it is said to be somewhat *red* and *short*, qualities of which it might be readily divested, were it required for work in which they would be inconvenient. It is stated that iron for gun-barrels is imported from Bagmeer, or Bajoura, a circumstance of which I am not fully convinced, as one of my informants had an interest in enhancing the value of iron; and he was contradicted by the testimony of others. At present the Cashmerees are unacquainted with the art of making any other castings of this metal than small shot in a slovenly manner for fowling-pieces; but, with suitable instructions, they would speedily learn to make iron shot for ordnance, as they are extremely ingenious imitators.

The forges of the gunsmiths are constructed in a manner which economises fuel, defends the work from cold air better than those commonly employed in Britain, and thus saves the metal in a greater degree from seeling; whilst the manipulations adopted for purifying and toughening the iron are, probably, not excelled in any country. The forests of Cashmeer abound with walnut, the oriental plane, and with other kinds of wood, well suited for gun-stocks. The walnut is of a much more open grain in its uncultivated state than that of Britain; but by cultivation, and by an ingenious mode of treatment practised during its growth, its wood is rendered suitable for this application.

Although Gurhdokh and the neighbourhood of the Yarkund might furnish abundance of agate, flints are imported from Hindostan only, and principally the blunted flints of the British Sepahees. And though the Cashmeree workmen have not made a great proficiency in the art of reducing them into a very regular form, yet they are capable of bringing them into a shape, which with the aid of stiff springs, and a long range of the cock in the locks now manufactured in this city and in Lahour, is not ill adapted to its object.

Sulphur is now imported into Cashmere from the Punjab, and

is of high price. Charcoal is obtained at a very easy rate; and the foundations and other remains of ruined buildings are numerous enough to supply a sufficiency of saltpetre for gunpowder. In the manufacture of this, however, when I was at Lahour, the Sikhs displayed no great skill; but the process is since, I believe, improved.

In Cashmere several varieties of timber may be met with fitting for gun-carriages, and the carpenters are adepts in the employment of the adze and chisel, though little skilled in the use of the saw, auger, or plane.

Through the limited scope for the employment of human labour in agriculture and the arts, in proportion to the population of Cashmere, many of the lower classes are driven to compete with quadrupeds in carrying burdens; and hence, as well as from the internal navigation, the breed of horses in this country has greatly fallen off both in numbers and quality.

Of the Management of Bees in Cashmere.—Every farmer in Cashmere has several bee-hives in his house, and in some houses I have counted as many as ten.

A provision is made for these in building the house, by leaving appropriate cavities in the walls, which somewhat differ in size, but agree in their general form, each being cylindrical, and extending quite through the wall. The tube thus formed is lined by a plastering of clay mortar, about an inch in thickness, and the mortar is worked up with the chaff or husk of rice, or with the down of thistles, which latter is employed also for clay mortar in general, being the first application of this substance to the use of man which I have yet witnessed. The dimensions of a hive are, on an average, about fourteen inches in diameter, and when closed at both ends about twenty or twenty-two inches in length. That end of the cylinder nearest the apartment is closed by a round platter of red pottery ware, a little convex in the middle, but with the edges made flush with the wall by a luting of clay mortar; and the other extremity is shut by a similar dish, having a circular hole about a third of an inch in diameter in its centre.

It does not appear that there is any particular rule for the height of these hives from the ground, as they are sometimes confined to the walls of the lower or basement story, generally appropriated to cattle in the farm-houses of Cashmere; at others are inserted into those of the first floor, and are frequently seen in both situations in the same house, as well as in the walls of its outbuildings. So little difference exists betwixt the practices ordinarily pursued in Cashmere and in Europe, in respect to hiving new swarms, as not to call for notice; but that adopted here for preserving the old swarm when the honey is taken, well deserves

imitation by other bee farmers. Although the season for taking the honey had passed when I visited Cashmere in the beginning of November, the cottagers indulged my wish of seeing the process by which this was effected, with little injury to the bees, and with perfect safety to the individuals concerned in its management, and which was as follows :—

Having in readiness a wisp of dry rice-straw, and a small quantity of burning charcoal in an earthen dish, the master of the house, with a few strokes of the point of a sickle, disengaged the inner platter of the tube, bringing into view the combs suspended from the roof of the hive, and almost wholly covered with bees, none of which, however, offered to resent the aggression, or to enter the room. Having placed the straw upon the charcoal, and holding the dish close to the mouth of the hive, he blew the smoke strongly against the combs, but removed the straw the instant it took fire, to prevent it burning the bees, and quenched the flame before he employed it again. Almost stifled by the smoke, the bees hurried through the outer door with such rapidity that the hive was cleared of its inhabitants within a few minutes; when the farmer, introducing the sickle, cut down the combs nearest to him, which were received into a dish previously slidden underneath them, and left undisturbed about one-third of the combs which were almost close to the outer door. He then replaced the inner platter, and brushing off hastily a few bees which clung to the combs, though apparently in a state of stupefaction, threw them out of the house. Observing many other bees lying motionless on the floor of the hive, I inquired whether they were dead or only stupified, and was answered that they would recover; however, I was not wholly satisfied that this recovery would take place: preparations for continuing my journey at a very early hour on the following morning having unluckily prevented my examining the spot where they had been thrown, until poultry had for some time been feeding near it.

The expelled bees returned as soon as the cavity was freed from smoke without stinging a single individual; and the whole business was completed within ten minutes, without, as was asserted, any perceptible loss. The honey was light-coloured, and of a taste as pure and sweet as that of Narbonne. It possessed less of the cloying quality generally attending this substance than any other I recollect to have met with; and I could not learn that the farmers had any suspicion of its ever being intoxicating or poisonous, as is the case occasionally with that made by the Bhoura (apis irritabilis), or large wild-bee in the northern mountains of Gurwhal, from feeding, as it is reported, on the flower of the monkshood. I was directed more particularly to inquiry upon this subject by

having observed this plant in flower in the valley of Runga, a few miles to the eastward of the bee district, and think it probable that it extends to these mountains.

The peasantry of Cashmere are unacquainted with the employment of honey as the basis of a fermented liquor, but eat it raw or mixed with articles of common food, whilst the most wealthy substitute it for sugar in preserving fruits. It is customary to take the hive every year, and the end of September or beginning of October is found the best season for this operation; a little time still remaining for the bees to add to the portion left for their support during five months. This amounts to about one-third of the whole produce, and would appear to suffice, as swarms seldom die, and the Cashmerees substitute no other article for food. It is stated that an old swarm yields more honey than a young one, and that families seldom die except of old age. I was informed that it was no uncommon circumstance to preserve the same community for ten and even for fifteen years, and some instances were quoted of a family having been retained for twenty years; but this was held to be of very rare occurrence. In consequence of the bees being thus literally domesticated, they acquire a mildness of conduct far more decided than those of Europe; and it is possible that the confidence thus gained, subduing their natural irascibility, may generate an increase of industry, or, at least, an increase of produce in relation to the number and size of the individuals of each community. It is also clear that the situation of the hive keeps many of the natural enemies of the bees at a distance.

The bee of Cashmere is a little smaller than that of Europe, though a little larger than the domesticated bee of Kumaoon and of Gurwhal.

The Bhoura, the rock-bee of Gurwhal, or the bee of the southern mountains, is, on the other hand, greatly larger than the domesticated bee of Europe, and greatly exceeds it also in the number of individuals in each community, and in the size and weight of its combs. But its honey is sometimes contaminated by an intoxicating quality, and the temper of the insect is so irritable as to be brought into a dangerous activity by a slight show of aggression. The former quality is suspected, upon probable grounds, to be caused by the secretion of the aconite eaten by this bee; and its irritability of disposition to be owing partly to the exposed situation of the combs suspended from the lower surface of a ledge of rock, and partly to the occasional attempts of bears to carry them off. Both these detractions from the merit of this bee are merely the result of localities; and, under due precautions, it is presumed that its irascibility might be so far subdued as to render it just as safe an inhabitant of a wall hive as the smaller variety of bee. In a portion of the Punjab, near the hills,

this bee is also met with; and I have seen the under surface of the principal branches of a large Peepul tree studded with so many colonies, individually of such great strength, as to deter the neighbouring peasantry from attempting to deprive them of their stores, notwithstanding it was conjectured that there were several hundred-weight of combs on the tree. The largest of these assemblages of combs, the probable accumulation of several seasons, was of such a size as I think it not prudent to cite; but from the specimens I have seen of the produce of this bee I conceive their domestication, if introduced into Europe, would prove a most valuable acquisition to this branch of farming, although I must confess myself unable to devise any safe and easy plan for transporting such a colony.

Of the Floating Gardens of Cashmere.—The city of Cashmere is situated in the midst of numerous lakes, connected with each other, and with the river Vedusta, by canals, separated by narrow lines and insulated plots of ground; in some localities so far raised above the water-line as to be out of danger of submersion on any rise of the water; but the greater portion lying so low as to be subject to be drowned, in considerable inundations, which are not uncommon, and, indeed, become annually more frequent, through the neglect of the government in not checking the accumulating growth of weeds and mud, which diminish the depth of the lakes, and consequently increase their surface.

These circumstances have suggested an expedient by which certain vegetables are cultivated in safety, and so that they derive as much moisture as may be beneficial to them without being exposed to the risk of being destroyed. This is effected through the medium of a floating support, of which the buoyancy and flexibility prevent the plants sinking into the mass, or being partially covered with it. Various aquatic plants spring from the bottom of the lakes, as water-lilies, confervæ, sedges, reeds, &c.; and as the boats which traverse these waters take generally the shortest lines they can pursue to the place of their destination, the lakes are in some parts cut, as it were, into avenues separated by beds of sedges and reeds. In these places, then, the farmer establishes his cucumber and melon-floats, by cutting off the roots of the aquatic plants just mentioned about two feet under the water, so that they completely lose all connexion with the bottom of the lake, but retain their former situation in respect to each other. When thus detached from the soil they are pressed into somewhat closer contact, and formed into beds of about two yards' breadth, and of an indefinite length. The heads of the sedges, reeds, and other plants of the float are next cut off and laid upon its surface, and covered with a thin coat of mud, which, at first interrupted in its descent, gradually sinks into the mass of matted roots. The

bed floats, but is kept in its place by a stake of willow driven through it at each end, which admits of its rising and falling in accommodation to the rise and fall of the water. By means of a long pole thrust amongst the reeds at the bottom of the lake from the side of a boat, and turned round several times in the same direction, a quantity of confervæ and of other plants are torn off from the bottom and carried in the boat to the platform, where the weeds are twisted into conical mounds about two feet in diameter at their base, and of the same height, terminating at the top in a hollow, which is filled with fresh soft mud drawn from the bottom of the lake, to which sometimes wood-ashes are added, though much more frequently omitted. The farmer has in preparation a number of cucumber and melon plants, which have been raised under mats, and of these, when they have four leaves, he places three plants in the basin of every cone or mound, of which a double row runs along the edge of every bed at about two feet distance from each other. No further care is necessary except that of collecting the fruit; and the expense of preparing the platforms and cones is confined to the value of the labour, which altogether is trifling, as the work is very soon done. Perhaps a more economical method of raising cucumbers cannot be devised; and though the narrow beds are ordinarily almost in contact by their sides, yet, from their flexible nature, they are so easily separable that a small boat may be readily pushed betwixt the lines without injuring their structure; and, for the most part, they will bear a man's weight, though generally the fruit is picked off from the boat. I traversed a tract of about fifty acres of these floating gardens in cucumbers and melons, and saw not above half a dozen unhealthy plants; nor have I seen, in the cucumber and melon grounds, in the vicinity of very populous cities in Europe or in Asia, so large an expanse of plant in a state equally healthy, though, it must be observed, running into somewhat too great luxuriance of growth.

It is presumed that the onion may be raised largely also in this manner, from the fact of my having met with a variety in Ladakh growing in swamps, and which, from its habit and from the colour of its flower, I have named the golden-headed swamp onion, of which some seeds are now transmitted. And perhaps water-culture may be found susceptible of being extended to many other plants besides these. The traveller who finds the water-melon of vast size buried in the hot and dry sand of the desert would not be readily tempted to conclude that it could be raised in nearly equal luxuriance of growth in the cool and humid atmosphere of a floating garden. Yet the fact points out an accommodating power in the constitution of this plant, which may be as largely found in others where at present it has not been supposed to reside. And the subject is of extreme importance, the water sur-

face of our islands having never been suitably called upon to contribute its share of produce to the maintenance of our population*.

On one of my visits to these floating gardens I observed that the stems of many plants had been newly earthed up with a few handfuls of black mud brought from the bottom of the lake. The general depth of the floating beds, or mass of reeds and of earth taken together, was about two feet, and some of the beds were about seven feet broad. The general arrangement was a line of cucumber cones bordering each edge, and one of water or of musk-melon along the middle. The melon plants were peculiarly strong, and their cones were wound round with a fresh addition of confervæ and of other weeds, so as to give to each about five feet in diameter. The season lasts for three months and a half, beginning in June. The fruit is seldom or never pulled in the small or girkin state, and differs in weight, when of a proper age for the market, from about eight or ten ounces to a pound and quarter, or

* If, in Asia, the traveller visit certain bathing places held as holy, and in which the fish are respected and fed, he will judge more correctly, even by the eye, than can the most experienced angler in Europe of the general difference in the condition of fish produced by a suitable allowance of food daily. And if he have the good fortune to possess a little interest with the officiating priest, through suitable management he may enjoy a proof, still more convincing, of the superiority in quality of those steadily and plentifully fed over those depending for support on an interrupted and incidental supply,—a superiority just as marked as that possessed by the white Dorking fowl, or by the Poularde de Caux, or of Boyeux, over the ill-fed barn-door fowl of their respective vicinities.

I have, in another place, noticed the Singhara or water-nut of the Ooller lake, of which the proportion which falls to the Renter of Cashmere yields above a lac of rupees a year. That the water-nut would flourish equally well in the lakes and ponds of Europe, by analogy with the climate of Cashmere, I entertain not the smallest doubt; but having a suspicion—though only a suspicion—of this nut being somewhat connected with the derangement in the alimentary canal so common in Cashmere, I dwell less upon it than its profitableness invites me to do, although it is possible that I may have taken up the idea too hastily. As a food for hogs, the Singhara may be very valuable; it is most largely productive, and gives considerable occupation to fishermen, who for some months are wholly employed in bringing it up from the bottom by nets somewhat similar to the landing net used for the taking fish out of stews. Some of the nuts are forwarded for trial, and nothing further is required than to throw them into the water. The decaying colour of the leaves indicates the ripeness of the nut, and the extracting them lasts from eight to nine months. But its long and sharp prickles prevent its being eaten, even by the hog, before the kernel be divested of its hard *skin* or *shell*.

The leaves of all the varieties of the Nymphæa lotus, or great water-lily, have thick fleshy stems pierced in their whole length by cylindrical tubes containing a small portion of mucilage. In the autumn, after the plate of the leaf has begun to decay, the stem has acquired its full maturity, and, being boiled till tender, constitutes a wholesome, nutritious, and, I had almost said, palatable article of food.

It may be said that water-nuts and lotus-stalk are likely to prove but a limited resource; but in answer it may be remarked, that about thirty thousand individuals are here almost wholly supported by the former for five months out of twelve, and about five thousand persons live upon the lotus-stalk for nearly eight months in the city alone. The quantity of food capable of being raised from an acre of water thickly planted with the Nymphæa nebumbo, and with the water-nut, amounts to some tons.

a pound and half. From the first setting of the fruit to the time of pulling, seven or eight days are the ordinary period. Having been much acquainted with the unwillingness of the farmers of the east to make a true report of the produce of their farms, I employed a servant of mine, who lived amongst the water-gardeners, to obtain an accurate account of the yield of a cone. He stated, that in answer to his inquiries, the gardeners acknowledged that thirty full-sized fruit from each plant, or from ninety to a hundred from each cone, were the average crop in the season. In the early part cucumbers of full size sell at the rate of about three for a piece of coin of the value of a halfpenny; but as the weather becomes hotter, and the plants get into full bearing, ten, fifteen, and even twenty, are purchased for this price. It is calculated that every cone yields a money return of about eighteen-pence, or each plant about six tunga of two pice each. Allowing sixpence for labour of every description, and including also the tax, the clear profit is a shilling for every two square yards. The yield of the melon and the water-melon is numerically less; but the return of profit is at least equal, in consequence of the fruit being sold at from a halfpenny to twopence each. The seed of the melon is brought annually from Baltistan, or Little Tibut, and the first year yields fruit of from four to nine and ten pounds each in weight; but if the seed of this melon be resown, the produce of the second year exceeds not from two to three pounds. On a more minute inquiry it would seem that the melons are sweet and well-flavoured, whilst the water-melons are of the common quality of this fruit. Unless when eaten to great excess, the melon produces not any derangement in the intestines, but otherwise sometimes causes purging. It is remarked that healthy people who live upon this fruit almost wholly during the season, become speedily fat; and the same effect is reported in regard to horses fed upon this fruit at Bokhara. Although water-mint grows spontaneously upon the floats, and the return is so profitable in cucumbers, no other vegetables are raised upon the spaces betwixt the cones. In fact, however, there are so few esculent vegetables in this country, that this apparent neglect affords no matter for surprise. Pennyroyal, cresses, and other useful vegetables, might certainly be raised upon them; and from what I have seen of the aquatic habits of lucerne, I am led to think that this plant would also flourish, and its long tap-root speedily tend to consolidate the crust. Thefts of whole floats are sometimes committed by persons joining in two or three boats to tow them off to distant parts of the lake in the night, and the property thus stolen is difficult to be identified. To prevent this depredation, and also night robbery of the cones, two persons generally sleep in a boat, which is pushed under the shelter of a roof of mats that is permanent during the season. The floating gardens are generally

cut off from the body of the lake by a belt of floating reeds, which also answer, in some degree, the purpose of defending the cones against the effects of winds. The boatways through this fence are closed by twisted withes of willow twigs, which, passing through the ends of the beds, join them so accurately as to prevent the union being recognized, except by persons acquainted with the fence. Altogether this variety of farming is highly profitable, and ought to be adopted in Europe as a great resource for raising food for man.

There are four varieties of walnuts in Cashmere, called khanuk doonoo, which is wild;—wantoo, doonoo, and kaghzee, which are cultivated. The khanuk doonoo, or forest walnut, is diminutive, with a very thick hard shell, and small proportion of kernel so firmly engaged in narrow compartments with strong partitions as not to be worth the trouble of extricating. The nut of Wantoo is a little larger, but the shell cannot be broken except by a sharp blow from a stone or a hammer, nor can the kernel be got out except with difficulty. The nut of the doonoo is somewhat larger still, its shell thick, but in a less degree, and the kernel, large and good, is readily extracted. The kaghzee is so called from its shell being almost as thin as paper, though this, taken literally, in respect to the common paper of Cashmere, is somewhat an exaggeration. However, it admits of being broken by the pressure of the hand, is the largest of the whole, and its kernel is also large and easily removable.

It is not known whether the wantoo and doonoo were originally distinct varieties, and have acquired their character from cultivation; but it is reported that the kaghzee owes its superiority to having been engrafted; the practice of engrafting being, however, at present generally discontinued, from a knowledge of this variety being reproduced from the seed alone, without degenerating. The nuts steeped in water for eight days are planted in the beginning of March, and the shoot makes its appearance on the surface of the soil, generally about forty days afterwards. If the proprietor thinks proper to engraft the trees, this process is performed when the plant is five years old, by the method called, if I am not mistaken, stock-grafting. The head being cut off horizontally to a convenient height, is partially slit or opened in its circumference, and three or four scions are introduced into distinct slits, and retained firmly without the aid of any binding. But clay mortar, worked up with rice husks, is put round it, and kept from being washed away by being enveloped in broad slips of birch bark.

In Cashmere the walnut-tree begins to fruit ordinarily when seven years old, but two or three years more elapse before it is in full bearing. This is conceived to be the case when, in a single

tree, the average annual number of nuts brought to maturity amounts to about twenty-five thousand. It has been observed here, that after a few seasons of full bearing, walnut-trees fall off in producing fruit, and run with great luxuriance to leaf and branch, to which condition the Cashmerees apply the appellation of *must*, and to remedy it cut over the top branches, bringing the tree to the state of a pollard. During the year following, shoots and leaves alone are produced, which are succeeded by a crop of fruit in that ensuing, so abundant as to compensate for the absence of nuts in the preceding year; and, in a few years, when the yield becomes less considerable, this process is repeated, and always with like success. The cut ends of the branches swell into knots or knobs, which are somewhat unsightly, and of which the structure has not been accurately examined.

Cashmere is, probably, indebted to incidental observation, rather than to previous reasoning, for the introduction of this useful practice, for its success has not induced the adoption of the same process in regard to other fruit trees. The hazel, as far as it has fallen under my observation, is here so luxuriant in the production of arborage (leaf and branch), that it rarely brings to perfection its nuts, scarcely of the size of peas, hidden within the long husks of large clusters; nor has any attempt been made, as in the walnut, to improve their quality by grafting or pruning. The vine scales the summit of the poplar and is never restrained by pruning, though compared with it, those of Europe, either on trellis or on the wall, sink into insignificance.

The walnuts which fall green furnish the material for a colour of the same tint, which, however, is not permanent; but the husks of the ripe fruit are sold to the dyers for the basis of a fixed black. When ripe, the fruit of the wantoo walnut is retailed in the city, for eating, at the rate of a hundred for two pice, or about one penny; the nuts of the doonoo, in the same number, for three pice, and of kaghzee for four pice, or twopence. The country people break the walnuts at home, and carry the kernel alone to the market, where it is sold to oil-pressers, at the average rate of seven rupees per khurwar, or ass-load. The khurwar weighs sixteen twink. About twelve thousand ass-loads of walnut kernels are annually appropriated to the oil press in Cashmere, producing, in the gross return of oil and of oil cakes, 1-13,000 rupees, independently of the nuts eaten by man. Walnut-oil is preferred to linseed-oil for all the uses to which the latter is applied; and in Cashmere, as on the continent of Europe, is employed in cookery, and also for burning in lamps, neither much clogging the wick, nor giving much smoke. It is, however, inferior both for cooking and for burning to the oil of til* (sesamum). Walnut-oil is exported to

* This oil possesses such qualities as fairly entitle it to introduction into Europe; and, if divested of its mucilage, it might perhaps compete with oil of olives, at least

Tibut, and brings a considerable profit. It is somewhat extraordinary, that a tree which furnishes timber durable and handsome, and a nut which yields a valuable oil, should not be more cultivated in Britain. According to ancient custom, in Cashmere, the crop of nuts was equally divided between the government and the owners of the tree; but, at present, the former takes three-fourths, leaving but one-fourth to remunerate the farmer. Yet, under this oppression, the cultivation of the walnut is extensive, and Cashmere, in proportion to its surface, produces a much larger quantity of nuts than any portion of Europe. The horse-chesnut is wild in the forests, and has not been reclaimed, but its fruit is said to be largely used in Chumba for feeding hogs.

Rice of many varieties is raised in Cashmere, and the similarity of the climate of this country to that of Britain encourages a hope that it would succeed with us also were the seed-grain employed brought from this province. In Cashmere the year is divided into summer and winter seasons of nearly equal duration, the former, however, being in general somewhat the longest. In 1822 snow began to fall about the middle of December, and the ground was not clear of it in the central part of the province till the end of March. It remained a yard thick in the gorge-like extremities of the frontier valleys until the middle of April; and lies in deep beds for the whole of the year on some of the crests of the mountain-wall which girdles the province. The quantity which falls annually is so great that its weight, resting on the wild apple-trees for some months, bends their boughs downwards into an acute angle with their trunks, giving them an affinity of appearance to the cypress, without diminishing, if not even rather increasing, their fecundity. Falls of snow are extremely frequent during December and the three following months; and the sky is so much obscured that the face of the sun is not discernible oftener than once in three or four days on an average, and then only for a short time. The end of March and the whole of April are distinguished by the popular name of dirty spring or the mud season, and these appellations, in regard to the mud on the ground and the rapid succession of gusts of wind with hail, with short gleams of sunshine, are well deserved. April 1823 afforded only four days of sunshine, and the waters of the neighbouring lakes rose three feet by the accession of large quantities of rain and of melted snow poured into them by mountain torrents. In May scarcely a day passed without a shower; dense clouds, continually resting

for individual purposes, and could be raised in any quantity in the British Indian provinces. It is sufficiently free from smell to admit of being made the medium of extracting the perfume of the jessamine, (yasmeen,) the tuberose, (tumbuk,) narcissus, (neighiz,) camomile, (baboona,) and of the yellow rose, (zeba). The process is managed by adding one weight of flowers to three weights of oil, in a bottle which, being corked, is exposed to the rays of the sun for forty days, when the oil is supposed to be sufficiently impregnated for use.

upon the summits of the mountains, veiled the thick beds of snow by which they were covered. In a word, I have never seen an atmosphere so frequently loaded with moisture; a circumstance probably increasing from the increase of evaporating surface previously noticed. The natives report, however, that this has been an unusually cold and wet season; and those Europeans who have resided for two years in the rude climate of Tibut have yet retained their warm clothing through the whole of May. It is said that June, July, and August, are hot; but the mornings, evenings, and nights are generally cool, and sometimes a failure in the rice crop has been experienced from the summer heat not lasting long enough to ripen the grain; but this is acknowledged to be a very rare occurrence. Rice is sown in the beginning of May, and is fit to cut about the end of August. The grain is either sown broad-cast into the place where it is intended to stand till ripe, or thickly in beds, from which it is transplanted when the blade is about a foot high. As soon as the season will admit, after the 21st of March, the land is opened by one or more ploughings, according to its strength, and the clods are broken down by blows with wooden mattocks, managed in general by women, with great regularity and address; after which water is let upon the soil, which for the most part, of a reddish or foxy earth, is converted into a smooth soft mud. The seed-grain, put into a sack of woven grass, is submerged in a running stream until it begins to sprout, which happens sooner or later according to the temperature of the water and of the atmosphere, but ordinarily takes place in three or four days. This precaution is adopted for the purpose of getting the young shoot as quickly as possible out of the way of a small snail which abounds in some of the washed lands of Cashmere, but sometimes proves insufficient to defend it from the activity of this diminutive enemy. When the farmer suspects, by the scanty appearance of the plants above the water in which the grain has been sown, and by the presence of the snail drawn up in the mud, that his hopes of a crop are likely to be disappointed, he repeats the sowing, throwing into the water some fresh leaves of the prango, called kraugas, which either poison the snails or cause them to descend out of the reach of its influence. The seed is for the most part thrown broad-cast into about four or five inches of water, which depth is endeavoured to be maintained. Difference of practice exists as to watering; but it is generally agreed that rice can scarcely have too much water, provided it be not submerged, except for a few days before it ripens, when a drier state is supposed to hasten and to perfect the maturity while it improves the quality of the grain. In general the culture of rice is little expensive, though more so in Cashmere than in Hindostan, from its being customary in the former country to manure the rice lands,

which is never done in the latter. This manure, for the most part, consists of rice straw rejected by the cattle, and mixed with cow-dung. It is carried from the homestead to the fields by women, in small wicker baskets, and is set on the land with more liberality than might be expected from the distance it is carried. Many of the rice-lands are situated higher than would be thought convenient in Hindostan, and are rather pressed into this species of culture than naturally inviting, but still yield good crops through the facility with which water is brought upon them from the streams which fall down the face of the neighbouring hills. By the Cashmeree farmers the utility of manure is thought rather to consist in its power of keeping the ground pervious to water than in affording pabulum to the plant. In common seasons the return of grain is from thirty to forty for one on an average, besides the straw.

In the time of Zein Ool Abundeen the annual produce of the rice crop is said to have amounted to seventy-seven lakhs of ass-loads, of which the sovereign received one half and the other went to the cultivator,—and it was calculated that there was a consumption of two sers per day per head for the whole population of the country. At present the quantity of rice raised exceeds not twenty lakhs, and the general consumption will scarcely reach one-quarter of the former allowance.

In several mountainous countries greatly distant from one another, and in which much grass, apparently of a good quality, might be cut for hay as winter food for cattle, I have observed a preference to be given to the leaves of certain trees for this purpose:—these were the willow, the mulberry, a variety of elm, and several others, but the first mentioned and the walnut were held to be the best, and considered much more warming and nourishing than any kind of grass made into hay, especially for sheep. Small branches, after having been cut when in full leaf, and before they begin to lose any portion of their verdure, are immediately so disposed within the first forks of the tree to which they belong as to be thereby retained in the form of large hay-cocks. These branches are piled loosely, yet are so engaged amongst themselves as not to be detached by wind, neither do they lose their leaves, nor are the latter rotted or in any other respect injured as to their fitness for food.

I am not mistaken in asserting that the fat is whiter of the mutton of Cashmere, not only than of the mutton of Tibut but of any other sheep I have seen; but whether this difference be wholly or in any degree owing to the sheep being fed upon dry leaves I have not facts enough before me to determine.

This forage, unless where very abundant, is reserved for the severe part of the winter, when the cattle are driven under the

trees on which the store is suspended, and the dry branches being pulled down, are eaten by them with great avidity. The practice is thus simple, unexpensive, affords a considerable resource in a well-timbered, or forest farm, and may, perhaps, be worthy of trial, if it prove not injurious to the growth or quality of the timber; on which I beg to refer to what I have already said of the management of walnut-trees in Cashmere. The scarcity of natural pasturage has forced the farmers of Tibut to cultivate the productions of their soil, as lucerne, merely for increase of fodder; whereas, in Cashmere, the exuberance of natural pasturage has led to the selection of natural productions, and to the neglect of cultivating them to perfection; and the selection of the leaves of forest trees in preference to the leaves and other parts of grasses, and to esculent roots, as turnips, may bring the soundness of judgment of the Cashmeree farmers into question by the farmers of England. My observations on this preference are too limited to be of any practical value; but I am able to aver, that sheep, which had been preserved from dying by the rot, through feeding on dry prangos, fell off in condition greatly when put upon clean washed turnips, and regained their former state rapidly on reverting to prangos. It appears to me not improbable, that if sheep, when they just begin to show symptoms of rot by *arching their back*, were put on a diet of dry leaves alone, they would be prevented dying of this complaint; and I conceive that it would prove speedily curative also in the case of the Oscaris worm nestling in the wind-pipe of lambs fed on rank aftermath in the beginning of a winter following a wet autumn. (The arching of the line of the back, perhaps produced by an attempt to relieve the irritation produced by the vigorous activity of the small fluke-worms which have only just entered the gall-ducts, is a symptom I have never heard noticed by shepherds; but, according to my own observation, is the first, which indicates their presence in the beginning of winter.) When grass is also stored here for winter fodder, it is twisted into thick ropes immediately after having been cut, and in this state hung across the upper branches of trees. Without other preparation for hay it thus keeps free from rottenness, and generally even from mouldiness, notwithstanding the great quantity of rain and snow that falls in this country. Grass thus dried is generally given to the flock in the morning, and leaves in the afternoon or evening; but the latter are most depended upon for fattening. Oil-cake, made of linseed, walnut-kernels, mustard-seed, along with the seed of cotton, are employed for this purpose, and flags or the leaves of sedge.

Other articles of food for domesticated animals are the prangos, the booklook, or yellow lucerne, and the sourna or sand-grass of Ladakh.

The prangos has great merit as a winter fodder for sheep and

goats, curing the rot, and speedily increasing the fatness of sheep fed upon it; it grows upon lands of the most sterile character. For details I must refer to my letter to the Board of Agriculture, as well as in regard to the lucerne.

The crocus of Cashmere has long been celebrated for the excellence of its saffron; and is a source of considerable revenue, its cultivation being very simple and unexpensive. I have procured a few seers of its bulbs, which are much larger than those of Europe. It produces freely the third year after being planted, flowers in October, and lasts many years. In consequence of a report of the root of the alisma plantago major having been believed to have proved useful in Russia in averting hydrophobia from persons who had been bitten by rabid animals, I have also procured a quantity of the dried root for the purpose of being placed at the disposal of the Medical Board; and seed has also been collected under the hope that an endeavour may be made to raise it in the marshes or moist lands of British India.

Deodar—a variety of cedar, having been seen to be particularly durable in Cashmere, both in houses and public buildings under great weight, and also in the spurs and starlings of bridges, I have sought and obtained seeds of it in the forests of Ladakh, and have also taken specimens of the wood from the starlings of the Zein ool Kuddul, where it has been exposed to the water for nearly four hundred years. The shinlik and christa rooroo are varieties, both supposed to be non-descripts or natives of Ladakh; but, perhaps, their merit may not entitle them to higher rank than a place in forests and underwoods. The latter has been treated of elsewhere.

The principal fruits in Cashmere are apples, pears, quinces, apricots, and a non-descript drupe, called sungeet. Apples are common both in Ladakh and in Cashmere; of the former I have treated somewhat largely in a letter to the superintendant of the Honourable Company's Political Garden.

The sungeet has a beautiful appearance, its flowers are exquisitely sweet, and its fruit, by distillation, yields a beverage, in the opinion of the Chinese, not inferior to that of the grape. The fact of sungeet having been raised in Cashmere from seed of Yarkund affords no inconsiderable probability of its being readily acclimated in Britain.*

* Another paper, similar to the above, may be gleaned from Mr. Moorcroft's materials, regarding the arts and manufactures of Cashmere; and also a third, of a miscellaneous nature, regarding Ladakh, in which country he resided two years. It seems desirable, however, to repeat here, that none of the papers which he had with him at the time of his death are yet in the possession of the Geographical Society; and that if any such could still be recovered through the medium of British agents in Caubul, Balkh, or at Bokhara, they would probably be of considerable interest. He died at Anghok (presumed to be in Balkh) in March 1825, and the latest previous information received from him is dated Cashmere, October 1823. —*See* vol. i. p. 233.