

Specimens were sent from—
Delhi (2540); Ambálá (2674); Simla States—Bhaji (2712), where it is called kohlá or kehú (2717); Kangra (2852); Amritsar (3015), with samples dál (3044); Lahore (3121), Gujrá (3220), dāngri.

KUNDI.

862.—Botanical name, *Cajanus bicolor*?
Synonyms—Kundi (Kangra), Dar mothi (Kashmír).

There are two varieties, but in the samples sent both are mixed indiscriminately. The seeds are smooth, oval, and slightly flattened, of a white or brown color. Samples were sent principally from the hill districts, as follows:—

Simla States—Bhaji (2715); Bagal (2748); Kangra (2853); Kashmír, Srinagar (3546), (*dar mothi*).

863.—Peas from Zangskár. Sradma or Sranma (Thibet). REV. H. A. JÄESCHKE.

These are small blackish brown peas, probably some species of *Vicia*? These are cultivated in Spiti and Zangskár, but not in Lahaul, because it is not

yet the custom, and there are no fences to protect them.

SOY BEAN.

864—Bhút (*Soja hispida*).

Several samples were sent from the Hill States, but they were not found in the collection; the identification is on the authority of DR. CLEHORN.

I conclude the mention of pulses with a table showing the relative quantities of nitrogenous matter contained in the various species. The abundance of this element renders them so suitable for forming an article of diet, together with substances abounding in carbonaceous or starchy matter.* The quantity of nitrogenous matter in pulses varies much. In the Soja or Dolichos it is the highest in any known vegetable substance; in gram it is very much less, as will appear from the table. The quantities given are averages from several analyzed samples.

Number of specimen from which the results were obtained.	Name.	Nitrogenous matter.	Starchy matter.	Fatty or oily matter.
		In 100 parts; varies in specimens from different parts of India, from		
1	Gram, <i>Oicer arietinum</i> , ...	18.05 to 21.23	60.11 to 63.62	4.11 to 4.95
3	Arhar, <i>Cajanus indicus</i> , ...	19.83 to 20.38	61.90 to 64.32	1.32 to 1.86
2	Mattar, <i>Pisum sativum</i> , ...	21.80 to 25.20	58.88 to 62.19	1.10 to 1.12
4	Lentils, masúr, <i>Ervum lens</i> , ...	24.57 to 26.18	59.34 to 59.96	1.00 to 1.92
1	Churál, <i>Lathyrus sativus</i> , †	31.50	54.26	0.95
2	Lablab vulgaris, ...	22.45 to 24.55	60.52 to 60.81	0.81 to 2.15
1	Rawán, <i>Dolichos sinensis</i> , ‡	24.00	59.02	1.41
2	Kálthi, <i>Dolichos uniflorus</i> , ...	23.03 to 23.47	61.02 to 61.85	0.76 to 0.87
1	Guwár, § <i>Cyamopsis psoraloides</i> , ...	29.80	53.89	1.40
3	Bhút, <i>Soja hispida</i> , ...	37.74 to 41.54	29.54 to 31.08	12.31 to 18.90
1	Urd, || <i>Phaseolus radiatus</i> , ...	22.48	62.15	1.46
2	Múng, <i>Phaseolus mungo</i> , ...	23.54 to 24.70	59.38 to 60.36	1.11 to 1.48
1	Moth, ¶ <i>Phaseolus aconitifolius</i> , ...	23.80	60.78	0.64

* DOCTOR FORBES WATSON has published a most useful table, showing the properties of nitrogenous substances which can be combined to the best advantage with carbonaceous ones, that is of pulses to be combined with cereals, arrow-root, sago, millets, and the like. By a simple formula we can find out the quantity of a pulse that should be added to a carbonaceous substance, provided only we know from previous analysis the amount of carbonaceous and nitrogenous matter in each, from which we can deduce the proportions of carbonaceous to nitrogenous in each, representing nitrogenous as unity.

Then to find the quantity of one substance to be added to the other we have this formula:—

Let the proportion of nitrogenous to carbonaceous in the given substance be $m : 1$.

Let the proportion do., do., in the substance required to be added be $n : 1$.

Then the standard proportion or best possible combination (which is 6 Carb. : 1 Nit.) = $p : 1$.

Let the number of parts in the given substance be a and the number required to be added be x , then

† Calcutta specimen. ‡ Bombay specimen. § India Museum, specimen from Poona. || Bombay specimen. ¶ Calcutta specimen.

$$x = \left\{ \frac{m(p+1)(n+1) - p(n+1)(m+1)}{(p-n)(m+1)} \right\} a$$

$$\text{Or simplified, } x = \left\{ \frac{(m-p)(n+1)}{(p-n)(m+1)} \right\} a$$

this will be clear from an example. Let it be required to know what proportion of a pulse, say gram, should be added to a hundred parts of arrow-root to give the best combination. By analysis we know that the proportion of carbonaceous to nitrogenous in arrow-root is 165.5 : 1, and in gram is 3.8 : 1, then in the formula m will be represented by 165.5; n by 3.8; p by (the standard known) 6 and a by 100 : so

$$x = \left\{ \frac{(165.5-6)(3.8+1)}{(6-3.8)(165.5+1)} \right\} 100 = \left\{ \frac{765.60}{366.96} \right\} 100 =$$

2.09 \times 100 = 209.0 = the number of parts required, that is, that 209 parts of gram to 100 parts of arrow-root makes the best combination. This formula is of great value in settling jail and hospital dietaries.

IV. MISCELLANEOUS GRAINS AND SEEDS USED AS FOOD.

These embrace several articles of considerable importance: these are the varieties of buckwheat (*Fagopyrum*) that cannot be conveniently included in the foregoing classes, and there are several Amaranthine plants (síl, &c.,) that are much used for food, especially by Hindús on their "bart," or fast days, a few of these seeds are wild.

BUCKWHEAT.

865.—Two varieties, an angular sharp cornered variety (*Fagopyrum polygonum*), and one with rounded edge (*Fagopyrum esculentum*).

The grain is eaten by Hindús on fast days. It is a very hardy grain and will grow at great heights.

There are considerable differences noticeable in the names of buckwheat.

Wherever it is found in the plains, it is called darañ. The following specimens will show how the names vary in different localities:—

Simla, Bháji (*F. polygonum* or *F. emarginatum*), úgla or ugal.

Simla, Kumharsen (*F. esculentum*, *F. polygonum*), pháphra, darañ.

Simla, Mahlog (*F. esculentum*), jhákí or kathú.

Simla, Sirmúr (*F. polygonum*, *F. esculentum*), úgla, pagua.

Kullú (*F. esculentum*), kathú or brés.

Kashmir (*F. polygonum*), trambah shirín.

The cultivation is confined to the hills, and forms an autumn crop: the seeds yield a hard bitter and unpalatable bread, which is said to be heating: it is only eaten in the plains during the "bart," or fast days, being one of the "phaláhas," food lawful for fast days. There seems to be little or no difference in the taste, &c., of the two varieties, but the appearance is dissimilar, one having sharp edges to the seed, the other being rounded off.

AMARANTHS.

There are several species of this tribe, the leaves of which are utilized as vegetables, and the small seeds as grain: these are ground up to form flour, or are treated as a pottage: they grow in the autumn. The species are—

866.—[]. Chaulai (*Amaranthus frumentaceus*). Sirmúr, Simla.

867.—[]. Síl, siyul, or sariará or salýára (*Amaranthus sp.*—?). Kangra.

868.—[]. Siyul or "kirín," from Srinagar, Kashmír.

869.—[]. Báthú. Sirmúr.

This is also an amaranth, and different from the batua or báthú of the plains, which is *Chenopodium album*; the grains are whitish in color and resemble the well known Russian "semolina." DR. JAMESON mentions two species, the red and yellow, called chúa, and cultivated in Kullú (*Amaranthus anardana* and *A. speciosa*).*

870.—[]. Black seed, siyal súya.

The other kind of siyul or síl, called síl siyáh, is a small glossy black seed of the *Celosia cristata*, the well known seed "cockscorn" of our gardens.

There are some other grains which I have not identified.

871.—[3401]. Símúkh, a species of amaranth.

Dera Ghazi Khan. It sells for a rupee a maund, and grows on the banks of the Indus.

872.—[3410]. Nángirá.

873.—[3404]. Koría.

This sells at 25 seers for the rupee: perhaps a species of *Penicillaria*?

874.—[]. Bihú. Kangra Hills.

These last four are all wild or spontaneous produce.

GRASSES.

A few of these are used in times of famine for food, as the "markán" grass, the wild sawáñk, and others. The following specimens were in the collection as fodders for cattle, some few that are useful in manufactures are noticed in the class next following.

875.—[]. Dúbh. Hissar.

This is the commonest grass, and that which is grown for lawns, &c., its dry creeping stems spread out and take root at the joints, it is the *Cynodon dactylum*; and more commonly called "khabal" in the Punjab.

This is the "dúrbá" grass of Sanscrit authors. In the Atháwana vedá it is thus apostrophized. "May Dúrbá which rose from the water of life, which has

* Physical Aspect of the Punjab, J. A. H. S. Vol. viii, p. 138.

a hundred roots and a hundred stems, efface a hundred of my sins, and prolong my existence on earth for a hundred years." The flower of this grass is a most beautiful object under the microscope.

876.—[]. Sawánk, the wild grain. (*Panicum colonum*). Hissar.

877.—[]. Gandhi. (*Andropogon* sp. — ?). Rohtak.

878.—[]. Anjan (*Pennisetum cenchroides*).

In Rohtak grass sells during the rains at from 4 to 10 maunds the rupee.

879.—[]. Phalwa. (*Andropogon Bladhii*).

880.—[]. Seed of dhaman (*Pennisetum cenchroides*). Sirsa.

The seeds are little conical brushes of bristles, the grass is esteemed extremely fattening for cattle.

Grass from the Rukhs of Lahore district the vernacular local names are as follows:—

Khabal (<i>Cynodon dactylum</i>).	Itsit.
Dhāman (<i>Pennisetum cenchroides</i>).	Indráni.
Palwān.	Sih char.
Chimbar (<i>Eleusine flagellifera</i>).	Gatwā.
Nunák.	Ghatti (<i>khatti</i>).
Salyāra.	Pauní.
Dhela (<i>Scirpus maritima</i>).	Sir.
Khavi (<i>Cymbopogon Invaranchusa</i>).	Kora (<i>Eragrostis</i> sp.—?).
Khañ (<i>Panicum mazi-mum</i>).	Murk (<i>Cyperus</i> sp.—?).
Kórh.	Sochal.
Kharm.	Más giah.
Dib (<i>Erag. cynosuroides</i>).	Surálá.
Lúkhí.	Leya (<i>Cenchrus echinatus</i>).
Mainá.	Laili.
	Agya ghás.
	Barau (<i>Sorghum halipense</i>).
	Tándala (wild rice).
	Sarkara (<i>Saccharum spontaneum</i>).

Grass is rarely if ever cultivated for grazing purposes as it is in Europe, and it is but seldom cut and stacked as hay; but in the Rakhs and in the "bar" tracts during the rains, the whole surface of the plain is covered with grass. There were several sorts—no less than thirty—each with its distinctive name, collected in the rainy season near Lahore.

The rapid growth and subsequent dryness render many Indian grasses unfit for pasture at the end of the year. This the inhabitants remedy by burning

down the old grass so as to allow the young blades which sprout up to afford fodder for the cattle.

Grasscutters, who provide horses, usually search for and collect the dúbh grass (*Cynodon dactylum*).

In a note at page 421, of the "Illustrations of Himálayan Botany," DR. ROYLE mentions that the grasses of Hariána (Sirsa and Rohtak);—and indeed it is true of the Rakhs generally—consist of species of *Panicum*, *Pennisetum*, *Cenchrus*, *Chaetaria*, *Vilfa*, *Dactyloctenium*, *Chloris*, *Eleusine*, *Achras*, *Poa*, *Eragrostis*, and *Andropogon*: species of *Saccharum*, and *Rottbællia* should also be added.

881.—Methi or methri, fenugreek (*Trigonella fænugræcum*).

This is a pot herb, and is eaten by all classes, and is much esteemed.

882.—Sowa (*Anethum sowa*). Syn.—Soyá, shibt.

This is a strong flavored herb, used rather for flavoring than as an esculent by itself.

883.—Pálak (*Beta bengalensis*).

Commonly eaten boiled with ghi and spices, &c.

884.—Khúrfá (*Portulacca sativa*).

This also makes a salad.

885.—Lúnak or loniya (*Portulacca oleracea*).

FODDER PLANTS.

Besides various grasses, other fodders are employed: in one place a clover or lucerne, "shotal," is grown; also *sinji*, but this principally by Europeans for their horses and other cattle. Cattle are usually fed (besides grass) on bhúsá, or as it is called in Punjabi "túri," the chopped straw of wheat and barley. Besides which they get "karbi," the dried stalks of jawár (*H. sorghum*); this latter when green and fresh is called "char-ri." Chopped leaves of the bér (both *B. vulgaris* and *B. nummularia*), called mulla, are much used, and are said to be fattening. See also page 150, No. 589.

The specimens were as follows:—

886.—[]. "Shotat," clover or trefoil. Hazara district. Syn.—Shaftal.

There is an interesting paper about the lucernes of Afghanistan and Kábul, in the A. H. Society's Journal, Vol. i., p. 105.

887.—[] Sinji. Lahore.

A species of trefoil or lucerne (*Medicago*); grown for horses' food.

888.—[] Turnips. (*Brassica rapa*).

The following is from DR. HENDERSON:—

"In Shahpūr and one or two other districts, turnips are grown very extensively for feeding cattle during the cold weather, and they often attain a size such as I have never seen them do at home. It is believed that in many districts, this root is scarcely at all grown by natives, and it is very desirable to introduce it. I shall be glad to supply seeds in any quantity, to those who wish to distribute them, the cost will probably be about four annas per lb. The season for sowing is during the month of September. A native of Shahpūr who cultivates a considerable extent of ground, and takes a great interest in all agricultural improvements, has furnished me with information regarding turnips. The following is a translation of his letter.

"In good soil 2½ lbs. of seed are allowed to each beegha, and 4½ lbs. if the soil is bad; during the growth of the crop, three top dressings of manure are given; a plough being run through the field so as to loosen the ground, but care being taken not to injure many of the plants. If the soil is very good, and the crop seems to be flourishing, only one top dressing is given.

"If rain falls abundantly, the ground will require to be flooded only three times; if no rain falls nine or ten waterings will be required.

"A good field of turnips will yield 640 maunds per beegha, and will sell as it stands on the ground, at Rs. 24 in a dry season; but if abundant rain should fall, there is less demand for green fodder, and a beegha of turnips will then fetch only Rs. 14.

"One good beegha of turnips and 14 maunds of chopped straw (bhūsā) will feed two pairs of bullocks for nearly three months.

"At a well where six pairs of bullocks are constantly working, so as to irrigate night and day, the proportion of ground sown with turnips for feeding the bullocks during the winter months, is eight or nine beeghas.

"After turnips, tobacco is not usually grown on the same field; opium, Indian corn, and cheena, are the usual crops."

889.—[] Bhūmphor (*Philippæa calotropidis*). Syn.—Khūrjīn, Khalātrī.

This very curious plant is figured in the annexed plate.

"The *Philippæa calotropidis** is mentioned in EDGEWORTH'S 'Florula Mallica,' as growing on the roots of *Calotropis* only, in the Māltān division."

MR. EDGEWORTH mentions that it differs from "*P. lutea* in the anthers which are macronate, while in this they are obtuse." I believe both species are common in the Shahpūr district, although I did not, whilst at Shahpūr, know the distinction between them. The idea that the plant only grows under a bush of *Calotropis*, which lead to MR. EDGEWORTH'S fixing the above given name, is erroneous; the plant has frequently been seen where no *calotropis* was near. It has been found in Shahpūr, and as far north as Kalābāgh, and south, half way down Sindh. MR. EDGEWORTH got it in Ambālah. "Nothing can be more remarkable than the habit and appearance of this plant: it grows like a parasite from seed which attaches itself to any long thin fibrous root of some other plant which happens to cross its locality in the soil: the seed lies dormant until such a root comes in the way: it then germinates and throws up a number of thick fleshy shoots, which are subterraneous; the thick tops of these shoots alone project above the soil. They are observed to be covered all over with little bracts; and above these, yellow flowers, shaped like a fox-glove, spring out: as soon as the sun gets hot the plant withers."

In Muzaffargarh it is said to be used for a fodder for goats and oxen, but not for camels. Its use in this respect is doubtful. I have only included it in the class of Fodder plants, to avoid omitting so interesting and curious a plant.

"In Shahpūr the plants grow on the roots of the *Salvadora oleoides*, on all the species of tamarisk, but chiefly on the *Salvadora*, and I have never found them on the *Calotropis*, though I have repeatedly dug up the plants, and with great labor traced the filament of root on which the parasite was growing to the parent stem. The only native name I have ever got for the plant is *gīdar kī tamākā*, jackal's tobacco: by some natives it is said to be poisonous, and by others it is said to be a remedy for hydrophobia. I have constantly found the plant filled with maggots, and on them it certainly has no poisonous effect. In STEWART'S "Flora of the Peshawar Valley," and in ATCHINSON'S "Jhelum Flora," the plant is not mentioned, and I have never seen it in the districts of Jhilm Gujrāt, Sealkot, or Lahore. At Shahpūr, and in fact, wherever it is found, it is a very striking object: the bare hard soil near a *Salvadora* bush, cracks, and in the course of a night the place is studded with what resembles huge flowering heads of *digitalis*, each

* Communicated by DR. G. HENDERSON.



PHILIPCEA CALOTROPIDIS. WALP ;
used as fodder.



with a stem more than an inch thick, and without any regular leaves. These flowers soon wither, but a succession is kept up just as in the case of mushrooms; and I believe they appear at intervals all the year round."

Camels are fed in parts of the Punjab in great numbers, they delight especially in "lānā," plants of the Salsolaceous tribe, which are also useful for burning to get soda: there is often quite a rivalry of interests over a patch of salsola land—the camel feeder wants it for his animals, and the soda burner for his furnaces.

The whole subject of cultivation of fodder plants ought to command a good deal of attention, when it is remembered how much the health of the population and our troops depends on their being supplied with milk and meat, which is obtained from animals that have been properly fed. It is a notorious circumstance that cattle, and especially sheep, are allowed freely to feed on the night soil removed from latrines; and Dr. BIRDWOOD says that, in Bombay even, *horse-dung* is given as fodder to oxen and sheep; the result is obvious, the milk is undrinkable, and the flesh gives rise to a variety of painful diseases.

HOPS.

The last section in the Agricultural Class will be a brief one, for hop cultivation in India is still only experimental, although a measure of success has been attained in the Dehra Doon and elsewhere. The first trial of hops was made with plants obtained by LORD AUCKLAND, at Dehra. At Kyelang, in British Lahaul, the missionaries have attempted the growth of hops; the same attempt has been made for the Simla and Kasauli breweries, otherwise the hops in use at the hill breweries are imported. The hops are well suited as to their season of flowering, as they come into flower just when the rains cease, and so there remains the dry month of October, during which they can be dried, packed and stored.

Three samples of hops only were exhibited.

890.—[]. Hops, from Hazara.

With regard to hops at Hazara, the Executive Engineer, CAPT. BLAIR, has kindly communicated the following:—"I found that CAPTAIN DAVIS had got some plants planted in the Executive Engineer's garden at Abbottabad, and I had them planted out in the proper way in 1863 and 1864. They grew remarkably well, and I sent a maund of these flowers to the Murree Brewery, which MR. DWYER, the Manager, considered first class, and as good as the home ones.

"The plants grow beautifully, but do not flower much so as to make the produce a paying speculation, although it may have been through my ignorance as to their proper treatment.

It is hard to get them through the heat at Abbottabad during June, but when the rains commence the creepers grow amazingly fast, and I think there is not a sufficiency of hot weather after the rains to allow the plants to flower properly."

891.—[]. Hops, from Kasauli.

892.—[]. Hops, from Simla.
MR. GEO. JEPHSON.

The bitter and odorous resinous substance of the hop (*Humulus lupulus*) consists of an acid ethereal oil, an aromatic resin, wax, extractive, and a bitter principle called Lupuline. By pressure the heads yield a light green acrid oil; the roots of the hop have been used as a substitute for sarsaparilla, and the young shoots eaten as a vegetable.*

In the fifth volume of the Transactions A. H. S., p. 46, an account is given of hop culture; which, as the volume is now rare, I have extracted *in extenso*.

"*Observations on the Culture of Hops.*—The first subject for the consideration of the planter is that of soil, whether he may possess any of a quality sufficiently rich to favor the growth of this plant, for the cultivation of it being expensive, unless the produce should make a suitable return, a certain loss must be created. The most genial soil is probably a loam or marl of a depth of at least three feet, and if the substratum is of a porous nature, it will be more favorable for the growth of the plant for the following reason:—that the root will run with greater facility; and that the moisture will more speedily escape, for while it is retained in the soil, it chills the root of the plant and checks its growth, on this account a clay soil is too tenacious in its natural

* LINDLEY, Veg. Kingd. 265.

state, but when improved by a copious dressing of free chalk, which not only opens the pores, but chas-
tens it, the plant will grow in it freely, and in my
own experience I have known it to succeed so well,
that the plant would take a sixteen foot pole with
more ease than the twelve foot pole, which it had
been previously supplied with.

"The next thing to which the planter's attention
should be directed is situation, as strong winds are
injurious, particularly those from north to east. It
is highly desirable to have the plantations as much
sheltered from that quarter as possible, so as to escape
the early ray of the morning sun coming on the plant
before the dew has evaporated, as insects will be pro-
duced by the warmth of the sun. The plantation
should be sheltered as much as possible from all winds,
as the fruit becomes discoloured when shaken much
by the wind, and although intrinsically it is not
injured (the virtue and strength being in the farina)
the sample is not so good to appearance. I now come
to the culture which is practised in England. The
process in the first place commences with preparing
the ground, by trenching it from two to three feet
deep according to the soil. When this is done, the
ground is set out in squares of six feet, leaving a
stick standing at every square, to mark the place for
planting. This is done either with nursery plants
or with cuttings which are the superfluous parts of
the roots taken off in the spring, and trimmed to the
length of four inches. When cuttings are used, five
are usually put into a hole, made with a large dibble,
the lower points being placed together, and the soil
over the top pressed hard round with the hand. When
nursery plants are used, three will be found sufficient;
some planters use one way and some another, but I
always gave the preference to cuttings, for if they
succeed, a year's growth is gained by it. The first
operation for the year is digging, which commences
when the weather becomes dry in February; the im-
plement used for the purpose is a prong and not a
spade. If favored by weather, a man will dig an
acre in eight days upon the average. The next pro-
cess is that of laying out the poles, which is taking
them from the stack and placing the heel of the pole
close to the hill to be in readiness to set up. Two
poles is the accustomed number to a hill, but where
the hill is very strong a third is sometimes used.
Next comes the opening and cutting, that is, clearing
away the old hill that was collected round the plant
the preceding year with a hoe, and cutting from the
stalk all that part which grew from it the former
year (it is from this the cuttings are collected);

and after thus clearing, a little earth should be drawn
round it again to prevent the bleeding. The polling
next follows, which is done when the bind begins to
shoot, by making a hole with a crowbar, and then
forcing the pole into the hole. When the bind is
sufficiently strong to select that which appears to be
the best, it is brought to the pole, viz., three to
each pole, and twisted round the pole with the sun,
and lightly tied with rush or Russia matting. After
the first tying, they should be constantly watched and
fresh tied, for if they are neglected they will slip
down the pole, and when they are above the reach,
a back ladder is used as soon as sufficient binds have
been selected for the poles, the remainder are torn off,
and with a hoe some earth is drawn round the hill to
stop the bleeding, which would much weaken the
plant. Hilling comes next in succession, this is done
with a shovel, by throwing a heap of earth
round the plant in a conical form to the height of
about 18 inches from the level of the ground to the
top. The plant being now set in order for growing,
nothing further is to be done until it arrives at
maturity, but to keep the ground clean. As the various
operations will have trodden the earth, it should be
loosened again, which is done with an instrument
made for that purpose with the hoe at one end and a
prong at the other, and is used like a pick-axe. When
the ground is turned up with this instrument, it
should be knocked about to break all the clods, and
render it smooth again. When weeds appear, it should
be kept hoed, but when the hop is in fruit, the hoe
should not go deep into the ground, or it will disturb
the fibre which runs on the surface and nourishes the
fruit. Next comes the picking, which is done by
drawing the pole (after cutting the bind about a foot
from the ground) and laying the pole across a basket
into which the fruit* is dropped. As fast as they
are picked, they are taken to the kiln to be dried,
where they are spread on a hair cloth, with a char-
coal fire underneath. Some kilns have French holes
made like an inverted funnel, and some English. I
prefer the French. The hair cloth should be at least
eight feet from the fire. The frame should be lathed
and plastered. Next comes the bagging, which is
done by men getting into the bag and treading them
hard, having a half hundred weight with which they
bump as they walk round. The hops should be
turned once or twice in the store room to cool them
thoroughly before they are bagged. Next follows
the sale, and last of all the collection of the money."

* Flower.



REPORT ON AGRICULTURAL PRODUCE.

SECTION A. CLASS III.

DIVISION I.

JURY.

COL. LAKE, <i>Commissioner of the Jalandhar Division.</i>	DR. GRAY, <i>Superintendent Central Jail.</i>
MR. R. EGERTON, <i>Commissioner of the Lahore Division.</i>	MR. BADEN POWELL.
DR. NEIL.	NABBI BAKHSI.
	CAPTAIN OGILVIE, <i>Assistant Commissary General.</i>

REPORTER—MR. DALLAS, *Inspector General of Prisons.*

THE duties of the Jury were confined to that portion of this class which is comprised under the head, Agricultural Produce, viz., cereals, millets, pulses, grasses, oil seeds, and hops. Subsequently, to the appointment of the Jury, oil seeds were removed from this Sub-division.

Although the class is one of the most important, and the number of specimens exhibited was large, yet there were comparatively few articles which attracted very much attention. The collection represented the Agricultural Produce of the whole province; and as the same grains are cultivated more or less in every district, it follows that though the number of specimens exhibited was large, yet the number of different kinds of articles was comparatively small.

The Punjab, with reference to its soil and climate, may be divided into four regions, in each of which some products may be localized or there may also be found some peculiarity of growth, form, or properties, in kinds of produce which are otherwise common to all.

The regions may be divided thus :—I. Well watered districts—whether irrigated by canals, wells, rivers, or abundance of rain—the soil of these is chiefly alluvial, such for instance are the districts of Lahore, Gujranwalla, Amritsur, Gujrát, Jalandhar, Ludianah, Ambalah, Delhi and Peshawur. This of course forms the largest division, and the samples may be looked upon as mere duplicates from the various districts of this division. The collection of rices from the Peshawur district is however to be excepted, for though the soil and abundant irrigation of the valley place it rightly in this division, the great productiveness of rice places it in some degree of resemblance to the Kangra valley, which is legitimately noted in another division.

II. This Division consists of those districts whose soil is arid and sandy, which are not well watered, where rain falls but sparingly, such as Múltán, Muzaffargarh, Shahpúr, or Gugaira. Sirsa properly belongs to this division, but the products exhibited are chiefly

those grown on the bank of the Ghaggar river, where there is abundance of moisture, and consist of rices, pulses, and cereals, resembling closely the products of the first division.

III. In this Division may be placed the intramontane and submontane valleys, partaking partly of the character of the hills in their climate, and partly of the nature of the 1st division in their being well watered. Such districts are Kangra, Gurdaspur, Hushyarpur, and perhaps, Sealkot. In this region may also be classed Kashmir.

The Kangra valley is the type of this class, and is important, as it constitutes the rice emporium of the Punjab.

IV. The Fourth Division is purely mountainous, and includes Simla and its Hill States—Sirmur, Tiroch and others; also Spiti, Ladakh, Kulu, and Lahaul.

This rough Division of the various districts may easily be completed, by considering the geographical and climatic characteristics of any district, which can then be referred to one or other of the Divisions.

The importance of the class of Agricultural Products, is obvious, when it is remembered that grain and pulse in some form or other enter very largely into the diet of the whole population of the Province. It is remarkable that the consumption of some of the articles of this class is confined almost entirely to certain classes of the people: for instance, the inhabitants of cities consume principally wheat, rice, and to a small amount, maize: the expensive varieties such as white wheat, or *barah*, the scented rice of Peshawur, being confined to the richer classes: the villager and cultivator seldom if ever use wheat, the value of the crop inducing them rather to sell than retain it for home consumption. Barley, however, millets, and pulses are chiefly used by the villagers.

A brief specification of the principal articles exhibited, together with the remarks of the Jury, may now be given.

WHEAT (*Triticum vulgare*).

Twelve samples of red and sixty-two of white were exhibited. Although not in any way inferior, yet the red wheat would appear to hold a very much lower place in the estimation of natives, and to sell at a cheaper rate than white. The former being consumed by the poorer classes and the bulk of the population, whilst the use of the latter is restricted to men of wealth. There is little to be said regarding this description of wheat. The samples generally were good.

Several varieties of white wheat were exhibited. The Gilgit or paighambri, a small round fancy grain,—also called “Múltán” or “Rai Munir” (from the places where it was first grown: there were also *dáúd khán*, *ghoni*, *kabr* and *vađanak* (*kanak dāgar*, *Shahpur*), the last named being a particularly fine large grain. The *Yásin* wheat, from Kashmir, was also remarkably good. Some specimens of red and white wheat sown together were exhibited under the name of “*jogyán*.”

BARLEY (*Hordeum distichon*).

Fifty-one samples, generally of a good quality were exhibited. There are two kinds—*Hordeum hexastichon* and *Hordeum caeleste*—the last is beardless. The barley from Spiti (called “*surmo*,” “*zezi*” and “*sowa*”) and from Lahaul was worthy of note. The beardless variety was also exhibited from Spiti. Paighambri, or black barley, was sent in from Gugaira and other districts. Hazara exhibited a fine barley, having a translucent, wax-like appearance,

and a greenish color. A sample of this sort of barley, the grains of which were remarkably fine, was also forwarded from Kashmir. It is worthy of note that though the Kashmir grains both wheat and barley, are of excellent quality, yet they enter but sparingly into the diet of the ordinary population.

OATS (*Avena sativa*).

Two samples of those were exhibited, one from Hissar, where the establishment by Government of a large cattle farm may perhaps account for their cultivation, and the other from Ambálah, where they are called javi. The samples were of good quality. Wild oats are common in Jhílam and Shahpúr, but are useless.

MAIZE, INDIAN CORN (*Zea mays*).

Thirty-five samples of the white, red, and yellow varieties of Indian corn, or makkai, were exhibited, one specimen from the Hills—yellow—was remarkably good, quite equal to that produced in America—the white variety was inferior, and so was the red. These are never considered equal to the yellow, and very rarely in the American markets realize as high a price. It would not seem however that they are less esteemed in this country; maize enters very largely into the dietary of the people of the Punjab, especially those inhabiting the hills and submontane districts, indeed it may be considered peculiar to this province, as the people of Hindústán would appear to consume but little of it. Doubtless the hardy nature of this cereal and rapidity with which it is matured recommend it to the people of the hills: it does not however keep well, being quickly attacked, especially the white variety, by insects.

RICE (*Oryza sativa*).

Of this grain ninety-seven samples husked, and forty samples unhusked, were exhibited from the various districts. The varieties as given in the lists are extremely numerous, but it is questionable whether all of them are in reality varieties, and not merely the same article recognized in different localities under a different name. That the latter may be the case will be easily understood when the varieties of dialect and the localization of rice producing tracts are taken into consideration. The chief varieties given may however be stated. Rice without the husk is called *brinj* or *cháwal*; whilst paddy or unhusked rice is called *chhona* (Panjábi), or *dhán* (Hindústáni).

Básmati is the first quality of good rice; and indeed the *real* básmati from the Kangra valley, with its large white and fragrant grains is a most beautiful product, it is scarcely less celebrated than the *bárah* rice of Peshawur. In the plain districts the coarse rice commonly grown is called *múnji*; other rices met with in the bazar, of second and third quality are *begami* and *samoja* also *sohn pat*: a fourth class, is the red skinned wheat called *sathi*, also "*sharbati*" and *chinwa lál*; this is inferior.

In Peshawur the varieties of rices are called *doába*, *shughá*, *záfráni*, *jyotshi*, *kaneri*, and *lukk*, or coarse rice.

In the hills rice is generally of two qualities, the first of which is called jhinjan and the second rebáni.

Both the Kangra and Kashmir valleys have a great variety of names for rice, which have been given already.

Some of the specimens from Kangra were remarkably fine. The Kangra people state

that they have as many varieties of rice as there are days in the year. Several varieties, kharcha, sabza, son karcha, munji, and sukhanand were sent from Sirsa, and the Jury consider the specimen of Peshawri rice introduced in the Sirsa district by MR. OLIVER, the Deputy Commissioner, worthy of note.

Kashmír sent four specimens with their local names—básmati, sukhdás, sháli-kanú, and shali shírimal—but they do not demand any special notice.

MILLETS.

A very large number of specimens of these were exhibited, the most important being the following:—Jawári (*Sorghum vulgare*); kangni, (*Pennisetum italicum*); chinán (called chijé, in Spiti and other hill districts), (*Panicum miliaceum*); bájra, (*Penicillaria spicata*); sawáñk (*Oplismenum frumentaceum*); kodra (*Paspalum scorbiculatum*), sometimes in the hills called kodram, and mandwa (*Eleusine coracana*), sometimes called mandal and chlodra; a specimen of imphí (*Sorghum saccharatum*) was also exhibited.

Specimens of amaranthine grains were exhibited called chaulai (*Amaranthus polygamus*) and bátua (*Chenopodium album*), this latter would appear to be called sometimes jugul, or síl. The grain called sariára is also very similar to, if not identical with, síl. There are two varieties of síl,—síl siya and síl safed. The number of amaranthine plants grown in Kashmír is considerable. It is to be regretted that the Kashmír samples did not come under the notice of the Jury. The amaranthine grains were chiefly from the hill districts. Samples of buckwheat (*Fagopyrum polygonum*) were also sent from the hills, and in one or two cases (Amritsar and Hushyarpúr) from the plains. The native names of buckwheat vary much according to locality; that from Kumharsen (Simla) was exhibited under the name of dharaun: that from Mahlog (Simla) as jháki or kathú; that from Simla and Sirmúr as úgla; at the latter place also called pagua. Kúlú exhibits it as kathú and bress, whilst Kashmír calls it taramba-shirín. Pagua and úgla would seem to be varieties, the one having the edges of the grain rounded, and the other having them angular.*

PULSES.

The specimens and varieties of pulses were very numerous. 185 samples in all came under the notice of the Jury. The chief varieties were lobiya (*Dolichos sinensis*); urd, máh or mash (*Phaseolus radiatus*); mung (*Phaseolus mungo*); channa (*Cicer arietinum*); kulthí (*Dolichos uniflorus*); rawáñ, (*D. sinensis*, var., perhaps *Catjang*); kúndi (*Cajanus bicolor*); guár (*Cyamopsis psoraloides*); moth (*Phaseolus aconitifolius*); churál (*Lathyrus sativus*), called in Hindústání *khesari*, and mentioned in the Muzaffargarh list as mattar, sometimes it is also called massar; keo (a black bean, doubtfully identified); masúr (*Ervum lens*), the red pottage of Scripture; and bákla, (*Faba vulgaris*). One sample of peas (*Pisum arvense*), grown from acclimatized seed, was exhibited from Delhi.

There were three varieties of moth, viz:—Black, or *moth siya*; white, or *moth safed*; and green, or *moth sabz*; so also were there three varieties of mung—black, white, and green—the white or rather golden yellow variety is perhaps the *Phaseolus aureus* of some writers. Three varieties of gram were exhibited, a perfectly black gram from Ambálá, the common red gram, and the Kábuli or white gram: a sample of gram actually brought from Kábul appeared to differ from that grown in the Punjab, in the size of its grain,

* Species *Fagopyrum esculentum* and *F. polygonum*.

being very much larger: a sample of gram from Dera Ismail Khán was remarkable for the small size of its grain; and a peculiar description of this pulse was exhibited from Muzaffargarh resembling the Kábuli gram more than any other, but redder in its tint. A sample of black and red mixed was sent in from Kúlú. A bluish-black sample was shown from Peshawur—one sample of bhút (*Soja hispida*) was exhibited from Simla: some curious vetches called locally *sradma*, or *sranna*, from Zangskár and Spiti, were exhibited, but they could not be botanically identified, though apparently the same as the "mattar rewari" from Amritsar, "karain" from Gujrát, and "mathar" from Kangra.

GRASS SEEDS.

The grass seeds used as human food were but few in number, and those only appeared to be used in times of famine and general scarcity; but there are some which perhaps are worthy of notice, among this is the phog (*Calligonum polygonum*), from Sirsa, the seed of which is used in times of famine, for human food. Dháman or anjan (*Pennisetum cenchroides*) is considered the best grass for cattle, rapidly improving their condition and increasing their produce in milk. Jhang exhibited a scented grass (probably *Andropogon schænanthus*); a similar specimen was also sent from Muzaffargarh. Muzaffargarh sent also a grass called kawi (*Andropogon muricatum*), the root of which forms the khas khas used in matting tatties and screens for cooling purposes.

The Lahore collection contained a large series of grasses procured from the grazing grounds and jungles of the district: the collection contained over 30 varieties, and consisted of all those that could be procured at the season of the year. Their use is principally as fodder, though some are strong enough as rope materials, and are also used for thatching. The dib grass (*Cynodon dactylum*), is the common grass collected by syces for feeding horses, and there is one species, the "markan" grass, the fruit of which was eaten long ago during a famine, the year of which is still remembered by the title "Markanwalí Sál." It is remarkable to observe how the natives distinguish the many kinds of grasses by separate names, showing the original pastoral habit of a portion of the population.

Methi or fenugreek (*Trigonella fænugrecum*), was exhibited from Lahore, Shahpúr, Simla, Gujranwalla, and Gugaira, and there were a few specimens of pálak (*Spinachia oleracea*), and one of "lúnak," also used as a green vegetable (*Portulacca oleracea*).

HOPS.

Three samples of hops were exhibited, one from Hazara, one from Kasaulí, and one from Simla: the sample from Simla was decidedly the best, and was of remarkably good quality, the others appearing to be old and inferior, or to have suffered very much from the packing.

JURY AWARDS.

The Jury stated the collections for which they considered prizes should be awarded as follows:—

SIRSA.—The Jury recommended a silver medal to be awarded, for the general excellence of the collection, for completeness of information supplied with the specimens, and for individual excellence of certain samples, *e. g.*, Peshawri rice, introduced into the district by Mr. OLIVER, dáúd khání wheat, and ghoni wheat.

KANGRA was recommended for a certificate for the general excellence and size of its grains: the grains from Spiti were particularly interesting; the wheats, barleys, and rices attracted considerable attention.

HUSHYARPUR was recommended for a certificate for general excellence of articles, for completeness and interest of collection, and for the fullness of information supplied with the various articles.

LAHORE was recommended for a certificate for the extent, completeness, and general excellence of collection, as well as for the interest and individual good quality of many of its samples, particularly the wheat and barley.

GUJRAT was recommended for a certificate for the general excellence of its collection.

MUZAFFARGARH was recommended for a certificate for the great excellence of the samples individually, and for the interest attaching to the collection.

SIMLA was recommended for a prize of five shares, or 50 rupees in value for its hops.

The Jury considered the following collections worthy of honorable mention:—

AMBITSA.—This collection was very extensive, and many of the samples of great interest, but it is to be regretted that when they came before the Jury, many of the articles were so worm eaten and dirty, as to render appreciation difficult.

SEALKOT.—The rice in this collection was worthy of notice.

GUGAIRA.—The Gilgit wheat and paighambri barley (black) in this collection, were considered worthy of mention.

DERA GHAZI KHAN.—The wheat from this district was considered of remarkably good character, and entitling the collection to notice.

After thus reviewing in detail the note-worthy samples in the collection, the Jury conclude their Report by offering some general suggestions and observations relative to the state of Agriculture in the Province, as far as that is illustrated by the collection before them.

The grains exhibited can only be judged of as samples according to the appearance, nutritiousness, or other qualities: they furnish no information as to any system of agriculture pursued in their production; the Jury therefore on looking at a sample of wheat, could not take into consideration the method of its production, nor how it was cultivated, whether on such principles as are generally correct, or whether on such as are calculated to exhaust the land and to debase the crop, both in quantity and quality. They are consequently unable to report or suggest with reference to methods of ploughing, sowing, weeding, hoeing, irrigation, rotation of crops, manuring, and the like; but on seeing the *varieties* of grain that are capable of being produced, and the excellency of some of them, they infer that the Province is capable of producing in the different classes of cereals, pulses, and millets, crops of a much improved character, to those now grown and in much greater quantity. They offer the following suggestions on this point. The greatest difficulty no doubt to be met at starting is the indolence of a portion of the agricultural class, and that contentedness with the existing state of things, and that lack of desire for progress and improvement which characterise alike the indolent and the industrious classes of agriculturists. To overcome these obstacles is no doubt difficult, but in order to do so, we are in possession of a great stimulus which operates to overcome both. The love of gain is predominant, and if we can succeed in practically demonstrating, that improved principles combined with painstaking effort, result in a large increase of profit, we shall not fail in our object: there is no impossibility in changing the leopard's spots in this instance, it is within every one's memory, how many of the tribes on our frontier—Afridis, Waziris, and others, whose previous occupation was rapine and plunder, have since the inauguration of our rule, as the Board of



Administration remarked in their first report, sold their horses and bought oxen, and taken to agriculture with zeal. The Rajpút has an inveterate contempt of the plough, yet multitudes indolent as they are, have been forced of sheer necessity to till, or die. The tea cultivation in the Kohistán has given employment to many more; in fact we need not despair of any class.

The Jury are of opinion that improvement might be effected especially by the following means :—

1. By the frequent holding of agricultural exhibitions, either general or of districts, or both, at which rewards should be given for products of novelty or excellence. Such rewards have been already offered in connection with the cultivation of flax at Sealkot, and with the happiest results. The Jury are of opinion that the extension of these rewards to other branches of agriculture, such as indigo, sugar-cane, wheat, cotton, pulses, &c., would be highly desirable.

2. The Jury are of opinion that a great deal might be done, by distribution of improved varieties of seed of all kinds of crops susceptible of amelioration. The improvement of seed stock is a point which has hitherto received little or no attention. Considerable success has already attended the distribution of cotton seed of approved growth, though the experiments have been on a very small scale; the same might result in the case of corns, pulses, &c, especially if done on a larger scale. An attempt has recently been made by the introduction of the Pedigree wheat of England, illustrated descriptions of which have been printed and circulated in the vernacular, but there is no reason why great improvement should not be effected by interchange of seeds within the Districts of the Province, *e. g.*, the beautiful wheats of Rawalpindi district, the Gilgit wheat, and various fine varieties of large grained white wheat, which occur in some Districts, might be advantageously sent for trial in others.

3. The formation of an experimental farm by Government, superintended by a person whose sole duty was to attend to it, who would introduce improvements, carry them out, and send forth instructed laborers once employed for pay on the farm, to cultivate on their own behalf, and practice what they have learnt, and thus exhibit by actual results to the surrounding Zemindars, the value of the plans advocated, would go far to spread abroad an improved system. At home where there are large capitalists, who like MR. MECHT and others, expend large sums in experiments of this kind for the good of the country, such schemes are taken up and worked by private individuals—here we have no capitalists of this class,* so Government must take it up, if it is to be done at all, and there can be no doubt that they would have little reason to regret the step. The farm would soon be more than self-supporting.

The establishment of small model farms would not succeed, they would never be under a uniform system of management. District Officers come and go, and there would be a perpetual fluctuation: one would take an interest, the next might not, and the model farm would be a model, which instead of promoting, would hinder the spread of any improvements.

The Jury do not think that much good would result from an attempt to force indiscriminately all kinds of English husbandry tools on native farmers: the native plough has

* Subsequent events have tended in some measure to invalidate this statement; but it may be allowed to stand until time shall show the result of the scheme for a large agricultural company now under discussion. If these results are successful, it will be a pleasing task to expunge this paragraph from the text.—B. P.

been much cavilled at, but after all it is very well suited for the soil in which it has to work, and there is great doubt whether the introduction of an English plough with its deep furrowing power, and its costliness (as compared to those now in use), would be of any material benefit.

The most important points to start with would be teaching the principles of a good rotation of crops and of a good system of manuring (both these points could be ascertained and tested in an Experimental Farm).

Last, but not least, is to be noted the importance of giving good seed, and teaching the people the principles on which to select their seed, and promoting an easy interchange of approved varieties from one district to another. There can be no doubt that if these points alone were attended to, the productiveness of many districts might be largely increased. And when we recollect that now regular Settlements exist in almost every district, and that the farmers are thus assured that within the long term of years fixed in the settlement contract, nothing can augment the Government claim, and that therefore all extra profits, resulting from their own skill, industry, and improvement, are secured to them beyond the power of a doubt,—when he sees too year by year that roads are being made, renewed, or extended, thus facilitating more and more the transport of grain, &c., to the central markets, he cannot fail to perceive that eventually success must crown intelligent effort. The obstacles as before intimated are great, very great; we must not under-estimate them, or we shall be sure to be disappointed—but at the same time we must not give over our endeavours on their account, or deem the difficulty insurmountable. The progress of the hard-working, rough, unintelligent and prejudiced “Jat” from his present state, to that of a thriving and intelligent farmer, is scarcely more visionary to contemplate, than the transition which history has marked in the past, and our senses verified in the present, the transition from the painted savages of Britain in times of the Druids, or the scarcely more civilized churl of Anglo-Saxon days, to the rich and ever progressing agriculturist of the nineteenth century. It is remarkable that at no period of the history of India has more effort or enquiry been directed than at present, to the extension of trade and to the facilitation of the production of articles of commercial value: iron, flax, coal, indigo, hemp, and many other products have all been (and deservedly) the subject of surveys, experiments, and reports; and the advance of agricultural knowledge should also be urged upon those who are the prime movers and directors of such inquiries and efforts. We cannot but point to the fact that agriculture is the sole occupation of two-thirds of the population, if not more, and that no surer way could be found to promote the physical welfare of the masses, than improving or encouraging that art from which they immediately derive all their substance.

A. M. DALLAS,

Reporter.



894.—[3661]. Mushroom (*Agaricus*)
2 ♀

sp.—?) khumba, khambur. Muzaffargarh. LOCAL COMMITTEE.

This is a species of a pure white color, with a powdery surface and destitute of gills; it is very common in the rains, and is much esteemed as an article of food. Fried in the ordinary way they are equal in flavor to English mushrooms. They are called khumba, and when very large khambur. Although usually eaten fresh, they are also dried for future consumption; they preserve their flavor even in their dry state wonderfully well.*

895.—[3550]. Gúchiyan, Kashmír. H. H. THE MAHARAJAH.

896.—[]. Morels (*Morella esculenta*). Called also "kaná kachú."

They are imported into India from Kashmír (ROYLE, Himalayan Botany, 440).

Gharikán, a species of Polyporus, is used in medicine.

LIEUTENANT LOWTHER, in his Notes on the Products of Kashmír,† writes—"I saw fungi of all sizes and hues daily collected and devoured by old women, which in Europe would have entailed death to the eater. Either the soil of this favored valley, or the stomachs of these hungry beldames, must be of an uncommon order. On the green slopes which are constantly grazed on by sheep and horned cattle, I gathered quantities of superior mushrooms, and observed numerous champignons (a French dainty) in the thickets on the hills. Morels or truffles are produced, which are dried and sold in the chief markets." The writer goes on to mention a morel, which sells at 2 annas per seer, and is called "kunguteh" (kaná kachú?): it imparts a rich mushroom like flavor to soups, gravies, &c.

897.—[]. Truffles (*Tuber Sp*—?) Kangra hills.

These were first found by MR. G. TAYLOR. I am indebted to the letter communicated by COLONEL ELPHINSTONE to the A. H. Society, for the following particulars relating to them:—"The truffle is described as a round rootless tuber, which when peeled and cut, displayed the anastomosing veins and granular formation of the true truffle: they were mostly growing at a depth of a few inches under the soil, while some of the larger ones had made their appearance above the surface. The locality was a rocky tongue between two shallow hill streams, and the

formation appeared to be sandstone thickly overgrown with pines (*P. longifolia*), though the immediate spot where the truffles grew was free from underwood, and only shaded by a few larger trees of the same species. One or two natives recognised the substance and said they had eaten it: others did not know of it. The truffle is brown or black inside; on eating it, it was found highly flavored, and of excellent quality."

This is not the same as the common truffle of France (*Tuber cibarium*), which has a very rough and uneven surface, and is of a dirty black color: nor is it the *Tuber albidum*, or white skinned truffle. Both these species have a thin skin which differs but little in color from the inside. The truffle of the Kangra valley on the contrary has a thick skin, differing in color from the inside, and a smooth surface. It is of an earthy yellow color, not unlike a potato in appearance, and when cut through shows different gradations of color, from white to black, according to its age.

It more nearly resembles the Piedmontese truffle (*Tuber magnatum*), and is of large size, a diameter of four inches being by no means uncommon.

It said that in Europe truffles are never found in coniferous forests, and only in calcareous soils: it is remarkable that as far as we know the Kangra truffle is found *only* in "chir" forests.

Truffles can be preserved as follows:—

After being peeled and washed, they should be placed in a large mouthed bottle, half a teaspoonful of salt and a little water be put over them, and then tightly corked. The bottle should be placed in boiling water and allowed to boil for half an hour. When cold, the cork should be well covered with sealing wax, so as to exclude air.

EDIBLE TUBERS.

898.—[3190]. Potatoes (álú), from Gujranwalla. LOCAL COMMITTEE.

899.—[3972]. Potatoes. Hazara and Dungagalli. DEPUTY COMMISSIONER.

900.—[]. 'Arbi (*Arum colocasia*, L.; *Colocasia antiquorum*, Schott.; *A. ceyptiacum*, Rumph). Synonyms—Ghuyáñ, ghwiyañ, kachálú.

Specimens sent from Simla—Kumharsen (2724)* and Bagal (ghwiya); (2744); Kashmír, Jammú (kachálú) 3551; Dera Gházi Khán (kachálú) 3421; Shahpúr (Khúsháb) 3272 (arwi).

* Memo. on the Products of Muzaffargarh, by W. COLDESTREAN, Journal Agri.-Hor. Society India, xlii., p. 2.

† Journal of the A. H. Society of India, Vol. viii., p. 207.

* The Hill specimens, Nos. 2724-44, may be ROYLE'S *C. Himalensis* (See ROYLE'S "Himalayan Botany," p. 405).

This plant is familiar to most readers: the large bright green arrow-shaped leaves are conspicuous in the fields in the rainy season: the root when fried is not bad, though very inferior to a potato. The use of this plant has been known for ages; it is mentioned by HERODOTUS and THEOPHRASTUS, whence its name *C. antiquorum*.

901.—[]. Zamin khand (*Dioscorea bulbifera*, L.)

The "yam" is a well known vegetable, and ranks next to the potato.

I have placed *Dioscorea bulbifera* provisionally opposite zamin khand, because the descriptions exactly tally. Zamin khand is in form a Samentaceous plant, having a large round root bigger than a turnip, and sometimes of such a size as to weigh 3 or 4 seers.

The root is a very dark purple color; rough, being covered with the little indentations, whence the stems of the plant spring up. When the root is cut open it is yellowish inside; at first it is very bitter and requires to be boiled several times, and sometimes also with lime water, before it is fit to be eaten. It is used also as a pickle. For this purpose it is cut into little pieces, and fried in oil till it becomes of a red color, and then it is put in vinegar, &c.; or in the mixture of mustard seeds ground up with salt, &c., in water or oil, which is sometimes used as a preservative. A sample of the pickle was exhibited in the Lahore collection.

Many species of *Dioscorea* are edible, the roots of some are used powdered as an application to ulcers; the flowers are edible. *D. globosa* is cultivated as the best species.

Simla, Bāgal (2745); Kashmīr (3549); Hushyarpūr (3967).

902.—[3353]. "Tarar," from Srīnagar, Kashmīr. H. H. THE MAHARAJA.

This is the root of the *Dioscorea deltoidea*.

The natives of the Jammū hills assert this root to be the wild kachālā grown old, for the young plants have not root enough to be of service, but when the plant is old the root grows large. STEWART, in his Notes of a Tour in the Khāghān valley (p. 52) gives the local name as *hriss*, and says that it is used for washing silk.

903.—[2574]. Batata, "shakarkand" (*Convolvulus batatas*, L.; *Batatas edulis*, Choisy; *Convolvulus esculentus*, Spreng.), from Palwal Gurgaon. DEPUTY COMMISSIONER.

This is a highly nutritious root; the tender shoots of the plant are eaten also. The leaves make excel-

lent fodder for cattle; the root is said to have a slightly laxative effect.

904.—[2732]. "Bach" (*Acorus calamus*, L.) Simla, Kumharsen.

The root is eaten boiled. A number of species of *Cyperus* yield a fecula which is good as a diet. *C. bulbosus*, *C. esculentus*, and others; and *Scirpus tuberosus* in China.

The name bach is given to *Acorus calamus aromaticus*, which is used medicinally as a stomachic, aromatic and stimulant. In Constantinople a sweetmeat is made out of this root. The leaves are also fragrant, and the plant is exported to Europe, where a hair powder is made of the roots, the scent being supplied by the leaves.*

I think it very questionable whether this "bach" is the *Acorus calamus*: there is an edible species of *Scirpus* described by ROXBURGH as *Sc. hysur* (Fl. Indica, Vol. i, p. 230), which may yield this root.

DR. ROYLE mentions that he has seen *A. calamus* in the Himālayas, and that it is used with the beans or seeds called "kat karanjwa" (*Guilandia Bonducella*) as a cure for ague.

905.—[3971]. Chamūna (*Cyperus bulbosus*, Vahl.)? Peshawur. LOCAL COMMITTEE.

Imported from Kābul; a sample was sent from Hazara.

This is called *Cyperus tuberosus* by the District Committee. In appearance it is a small bulbous nut-like root, with three blunt excrescences on the surface. The skin of the nut or root is dark colored, is easily removed with the nail, or when dry it cracks and comes off of itself, and the inside is whitish colored. It is roasted and eaten. The sample consists of the little bulbs picked off the fibrous root to which they are attached.

ROXBURGH describes a *Cyperus*, of which the little bulbs are picked off and washed, and then rubbed gently in a cloth to remove the sheath, after which they are ground into flour. He states that the bulb has the taste of a roast potato. This exactly answers to chamūna which is probably *C. bulbosus*, Vahl. It is only known at Peshawur, and comes from Kābul.

The rhizomes of *A. cal. aromaticus* have been given successfully as a tonic in cases of intermittent fever. The roots of *C. hexastachyus* are sold by druggists in the bazar, by the name of "magar motha."

906.—[2722]. Onions (*Allium cepa*). Synonyms—Piyāz gandhani (Punj.); basl (Arab.)

Simla, Bhaji (2722); Gugaira (3327).

This vegetable is eaten raw or cooked.

907.—[]. Garlic (*Allium sativum*).

Synonyms—Lasam; som (Arab.)

Simla, Bhaji (2723); Pattiala, Gugaira (3328).

This vegetable is always cooked.

908.—[]. "Surāl" (*Pueraria tuberosa*).

Mentioned by DR. CLEGHORN as one of the plants of Kālū and Kangra. The tubers are exported to the plains.

909.—[]. Roots of "piperi" (*Tulipa stellata*).

Grows in the Sutlej valley, at an elevation of 4000 to 6000 feet: the root is edible (CLEGHORN).

910.—[2818]. Bulbs of "mungoh." Himālayas. MR. GEO. JEPHSON of Simla.

This is described as a climbing plant, growing 20 to 30 feet high.

911.—[2819]. Bulbs of "godhī." (*Marsilea quadrifolia*, L.?) MR. GEORGE JEPHSON.

These are eaten either raw or boiled in the hills.

912.—[3548]. "Bekh-i-nīlofar." (*Nymphaea edulis*, De. C.) Srīnagar, Kashmīr. H. H. THE MAHARAJAH.

This is the root of the edible lotus, which grows so abundantly in the lakes of Kashmir (*vide* "kaul doda," &c., "tukhmī nilofar").

The collection did not include those we regard as fresh vegetables. Those most in use among natives are—

Gājar, carrot (*Daucus carota*).

Shalgham, turnip (*Brassica rapa*).

Mūli, radish (*Raphanus sativus*, L.)

Bhindi or tori (*Hibiscus esculentus*, *Abelmoschus esculentus*, W. and A.)

Mūgra (*Raphanus caudatus*). This curious plant, with its enormously elongated seed-pods, has excited much attention in Europe, and the seeds sell at a high price: here seed can be easily had for Rs. 2 a seer. The natives have an idea that this plant is only the *R. sativus*, subjected to a peculiar treatment, viz., being taken up, and having all its roots cut close round and then replanted.

Onions,* piyāz—gandha (Panjabī) (*Allium cepa*), often eaten raw.

Garlic; lahsan or shom (*A. sativum*), is eaten always cooked.

Beans, "Sem" (pods of *Canavalia gladiata*, De. C.)

There are various plants used as greens, such as—

Methi (*Trigonella faenugrecum*).

Pālak (*Beta bengalensis*).

Khūrfa (*Portulacca sativa*, L.); and lūnak or lūnyān (*P. oleracea*).

The leaves of chaulai and bāthā, species of amar-Kashanthas.

Soyā (*Anethum sowa*).

"Karm" a kind of greens (*Brassica*), used by miris and others.

Various other roots that are used are mentioned in the sequel; also the Cucurbitaceous plants.

Vegetables are usually boiled, and the water squeezed out, after which ghī or oil, red pepper, or other spices and salt is added. Such vegetables as cabbages, calliflowers, lettuce, beet-root, celery, &c., are mostly used by Europeans; a few natives eat green peas with pepper and ghī.

ROOTS YIELDING FECULA.

913.—[3966]. Arrowroot (*Maranta arundinacea*), Jālandhar. MR. TAYLOR.

914.—[] A sample of arrowroot, with a sample of the tubers from which it is obtained, exhibited by DR. JAMESON, Dera Dhūn.

This plant appears to flourish in great differences of climate, having been grown at Madras and also successfully in the Dera Dhūn and Jālandhar. The West Indian arrowroot is obtained from this species, and also from *M. nobilis*, and another; ROYLE adds the *Canna glauca* (*Tous les mois*) as a source of arrowroot; it is from the stems of a species of *Maranta*, that the material for making the much admired mats of Calcutta is obtained. DR. JAMESON writes of the arrowroot as follows:—"It grows well throughout the N. W. Provinces. The tubers are ready in January, which is the best month for preparing the powder. It is thus prepared:—Wash carefully the tuber, and then reduce it to powder on a grater, wash it carefully and strain it through a cloth, by mixing it with water. This must be done at least four times, to extract the poisonous principle."

of Bijnour, says that some castes of Hindūs will not touch onions, garlic, turnip or carrots, from a supposed resemblance in substance to flesh: I am not aware whether such a practice obtains in the Punjab.

* DR. STEWART in his account of the Food of the Inhabitants

* Report on the Botanical Gardens, Saharanpore, p. 3.

915.—[]. *Sálab misri* (*Orchis mascula*, L.; *Eulophia vera*, Royle; *Satyrium*?)

916.—[3970]. Salep, from Kábul. PESHAWUR LOCAL COMMITTEE.

Selling price, Rs. 8 a seer.

DR. CLEGHORN writing from the valley of the Chán-drabhágá (Chenab), says of the plant as follows:—“Salep is believed to be the produce of several Terrestrial Orchids, belonging to the genera *Orchis* and *Satyrium*. The starch is highly nutritious, and the tubers fetch a high price. The commercial route is not exactly known by which they are brought to the plains, but as Kábul horse-dealers carry the genuine salep as far south as Bangalore, we may infer that Afghanistan is the native country. The producing plants occur both in the Himálayas and Nilgherry hills. Old residents at Simla and Ootacamund collect the tubers of various ground orchids which they use in their families as salep.”

DR. BELLEW, of the Guides Corps, speaking of his journey to Kandahár, says that at Hazrah, four marches west of the Karrah fort, at an elevation of 11,000 feet, he met with a species of *Orchis*. The following is extracted from his letter to Government, published in MR. DAVIES' Report on the Trade and Resources of the Countries on the N. W. Frontier.

“The leaves of this orchis are thick and fibrous and contain a good deal of water, its root is a firm roundish tuber, from the size of an almond to that of a walnut. I believe it is the true salep. I have often examined samples of the salep exposed for sale in the bazars, and always found them to contain the roots of three or four different plants. These I could not positively recognize, but conjectured them to be the dried roots of the wild squill, the wild leek, and onion, and of the long thin leaved and other kinds of orchis plants, all of which I have seen growing in the same localities as the true salep-yielding orchis.”

LINDLEY says that the salep of India is produced from a species of *Eulophia*,* and adds that several Orchids and Ophreous plants yield a similar product.†

The salep contains a principle, called by chemists bassorin, which exists abundantly in *Tragacanth* and in the Bassora gum of commerce.

The plant is described thus:—“The root consists of two bulbs, attached at the base of the stems (it is

figured in LINDLEY's Vegetable Kingdom, p. 180). The stem is round, smooth, upright, and about a foot high; naked above but below surrounded with leaves, which are lanceolate, alternate and broadish; the flowers are numerous and on a loose spike.”

The principle value of the plant consists in its nutritious properties; it is eaten boiled with milk like arrowroot, and is much recommended as a diet in dysentery and internal inflammation. According to the doctrine of resemblances, judging from the form of the root, the ancients—PLINY, GALEN, and others—supposed that the roots had great restorative and aphrodisiac powers. HONIGBERGER* says, that the natives attribute different virtues to the different sorts, and mentions in his list of localities producing salep, Hindústán. Beside the two varieties, salep “misri” and “kóhi,” he failed to discover others; but a variety is undoubtedly sold under the name “Hindustáni” (see note on next page). Salep is produced in the Nilghiris, and there are salep yielding species in Ceylon.

MACCULLOCH and others, speak of the salep as if it were an artificial substance made up into little lumps; but all the salep I have seen consists of the pale brown, semi-translucent roots themselves—of various sizes—from quite small, hardly bigger than an almond, to the size of a dry fig. The roots are strung on a string like beads, and so brought from Kábul and other places where they grow; hence the roots bought in the bazar are generally found to be pierced. AINSLIE mentions that salep possesses the curious property of depriving sea water of its salt taste, a property which, he remarks, might be turned to account in long voyages. The mucilage of salep answers best for this purpose.† Salep is said to contain the greatest possible quantity of nutriment in the smallest space. About 60 parts of boiling water are required to one of salep to dissolve it.

As to the locality of this plant, there can be no doubt that it is produced in the hills of Biluchistán, Kábul and Bukhára, whence it is brought into India. In Appendix XIII. to MR. DAVIES' Report, Mashad is mentioned as a locality producing annually one maund of salep, at value of Rs. 4-8 per seer, which comes *viâ* the Bolan pass to Shikárpúr, and then to the Punjab; it is the Egyptian (*misri*) salep coming from Cairo and Arabia, through Persia, which reaches Mashad and Herat, and is thence imported in small quantities to India.

The author of the *Makhsan-ul-adwiya* says, that it grows in all marshes and hills everywhere, but the two best kinds are “rúmi” and “misri.” The “rúmi,”

* ROYLE says (Botany of the Himálayas, 28), that it is found in the hills between Jammú and Kashmir; that specimens of the plant with the root, leaves, and seed vessel, but without flower, were sent to DR. LINDLEY, who considered it a species of *Eulophia*, and that he (ROYLE) has called it *Eulophia vera*.

† Veg. Kingdom, p. 180.

* Thirty-five Years in the East, p. 339.

† Mat. Med. Ind., I., 369.

or Turkish, is the best, because it is allowed to ripen in the ground, while the "misri" is picked sooner.

It is also produced in the hills between Kashmir and Jammú, and that of the best quality. The Pansáris uniformly assert that the real "misri," or Egyptian salep, is not found anywhere here but is imported from Egypt and Arabia. DR. ROYLE mentions (page 371, *Himalayan Botany*) that gardeners from the Saharunpúr garden were sent with the traders into the Hills, and they found salep a little way beyond the Jihlam river, at the place where the road from Kashmir to India crosses it. These specimens were said by DR. LINDLEY to be an *Eulophia*, and ROYLE has called the species provisionally *E. vera*. DR. ROYLE says that he actually tried and succeeded in obtaining good salep from *E. campestris*, gathered near the Kheri pass. (The root is preserved by boiling for a short time, and then drying carefully). LIEUT. HUTTON, in an account of a visit to the Broang pass, says that "even the grassy hills between Phuggoo and Mullianáh, during the rains, immense quantities of a species of orchis were collected as a salep misri, which were dried and sent to Simla, whence they were sent for sale in the plains."

A species, probably says ROYLE, *Eulophia herbacea*, is used for salep at Masúri. Salep misri is said to be found in Hazara but only on the higher hills, but this is really a root, called "karimcha," "mithúwa" and "núr-i-'álam," which sells for about 5 annas a tolah. I have found this plant, which is a species of *Convallaria*, having red berries, and is very like the well known "Solomon Seals" of English gardens. In the district list of the Hazara contributions, salep misri and shakákul are written as synonyms.

From these facts we may safely infer that the salep of the bazars consists of the roots of more than one species; that the best, or salep misri, is that which is the genuine or standard salep of Kashmir, and the other, salep kuhí and Kábúli, such species as are brought from Kábul, Simla and other hill places, while the smallest and worst is found in parts of the Punjab and Hindústán, called salep Hindustáni.* In Europe several orchids yield salep, *Orchis papilionacea*, is called in modern Greek "salepi." The other salep

yielding European species are *O. morio*, *O. mascula*, *O. militaris*, *O. latifolia*, and *O. bifolia*.

917.—[3422]. "Borí." Dera Gházi Khán. LOCAL COMMITTEE.

This is a curious substance in yellow lumps, consisting of the pollen of the dib grass (*Typha elephantina*), collected and kneaded together, perhaps with the aid of a little molasses.

918.—Singhárá, water caltrop (*Trapa bispinosa*).

Though not a root, it is a substance so nearly allied in its qualities and uses to arrowroot, &c., that it is included.

A fine series exhibiting the use of this plant was sent, comprising—

(a.) The plant with the root.

(b.) The brown horny fruits with the long spines, whence the name *bispinosa*.

(c.) The nuts or fruit containing the fecula, with the shell removed.

(d.) Fine flour of the singhárá.

(e.) Fine colored pink flour, used by Hindús to throw at one another in the Húli festival.

The singhárá is planted in the month of June, and is ripe in November, the deeper the water the better the crop. Green singhárá sells at 1 maund 24 seers per rupee, and dry at 18 seers per rupee. Singhárá flour sells at 8 and 10 seers per rupee: it is much used at Hindú festivals, and is also colored and thrown about during the Húli. The produce of one seer of seed in a good season is about 20 maunds. Specimens were sent from—

Muzaffargarh (3968).

Lahore (3643).

Singhárá "purbiya," Amritsar. (The down-country (*purbi*) singhárá is superior).

Singhárá desi (3036). Amritsar.

Jálándhar (3574). The Jálándhar Committee remark that the singhárá grown in the pools near the Jálándhar Cantonment is considered very superior.

919.—[3531]. "Maghz" (or kernel of the) singhárá. Jammú. H. H. THE MAHARAJA OF KASHMIR.

* In the bazars of Lahore city, three varieties were obtained. One the largest, about 1½ inch long and 1½ inch broad, in shape flattened, ovoid, coming to a point; this is called "salep misri" and sells for 4 tolahs per rupee. This is stated not to be produced in Indian countries, but is imported, it does not come by sea, and probably comes from Persia and countries beyond. This specimen was laterally transixed by a string, which once had held a number together.

The next kind is smaller, but otherwise similar. This is called "Kábúli," it is a little over an inch long and less than an inch wide, it tapers gradually to a point, having at the upper

end an indentation where the stems springs: it sells at about 6 tolahs a rupee.

The third variety is called "Hindustáni;" the smallest of all, being very narrow in proportion to its length. It is about an inch long and less than a quarter broad, and looks like the incisor tooth of an animal; it sells at 10 tolahs per rupee. It comes from Kanhuwán, in the Gurdaspúr district, near Batálá, and from several other places also.

Speaking of the singhára, DR. ROYLE writes*—"A species called by the same name, forms a considerable portion of the food of the inhabitants of Kashmir, as we learn from MR. FORSTER that it yields the Government £12,000 a year of revenue; and MR. MOORCROFT mentions nearly the same sum as Ranjit Singh's share, from 96,000 to 128,000 ass-loads of this nut yielded by the lake of Ooller.

The following account of singhára is extracted from COL. SLEEMAN'S "Rambles of an Indian Officer."

The long stalks of the plants reach up to the surface of the water (in which they grow), and upon which float their green leaves, and their pure white flowers expand beautifully among them in the latter part of the afternoon.

The nut grows under water after the flowers decay, and is of a triangular shape, and covered with a tough brown integument adhering strongly to the kernel, which is white and esculent, and of a fine cartilaginous texture. They ripen in the latter end of the rainy season and are eatable till November.

In the N. W. Provinces, the cultivation of these is extensively carried on by the Dhámar casts, who keep boats for planting, weeding and tending this water crop. The holdings of each cultivator are marked out in the tank by bamboos. The rent paid for an ordinary tank is about Rs. 100 a year. But the plants cause such an increase of mud that a tank is quickly spoiled by these plants, and the cultivation is not allowed where the tank is required as a water reservoir for use as such.

SEEDS AND SEED VESSELS USED AS FOOD.

920.—Lotus fruits, "kaul doda" (*Nelumbium speciosum*, Willd.; *Nymphaea nelumbo*, L.; *Nelumbo nucifera*, Gaertn).

Sent from Simla; Ambálah; Dera Gházi Khán (3669); Gugaira (3314).

This is supposed to be the bean of Pythagoras,† "bakla kubti;" not only the black seed or nut, but

also the root and the flower are edible, as is the case also in several species of *Nymphaea*. *Nelumbium* is planted in tanks, says ROYLE, now in India, just as it was in Egypt, by enclosing a bean in a ball of clay and throwing it into the tank, &c. This is not to be wondered at if it be true that the Egyptian bean lotus was originally indigenous in India and found its way into Egypt; although several species of *Nymphaea* still are found in Egypt this species has entirely disappeared. It is accurately described by HERODOTUS as follows:—

"There are also other lilies, like roses, that grow in the river, the fruit of which is contained in a separate pod, that springs up from the root in form very like a wasp's nest: in this there are many berries fit to be eaten, of the size of an olive stone, and they are eaten both fresh and dried." It grew abundantly in all the lakes and canals. STRABO and particularly THEOPHRASTUS, have both mentioned the sacred plant of Egypt, and the latter has most minutely described it, but the *savans* who accompanied Napoleon in his expedition to that country looked in vain for it. It has long ago disappeared. The most remarkable part of the plant is the structure of the seed receptacle, which has been aptly compared to a pomegranate cut in half, or as HERODOTUS says, is like a wasp's nest. When ripe, the seeds are loose each in their separate cells, and if shaken make a noise like a rattle. Unlike the *Nymphaea*, the stems, petioles, and flower-stems of the lotus are raised above the water, a peculiarity which may serve to distinguish it, where so many errors have been made in the specification of the two genera. In this country, as well as in China and Ceylon, the flowers are held especially sacred.

921.—[3557]. Tukhm-i-nilofar. Sirsa. DEPUTY COMMISSIONER.

These are the capsules and seeds of *Nymphaea edulis*, which are eaten or else mixed with flour and made into cakes; they are also *curried*. A sample of the edible root was sent from Kashmir, the stalk and flowers are used also as vegetables, or are dried and used as a cooling medicine.

922. Seeds vessels of the "jhand" (*Prosopis spicigera*, L.; *Adenanthera aculeata*, Roxb.)

Gugaira (3309).

Sirsa (2647).

Mazaffargarh (3658).

Lahore (3615).

These are called "sangri," or "shangar." The tree is abundant in the rukhs and desert tracts, where

* Himalayan Botany, 211.

† Whatever reason there may be for identifying the bean of Pythagoras with the seed of this lotus, it is evident that the poet Horace regarded Pythagoras' bean as the common garden bean; he speaks of it thus (Sat. II. 63):—

"O quando faba Pythagorae cognata simulque,
Uncta satis pingui ponentur oluscula lardo."

Here the homely juxtaposition of beans, cabbage and bacon (familiar to the Augustine poet in his Sabine farm as in the England of to-day) excludes the notion that the bean of Pythagoras was the lotus seed: the argument is by no means conclusive, but the opinion of Horace indirectly expressed comes in curiously in discussing the question of identity.

it grows as a stunted knarled and crooked tree; its wood is hard, and both root and stem make excellent fuel. The seed vessel contains a farinaceous substance of a pleasant sweetish taste. The young pods are eaten green, and when ripe are preserved dry. MR. COLDSTREAM mentions that in Muzaffargarh it is eaten mixed with dahi (or curds) and called "eraita," and that it is also boiled with ghi as a relish. Shángar is used by Hindús on the "bart" or fast days.

923.—[3659]. "Phogli" Muzaffargarh.

This was the only specimen exhibited. MR. COLDSTREAM writes of it:—"Found only in earth on the margin of desert tracts; the plant is called "phoke." It somewhat resembles the caper in its habit and color, being destitute of true leaves and composed of numerous fine and angular branchlets. It is much more slender than the caper, and does not attain to the same size. The flowers and fruit, which are very small and of a gray color, fall off on attaining to maturity, and are gathered by the natives, who make them into bread, or mixing them with ghi use them as a relish. The fruit is called phogli, and is well known throughout the district.*

924.—Sittú (*Boucerosia edulis*). Muzaffargarh.

MR. COLDSTREAM writes of this specimen:—"The sittú, called, I hear in the Jhang district "pippu," is a remarkable little plant of some value in these regions. It has been fully described and figured by EDGEWORTH in his "Flora Mallica," under the name of "Boucerosia edulis."

The root is a wide spreading rhizome, which runs irregularly under ground, among dense thickets of the jhand, jhal, or other shrub, and sends up numerous little stems from 6 to 12 inches high: mostly erect and bearing small sessile acuminate leaves. These shoots are very tender and succulent. They have a pleasant subacid taste, and are extensively used by the poorer classes during the rains to give a relish to their farinaceous diet. Sítú is occasionally, but not often, to be seen for sale in the bazar.

This was described by a native of Lahore as growing in karil thickets, by the name of "súhi gandhal."

CUCURBITACEOUS VEGETABLES.

925.—[3305]. "Kakora." Gugaira. LOCAL COMMITTEE.

This is the *Momordica muricata*, Willd.; it is

cut into slices and dried, these are easily recognized by their being divided into four compartments with seeds in each; the skin is rough.

926.—[3306]. "Kachri" (*Cucumis pubescens*, Willd.) Kachri is also sent from Lahore (3914) and Amritsar.

The following Cucurbitaceous seeds are exhibited.

927.—[3671]. Pumpkin seeds (*Cucurbita maxima*). Peshawur. LOCAL COMMITTEE.

928.—[3672]. Melon seeds (*Cucurbita melo*).

929.—[3673]. "Sirda," melon seeds.

This celebrated fruit rapidly degenerates if sown in the plains. In Kábul it thrives and is in perfection in October and November, when the first frost touches the plant. It is brought for sale into the city of Peshawur largely.

930.—[3380]. Seeds of musk melon (*Cucurbita melo*). DERA GHAZI KHAN.

931.—[3381]. Seeds of water melon, tarbúza (*Cucurbita citrullus*).

A number of melon, cucumber and "kadú" seeds, are included among oil seeds, on account of their yielding oil.

The consumption of Cucurbitaceous plants in the province is very considerable. In the proper season melons, cucumbers, &c., are to be found by thousands, in every bazar, and the natives eat them with delight in quantities. The crop is easy of cultivation: they require at first that the seed should be sown in a damp soil, but after that they require no irrigation for some time till the trailing plant has attained a considerable size. The earth is then loosened about the roots, and afterwards irrigation is given. Manure is frequently given, and some species benefit by the application of alkaline earth to the roots.

The principal cultivated varieties are the bottle gourd, kaddu (*Lagenaria vulgaris*, Ser.), a very large gourd of this description dried, was among the collection. Fakírs make bottles out of this gourd, and the large ones (támbla) furnish the body of the "sitar," or guitar. There is also a wild species, which is entirely bitter and even poisonous. Besides there are the white kaddu, kaddu safed, or "squash" (*Cucurbita pepo*, L.), and the karela (*Momordica charantia*), which is used as a pickle, and also as a vegetable.

DR. ROXBURGH writes of the white kaddu as fol-

* Journal A. H. Society India, Vol. xlii., p. 2.

lows:—"This appears to me to be by far the most useful species of *Cucumis* that I know ; when little more than half-grown, the fruits are oblong and a little downy, in this state they are pickled ; when ripe, they are about as large as an ostrich's egg, smooth and yellow ; when cut they have much the flavor of the melon, and will keep for several months, if carefully gathered without being bruised and hung up : they are also in this state eaten raw, and much used in curries by the natives. The seeds like those of other Cucurbitaceous fruits, are nutritious ; the natives dry and grind them into a meal, which they employ as an article of diet ; they also express a bland oil from them, which they use in food and burn in their lamps. Experience as well as analogy, proves these seeds to be highly nourishing and well deserving of a more extensive culture than is bestowed on them at present. The powder of the toasted seeds mixed with sugar is said to be a powerful diuretic, and serviceable in promoting the passage of sand or gravel. * * * * *

In the Guntoor Circar, where the seeds form a considerable article of commerce, they are mixed with those of *Holcus Sorghum* or some others of the large culmiferous tribe and sown together ; these plants run on the surface of the earth and help to shade them from the sun, so that they mutually help each other. The fruit as I observed above, keeps well for several months if carefully gathered and suspended. This circumstance renders it an excellent article to carry to sea during long voyages.

932.—[]. *Kakri* (*Cucumis utilis*).

This is very extensively eaten by natives, who eat the whole, skin and all, raw. Europeans make a salad of it with vinegar, which is very like the cucumber, but has not so much flavor.

933.—*Khirá, khiyár* (*Cucumis sativus*).

The common cucumber.

934.—*Tindá* (*Cucurbita lobata* ?)

A small round gourd when young, at which time it makes a most delicious vegetable for the table : the fruit is not bigger than a small turnip.

935.—*Pethá* (*Benincasa cerifera*).

This species is used principally in making a sweet-meat, which consists of pieces of this gourd coated with sugar ; it is said to have cooling properties.

936.—*Tori or turai* (*Luffa acutangula*).

This is occasionally cultivated, and cooked as a vegetable or curried.

The species eaten as fruit are—

937.—*Tarbúz, hindwána, water melon* (*Cucurbita citrullus*).

The juice of this fruit is very cooling, and is said to do well for a cooling drink and antiseptic in typhus fever. AINSLIE mentions (p. 217) that he has thus used it with success when he could not obtain oranges.

938.—*Kharbúza, musk melon* (*Cucurbita melo*).

The common sweet melon, is very inferior to the English melon.

A number of seeds and fruits are also eaten, which were not exhibited, as not being capable of preservation—such were :—

Baingan (*Solanum melongena*).

Bhindá tori (*Abelmoschus esculentus*, W. & A. ; *Hibiscus esculentus*, L.)

The flower buds of the *Bauhinia variegata* (*kach-nár*) are also eaten.

The seeds taken from the huge pods of *B. racemosa* are eaten in the hills. The pods look like pieces of thick undressed leather, about a foot long and an inch or two broad ; they are placed over the ashes of a fire till they roast and split open ; the flat soft seeds are taken out and eaten : the flavor is pleasant ; but the seed is not wholesome.

It is said that the seeds of the *palás* (*Butea frondosa*), called *pit pápra*, are occasionally in time of scarcity, turned to account by being ground into flour.

SUB-CLASS (C). FRUITS, DRIED AND PRESERVED, AND PICKLES.

The fruits produced by this province are certainly not remarkable for their excellence. The best fruit, the mango, grows pretty generally; but really good kinds grown from grafts are only produced in a few of the best gardens; in certain districts, however, such as Hushyárpúr and Karnál, a fruit nearly equal to that of Bombay and Malda is produced. The majority of the common mangoes are small, often of a bright yellow and red color when ripe, and very stringy.

Mangoes are often dried before they are ripe, after having been cut in slices, called "ám chúr." The kernels are also occasionally eaten.

Of the other fruits, the guava grows freely in gardens; as does also a yellow bullace, álúcha (*Prunus domestica*). Occasionally trees of the álú bukhára (*Prunus bokhariensis*) are seen. Loquats are not uncommon. Peaches, both round peaches, and the flat Chinese peach, are abundant, but inferior in flavor, and somewhat dry in texture.

Strawberries have been introduced, and certainly are capable of being produced in considerable perfection. The cherry tree has been introduced, and there seems some hope of this fruit becoming naturalized in the plains.

Limes, citrons, and oranges of several varieties, are abundant during the cold season, and have a very beautiful appearance in the gardens. The plantains (*Musa paradisiaca*), "khela" of this province, are larger than those of Bengal, and have much less flavor, but they make a pleasant dish when roasted or fried in slices.

Hardly to be accounted a fruit, is the acrid sloe-like jáman, the fruit of *Sizygium jambolanum*, which requires to be rubbed with a little salt before eating.

Carissa corunda produces the corunda, which serves as a tart fruit, and produces a palatable jelly.

The tipari, as it is called in Bengal, or Indian gooseberry (*Physalis peruviana*, W.), (Pers. ' Urusak dar parda, "Bride in the veil," from the fruit being enclosed within a loose covering), grows occasionally in gardens, and is tolerably good, especially when made into jam.

The "gondi" (*Cordia myxa*) is a yellow berry with a strong sweetish taste, and serves as a preserve fruit.

Grewia asiatica, fálša, yields a berry which has a pleasant acid taste.

Long, thin, very sweet, but otherwise insipid mulberries of two colors, white and black, are produced from the trees of the shahtút (*Morus indica* and *nigra*): this fruit is abundant in the beginning of the hot season.

The bér (*Zizyphus jujuba*) when cultivated yields the "unáb," or jujube fruit. The wild shrub yields a smaller fruit or berry, which is eaten also, and called "kokan ber."

Perhaps the best fruits are those brought from Kábul, which are seen in abundance in the cold weather; they consist of raisins, dried apricots, sultana raisins (kishmish), walnuts, pomegranates (not very good ones), apples, pears, and best of all, very sweet green grapes, which are sent down in round boxes, each grape being picked separate, and packed between layers of cotton wool.

Currants (zirishk), both acid and sweet, the former being the fruit of the berry dried and which resemble European currants, are also brought from Kábul and other hill places.

939.—The following series of fruits in model was exhibited from Lahore, by TEHSILDAR BARKAT ALI KHAN.



English Name.	Native Name.	Botanical Name.
Apple,	Seh, seo,	<i>Pyrus malus</i> .
Pear,	Naspáti, nák,	<i>Pyrus communis</i> .
Pomegranate,	Anár,	<i>Punica granata</i> .
Guava,	Amrúd, anjír,	<i>Psidium pyrifera</i> (white and red.)
Bullace plum,	Alucha,	<i>Prunus domestica</i> .
Bukhára plum,	Alu bukhára,	<i>Prunus Bokhariensis</i> .
Mango,	Am (maghzak, Ar.)	<i>Mangifera indica</i> .
Quince,	Bihí,	<i>Cydonia vulgaris</i> .
Mulberries,	Bedána,	<i>Morus indica</i> .
"	Shahtát,	<i>M. nigra</i> .
Jujubes,	Ber ('unáb),	<i>Zizyphus jujuba</i> .
Plantain,	Khela,	<i>Musa paradisiaca</i> .
Peach,	Aru,	<i>Amygdalus persica</i> .
Apricot,	Zardalú,	<i>Armeniaca vulgaris</i> .
Orange,	Náringi,	<i>Citrus aurantium</i> .*
Citron, acid,	Khattá,	<i>Citrus medica</i> .
" sweet,	Mitha,	<i>Citrus medica</i> , var.
Lemon,	Nimbú,	<i>Citrus limonum</i> .
Thin skinned lemon,	Kághzi nimbú,	<i>Citrus acida</i> , Rox.
Lime,	Sangtarah,	<i>C. bergamotica</i> , Risso.
Galgál,	Galgál,	<i>Citrus galgala</i> .
Shaddock, pomello,	Chakotra,	<i>Citrus decumana</i> .
Jaman,	Jáman,	<i>Syzgium jambolanum</i> .
Loquat,	Kamrak,	<i>Acerhæa carambola</i> , L.
Strawberry,	Lukát,	<i>Mespilus japonica</i> (<i>Eriobotrya japonica</i> , Lind.)
"	Istrábri,	<i>Fragaria</i> .
"	Amlok,	<i>Diospyros lotus</i> .
"	Lasúra,	<i>Cordia myxa</i> .
"	Khirmi,	<i>Mimusops kanki</i> , L.
Tamarind,	Imli,	<i>Tamarindus indica</i> .
Gondi,	Gondi,	<i>Cordia angustifolia</i> .
Falsa,	Fálsah,	<i>Grewia asiatica</i> .
Corunda,	Karunda,	<i>Carissa corunda</i> .
"	Dilá,	<i>Capparis aphylla</i> .
"	Pinjú,	<i>Salvadora oleoides</i> .
Date,	Khajúr,	<i>Phoenix silvestris</i> .
Bael,	Bel,	<i>Ægle marmelos</i> .
Emblie myrobalan,	Anwlá,	<i>Phyllanthus emblica</i> .
Figs,	Anjír,	<i>Ficus caricaoides</i> .

Some of these will receive a separate notice.

The following fruits were exhibited of the nut kind.

940.—[]. Hijli bádám. Lahore. (Not common).

This is the cashew nut (*Anacardium occidentale*.) The pericarp of the nut contains a black acrid and poisonous oil. This oil is called cardole, and is a powerfully vesicating agent. It is applied to warts, corns, ulcers, &c., but it is said that the vapour of the oil when roasting will produce violent swelling and inflammation. A gum is obtained from the tree which

is useful as a varnish, and is said to resist the attacks of insects. The kernel is edible and wholesome.

941.—[]. Walnuts, (*Juglans regia*) akhrot; or Chármaghz (Persian).

The species of this fruit is in every respect similar to those we see in Europe: they are sent from—Simla States—Bagal (3560), Sirmúr (3562), Basáhir (3565), Kofi (3569), Balsan (3570), Baghal (3572); Kangra (Kálú), 3575; Rawalpindi (Mári hills) 3364; Peshawur (Kábul) 3681; Hazara, from Thandiani hills (3706); Kashmir, Srinagar (3710). The tree

* Dr. ROYLE says (Himalayan Bot., p. 129), speaking of the Aurantiaceæ, that he considers the orange, lemon, lime, citron, and shaddock, as distinct species, without being able to say whether the sweet kinds should be ranked as varieties of the acid or be ranked as different species.

grows wild, but the cultivated trees yield the really good fruit. Two kinds are sold: one with a thick shell, and one which has a thin shell, and is called "kághazí" akhrot; the latter is esteemed, and sells at a higher price. In Kanáwar walnuts sell at 1,000 per rupee. Pangi is famous for them; the tree grows at an elevation from 7,000 to 9,000 feet.

942.—[]. Hazel nuts, "findak" (*Corylus avellana*).

Were exhibited from—Simla, Basáhir (3563); Peshawur, from Kábul (3691).

943.—[3682]. Pistachio nut, fistak, pistá (*Pistacia vera*).

Peshawur, from Kábul; Kashmir (3715). Sells at 2 seers per rupee.

These are brought down to the plains in abundance, but often have a disagreeable taste of assafetida, which is brought down also by the same traders.

944.—[3689]. Khinjik (*Pistachia cabulica* or *khinjak*). Peshawur, from Kábul. LOCAL COMMITTEE.

945.—[]. Almonds (*Amygdalus communis*).

Almonds are recognized in the bazar, as at home, by two kinds, bitter and sweet,—Bádám talkh and shírín.

Peshawur, sent two varieties (3677-78), both from Kábul.

"Bádám" sells at 3 seers per rupee; and "bádám kághazí," or thin shelled, at 2 seers per rupee. Kashmir, Srinagar (3709).

946.—[]. Apricot kernels (*Armeniaca vulgaris*), sári or maghz khubáni. Simla, Basáhir.

The stones are sold as "sári" in the hills, and the kernel is called "maghz khubáni," from which oil is extracted.

947.—[]. Seeds of the edible pine (*Pinus gerardiana*), "chilghoza."

Simla, Kanáwar (3566-67); Peshawur, from Kábul (3679).

948.—[3692]. Quince seeds, "bihí dáuá." Peshawur. LOCAL COMMITTEE.

Value, 1 seer per rupee.

949.—[3693]. Pomegranate seeds, "anárdána." LOCAL COMMITTEE.

Selling price, 3 seers 8 chittacks per rupee.

The fresh pomegranates come from Kandahár, where they grow of large size, beautiful red color, and of

great lusciousness. There are six or seven sorts; those of Jelálábád are famous. The common pomegranates of the plains are very poor, and the color inside white or pale pink; they are chiefly useful for the seeds, or the husk of the fruit, which is very acrid, and is used in dyeing, and in medicine as an astringent: the root bark has similar properties.

DRIED FRUITS.

950.—[]. Dates, khajúr, &c. (*Phoenix sylvestris*, Roxb.).

Date trees are found in almost all the desert districts of the Sind Sagar Doab; they grow on the borders of sandy tracts, and in land such that little else grows there. The fruit forms the staple of food in some districts, and is known by different names, according to the method by which it is preserved, split, dried, boiled in oil, &c., &c.

These date trees pay a tax to Government, which forms an important item in the "sair" revenue of some districts.

MR. COLDSTREAM writes of this tree in Muzaffargarh as follows:—It does not grow actually in the sandy desert, but flourishes on its borders in the most wretched soil, and where hardly any other vegetable exists: it is often found in luxuriant groves.

It is a current idea among natives that the palm will not grow except in soil which is or has been subject to inundation. The produce of the tree varies much according to the soil in which it is rooted. The date is here one of the staples of food, and palm groves form one of the valuable properties of the country. The produce of the palms in the Muzaffargarh Public Garden, sells for about Rs. 100 a season. Dates are sold in the bazar under three forms. The most esteemed is the "chirri." This is the date of the best palms, split up the middle (as the name imports) and dried in the sun. The second best is the "pind," which is eaten as it comes from the tree, without further preparation. The least esteemed variety is "bágrí." It is taken from inferior trees, and boiled in oil and water. The same tree always produces the same variety of fruit, and is known accordingly.

The large succulent terminal head of the palm cut from among the mass of leaves at the top of the trees—called in Hindustáni "gaddah"—is commonly eaten, it is called in Muzaffargarh, gari or gallí.

The dates of the Punjab are very inferior to the Egyptian dates of *Ph. dactylifera*.

Dates are carefully preserved when beginning to get ripe, by a piece of matting being put over the cluster to prevent the ravages of birds, &c. The right to the fruit of the trees is often the subject of

litigation. The unsightly hacking of the stem of these trees* into a sort of notched ladder is never practised here, since the manufacture of toddy, which occasions the cutting, is not allowed.

The kernels or stones of the date are esteemed medicinal. They are said, if held in the mouth, to relieve thirst; and as a medicine they are incinerated and mixed with sugar and other ingredients. A gum is obtained from the palm-tree, called "hukmchil."

Dates are exhibited from the following localities.

Gujranwalla (3644).

Gugaira (3311).

Shahpūr (3650).

Jhang (3651), species both dry and fresh.

Muzaffargarh (3652-54).

"Khajūr bhūgrī," "pind," "chirwi" (*vide supra*)
Selling prices, 16 seers, 13 seers, and 8 seers respectively, per rupee.

Dera Ghazi Khān (3663-3665). Three varieties—Khurmah (Persian name,) chivriān (chirwi, *supra*), and būgrain (bhūgrī:) selling prices, 16, 6, 12 seers per rupee, respectively. The chirwi have no stones, and hence weigh lighter than the others, besides being a superior quality.

951.—[]. Dried apricots (*Armeniaca vulgaris*, L.), astak, khustab, kishta and khubānī, are the varieties.

This fruit is grown with great success in some of our hill stations, and makes an excellent preserve. Large quantities are dried and exported to the plains. The unripe apricot dried hard forms the "kishta;" which besides forming an ingredient in chutneys, is also extensively used as an acid brightener in dyeing with safflower and other colors that will not bear alum. The best of the dried apricots come from Kābul and Bukhāra: I find dried apricots included in the Lahaul list, under the name of "pating" (Thibetan); they are brought thither from Balti, and sell usually at the rate of 4 to 6 seers per rupee.

Samples of dried apricots are sent from the following localities:—

Kanawār (3573). Mr. S. BERKELEY.

Kangra, Balti (3578).

Simla, Baghat (3572).

952.—Apricots from Kābul and Kandahār, *vid* Peshawur; the varieties are as follows:—

(3684) "Khubānī." Dried fruit for eating, containing the blanched kernels of the fruit. 4 seers per rupee.

(3684) "Astak be magz," do., without kernels.

(2685) "Khasta" dried apricots, best. 2 seers per rupee.

The trees grow in great luxuriance in Kābul and in Kāghan, the people have tried grafting, but never prune or take care of the trees.

953.—[3642]. Kishta, the dried unripe apricot, from Lahore bazar.

In Kandahār there are eleven varieties of apricots. When dried, without removing the stone, they are called "taifi." Sometimes the fruit is split open, the stone taken out, and the kernel being extracted is replaced: this forms the *khubānī*, a term sometimes erroneously applied to figs. The taifi is what we here call kishta, being made of the unripe fruit and very acid. A hot decoction of these is used by goldsmiths to restore the lustre to old silver and gold ornaments: the article is first heated and then plunged into the kishta solution. I have cleaned silver coins in this way with great success. Kishta is used also in making pickles and chutnies; and in dyeing as a mordant or brightener.

954.—[]. Bér fruit, "unáb" (*Zizyphus jujuba*).

This fruit is brought from Kandahār, but it is also extensively produced in the Punjab. The wild kind also produces an edible berry, and is called "kankanber." Specimens were sent from—

Kangra (Haripūr) 3576.

Hushyarpūr (3580).

Lahore (3590).

Gugaira, both wild and cultivated (3308-09).

Muzaffargarh (3655). Here the *dried* fruit is called bhūgrī: it sells at 1 maund 8 seers per rupee.

Dera Ghāzi Khān (3366), wild bér.

Peshawur, from Kābul (3691): sells at 2 seers per rupee.

955.—[]. Currants, zirishk.

These are of two kinds, somewhat alike in appearance; one is sweet, and grows in Kābul, &c., being a species of small fruited vine (*Vitis*); the other is acid, being the dried berry. Currants were exhibited from—

Kangra (3579).

Basāhīr (3568).

Mahlog (3560), "zirishk tārsh" (*Berberi aristata*, De C.)

Peshawur (Kābul, Bukhārā) 3696; Kashmir and Ladākh, sweet currants (3716).

* Each tree, in places where grown for this purpose, yields from 120 to 240 pints of juice. The toddy is either drunk fresh, or fermented into an abominable spirit, or boiled down into a sugar. Neither one nor the other is done in the Punjab.

956.—Amlok, the fruit (dried) of *Diospyros lotus*.

It has the appearance of a dried cherry, but darker in color. Specimens were sent from—

The Murree hills, Rawalpindi (3649).

The Thandiani hills, Hazara (3707).

The following districts exhibited collections of fruit which do not admit of further classification.

957.—[]. Tamarind, "imli" (Tamarindus indica). DEPUTY COMMISSIONER.
Rohtak.

958.—[3645]. Malta oranges. MR. A. BRANDRETH.
Gujranwala.

This remarkably fine variety of orange continues to flourish at Gujranwala, and bears a fruit of high flavor, far superior to the ordinary orange of the country. The sample was from MR. BRANDRETH'S garden. At Delhi a very fine kind of orange is grown, under the name of "damresi."

959.—[3674]. Raisins, "kishmish surkh." Peshawur, from Kábul. LOCAL COMMITTEE. (See also under *Grapes*, No. 971).

Common raisins dried in the sun : selling price, 18 seers per rupee.

960.—[3675]. Raisins, "kishmish sabz."

Raisins dried in the shade, and preserving a pale green color : 4 seers per rupee. Both these are varieties of the small raisin, called in England the "sultána, or seedless raisin."

961.—[3676]. "Munakka," pudding raisins.

These are the large ordinary grapes, dried carefully in the sun : price, 3 seers per rupee.

962.—Dágh, bloom raisins.

Prepared by dipping the finest bunches into a hot solution of lime and potash, and then drying in the shade.

963.—[3680]. Figs, anjir, from Kandahár.

One seer per rupee.

These figs are dried, flattened, and strung together, and in this state are brought down ; they can be had in any city bazar.

There are two kinds of figs—one being a black fruit, and called *makkai* ; the other white, and called

sáda ; the latter are locally consumed, the former are dried and strung together. In the Punjab the only fig is the small sweet but rather tasteless fruit of *Ficus caricoides*, which is black, having red seeds and pulp.

964.—[]. Mangoes, "ám" or "maghzak" (Arabic), (*Mangifera indica*).

Though this fruit is grown extensively, there are very few good mangoes to be obtained ; the majority are small in size, very fibrous, sweet, but abounding in turpentine, and of a deep yellow color inside.

In good gardens, large mangoes are obtained, and frequently that sort which has a pale yellow pulp and a sub-acid taste. The best of all are the "pai-wandi," or grafted mangoes ; these are of the Bombay, Malda, and other approved sorts. They are at once known by the utter absence of all stringiness of texture, and by their delicate flavor. Natives usually prefer mangoes when they are so ripe that they have lost their firmness, and are quite flabby and soft. The best mangoes come from Máltán ; also from Hushyarpúr and Karnál.

The various "nazál" gardens (*i. e.*, Government property) are generally planted with mangoes, as well as other trees ; and the right to sell the fruit is sold on contract by auction at the beginning of the season ; the produce of a large garden like that of Shálimár, at Lahore, is something very considerable. Natives say that a mango tree will not bear fruit till it is 12 years old, but I have seen fruit on trees certainly not more than 6 or 7.

965.—[3686]. Dried Prunes, "álu bukhárá" (*Prunus bukhariensis*, Roxb.)

Selling price at Peshawur, 2 seers 8 chittacks per rupee. They are extensively brought to the plains, and can be bought in any bazar.

966.—[3687]. Sinjad (or zinzid, Royle).

The fruit of *Elaeagnus orientalis*. This is eaten in Persia : it sells at Peshawur for 4 seers per rupee.

LINDLEY* mentions that the flowers of *E. orientalis* have a delightful perfume, and abound in honey, which is esteemed in some parts of Europe a remedy for malignant fevers.

967.—[3694]. Dried plums, "álu-cha." Peshawur.

968.—[3711]. Apples. Srínagar. Kashmir. H. H. THE MAHARAJA.

These Kashmir apples are better

than those of our Hills, but little superior to those of Kanāwar, grown at Sungnam.

969.—[3712]. Pears. Do., do.

970.—[3713]. Quinces. Do., do.

There are three kinds of quinces—(1), Shakkar, or sweet; (2), Tursha, sour; and (3), Miyāna, or middling. The first is eaten fresh and has a delicious perfume; the second is dried, candied, &c.; the seeds of all are demulcent, and used in sherbets and as a cooling drink in fever.

971.—[3715]. Grapes, angúr.

There are several varieties of grapes recognized—The 1st is “Kandahári,” being a purple grape; 2nd, the “kishmishi,” small seedless grape (producing what are called in England “sultáná raisins”), these are of the varieties called *sahibi surkh* and *sahibi ablak*; the Khátan grapes produce the large common raisins, called “munakka;” 3rd, “Gholab dan,” a white grape; 4th, “Husaini,” these are the grapes that come to Lahore from Kábul, in round boxes packed in cotton wool; 5th, “Sahibi,” a superior grape (white); 6th, “Fakhri,” sometimes called “askari,” a black grape; 7th, “Munakka” and “abjosh munakka,” are grapes dried in the sun; to make abjosh the grapes are plunged into boiling water, and then dried in the shade; 8th, “Rish bába;” 9th, “Dídah-i-gau,” a white grape, with some spots on the skin, which are said to resemble a cow’s eye, hence its name; pious Hindús refuse to eat this grape on this account. 10th, “Kargháni” (white), called from the name of a place; 11th, “Angur Jalálábádi,” called also “khatta angúr,” grown at Chárbaġh, a few miles from Jalálábád; 12th, “Chárangúr,” grown also at Jalálábád; there is a kind of fruit which is called angúr, but is not a grape really, it is properly called “kháya ghuláma.” The common sort of grapes, “rocha-i-surkh” and “rocha-i-safed,” also “toran.”

The green grapes that are so commonly sold in the plains in the winter time, are the “hosaini,” or “shaikh khalli” grapes; they are of large size, pale green color, and of delicate flavor, they are picked before being quite ripe, and packet between layers of cotton wool, in round boxes, made of white poplar wood, and tied up with a string of goats’ hair: these are exported in thousands.

There is yet another, the “akta” grape, which produces bloom raisins, called “dagh,” or more properly kishmish-i-dághi, or abjosh, which are prepared by dipping the ripe bunches of fruit into a boiling solution of quicklime and potash (hence called abjosh, lit. infused in water) before drying in the shade.*

Of vines in the Punjab, DR. HENDERSON writes—“In many parts of the Punjab, the vine thrives quite as well as in Europe; it seems to be indigenous in Hazara, and possibly also on the Salt range, its only fault here seems to be the tendency it has to grow too luxuriantly, so that it all goes to wood and leaves. This tendency might probably be counteracted by proper cultivation and by choosing a poor rocky soil, and selecting suitable varieties of vine. There seems to be no good reason why, if the best vines were obtained, good wine should not be produced in many parts of the Punjab, particularly in the hills on stony ground, where little else will grow. I am not aware that any attempt has been made, on a large scale, to grow grapes in the Punjab for the purpose of making wine. In the plains the grape ripens at a season when the heat is, probably, too great to allow the juice to ferment properly without turning acid, but in the hills this does not hold, the difficulty there will be to get, either a climate where there is little or no rain, or to get the fruit to ripen before the rains set in. In an old number of the Calcutta A. H. Society’s Journal, to which I cannot at present refer, I recollect having seen a notice of a vine found in the South of India, which ripens its fruit much earlier than the common vine of the country. I believe the subject is worthy the attention of tea planters, and others permanently resident in favorable localities.”

972.—[]. Mulberries (*Morus Indica*).

In the Punjab there are two colors of mulberries, red and white, and two sorts of each color; one is a small oval, being rather sweet, but a most miserable fruit. The other, called shahtút, is a very long narrow fruit, looking almost like a caterpillar, either greenish yellow or red-black in color; this fruit is better than the first kind, but still is not much; it is very sweet, but has no flavor.

This shahtút must not be confounded with the real shahtút, the “royal mulberry” of Kashmir, which is the fine, large, sub-acid fruit, having a good flavor just like the English mulberry.

In Kandahár and Kábul there are ten or more varieties—some of them are preserved, dried, and eaten with almonds and raisins, or with walnuts and parched maize or lentils. In the north part of Afghanistan the fruit is dried and made into flour, the bread made from it is nutritious and fattening.

973.—[]. Apples, “seo,” sev or palú (in the hills).

The apples that grow in the plains are small and acid, and fit for nothing but cooking; those of the

* See CLEGHORN’S Forest Report, p. 224, and BELLEW’S Mission to Afghanistan.

hills are brought down to the plains in the cold season. Kanáwar produces great quantities, and also from many other places men may be met travelling downwards with kiltas or long baskets full of apples and pears. Basauli, on the Rávi, is a great place for apples; they are of very pleasing appearance, large and well colored, but though sweet, their flavor is deficient.

974.—Cherry (*Cerasus* sp.—), “álú bálu,” and “gilás.”

These are occasionally to be seen dried; but the fresh fruit is only known to Kashmir and Afghanistan.

975.—[]. Peach, “árú,” shaft-álú.

There are two species in the plains—one a round fruit, which is elongated to a point on one side, this is called “nokí” (from nok, a point); the other is a flat fruit, like the Chinese peach, and is called “tikí,” the latter is much superior, both in juiciness and flavor. At Kandahár there are two sorts, one small and strong flavored, called “bábri;” and one large and luscious, called “tirwah.” Nectarines are called *Mundla árú*.

HILL FRUITS.

I have mentioned the principal of these already, *seriatim*, but there remain a few more, which it is more convenient to describe in a group.

In the Upper Hills, the apricot, jaldáru (or zardáru) is common, its kernel yielding oil. Apples and pears are also grown. There are two species of cherry, the jamuna, or *Cerasus cornuta*, and the *Cerasus pad-dam*; the former has black sweetish berries, which are eaten. The wild pear, called *mehal* or *kainth* (*P. variolosa*), is common also in the hills: it somewhat resembles our medlar, and the fruit is sweet when it is rotten. In Kangra and Kúlú, there is a crab, or wild apple, called “ban mehal” (*Pyrus baccata*) also a quince (*Cydonia vulgaris*).

The fruit of the “trimal,” or *Ficus macrophylla*, is sold in the bazar at Simla.

There are on the Upper Sutlej some species of *Ribes* (*R. rubicula* and *R. glaciale*), which are like currants, but have little flavor; also a species of gooseberry. There is a wild strawberry (*Eragaria vesca*); and a blackberry, called “unsri” (*Rubus fluvius*), the fruit of which is preserved. In Kúlú, the (*R. flavus* and *R. purpureus*), “akhi,” both yield pleasant fruit. In the Kúlú and Kangra list, the loquat (*E. japonica*), and the pomegranate, “darim” (*P. granatum*), both appear. The *mitha-tendu*, or fruit of the *Diospyros tomentosa*, must not be omitted. In the Sutlej valley

Myrica sapida, yields a fruit useful for making sherbets. Among nuts, we find the findak, or nuts of *Corylus lacera*, sold at Simla; and the seeds of the edible pine (*P. gerardiana*) are kept for food in Kanáwar, where they sell at 2 annas a seer. Above Chini, this tree is the principal one in the forest. In the Lower Hills the fruit of the “ámia” (*Phyllanthus emblica*), should perhaps be included: the well known plantain and mango do not occur; the latter is last seen, says DR. CLEGHORN, near Rampúr, on the Sutlej, and the former below Kotgurh. *Eleagnus conferta*, “gehai,” and *Carissa edulis*, yield fruits that can be preserved, the latter making the well known karunda jelly.

976.—[]. Fruit of *Hippophæe salicifolia*, Súrch (Sutlej valley). Tsarkard (Thibet); called in books, “starbu.” Preserve of the fruit. REV. H. A. JAESCHKE.

This is a stout thorny shrub; the fruit is very acid, but when preserved with sugar is palatable. It is common in the valleys of British Lahaul and in Spiti; the natives chiefly value it for hedges and for fuel. The conserve (khandá) of the fruit is used by the Tibetans medicinally for diseases of the lungs and phlegm.

Of the fruits in these remote regions, DR. CLEGHORN mentions the *litsi*, a species of *Prunus*, which ripens in September and has a tolerably sweet fruit something like a cherry. Another kind is the “biliti,” a small sour woolly gooseberry; and a currant like the European red currant, called “rasta” is largely eaten by the people.

977.—Sweet currants, “basho” (Thibetan) (*Vitis* sp.—?) From Lahaul. REV. H. A. JAESCHKE.

These, like the apricots, are imported from Balti.

In this class are included some curious berries or fruits, being jungle produce, which were exhibited from several districts.

978.—[3656]. Caper (*Capparis decidua*). Muzaffargarh. LOCAL COMMITTEE.

The fruit of the caper, called “délé,” is gathered from the tree (which is called “karil”), when it is of a bright red color and about the size of a cherry; it is used as a pickle. Karil wood is said to resist the ravages of the white ant.

This was exhibited from Gugaira (3304).

979.—[3613]. Caper, délá. Lahore. Used as a pickle. The sample was from the rakha in the Sharakpúr tahsil.



It was exhibited from Sirsa, under the name of "taint" (2648).

980.—[3614]. *Pilú* (*Salvadora oleoides*), fruit of the jhál tree.

Exhibited from Lahore, under the name of pinjú (Sharakpúr rakh).

Gugaira (3310).

Dera Gházi Khán (3667).

Muzaffargarh (3657), "khokar."

For an account of the tree jhál (*see* under Timber and Woods).

The fruit is called "pilú," a name often applied also to the tree itself. It is a small red berry which covers the tree in the beginning of the hot season. This is consumed in immense quantities by the Thal villagers, who look on it as a real staple of food. A bad "pilú" crop is regarded as a calamity. When dried the pilú is called "khokar."*

981.—[3360]. *Panír* (*Withania coagulans*). Muzaffargarh. LOCAL COMMITTEE.

A sample was also sent from Dera Gházi Khán (3368).

Selling price, 12 to 14 seers per rupee. The shrub is called akrí, a quantity is also brought from the Hills beyond the Indus; it is used medicinally and also to curdle milk. It is mentioned in the list of Dera Gházi Khán specimens, as being given to horses.

982.—[3302]. *Kúhni* fruit of *Careya arborea*. Gugaira. LOCAL COMMITTEE.

983.—[3312]. *Lasúrá* (*Cordia myxa*). Gugaira. LOCAL COMMITTEE.

This fruit was formerly included in the European *Materia Medica*, and was called *Sebesten*, hence the plant has been called *Sebestana* (Goertn.) The mucilage of the fruit is demulcent. The root is said to be purgative: the larger fruit is called *lasúrá* and the smaller variety *lasúri*.

The following samples of fruits preserved in syrup were exhibited.

984.—[3619-3635]. Fruits, preserved. TEHSILDAR BARKAT ALI.
Lahore.

Preserves of mango, apple, pear, melon, quince, lemon, 'amla (*Emblica officinalis*), halela (*Beleric*

myrobalan), carrot, bér, ginger, and conserve of red capsicums.

985.—[3646]. Preserved lemons. Gujranwalla. LOCAL EXHIBITION COMMITTEE.

986.—[3697-3705]. Series of preserves. LOCAL COMMITTEE.
Peshawur.

Preserve of lemon, bukhára plum, limes, rhubarb, cherry (gilás, lará siyá), apple, quince, pear, peach and water melon.

PICKLES.

The native method of making pickles is very different from the European. Their pickles are for the most part such that they will not keep good for years like those of MESSRS. CROSSE and BLACKWELL, but are prepared to last only a few days, and are consumed as soon as made; hence the majority of districts were prevented from exhibiting them. The Lahore and Gujranwalla districts however contributed a series. Pickles are either prepared with vinegar (native vinegar is generally sugar-cane juice fermented till it turns acid) or else with oil, or else with some "masálah," as mustard seeds ground up with salt, &c., which being moistened with a little oil or water, is rubbed over the vegetable to be pickled, and left until it becomes sour.

Another form of pickle is "chatni," of which there are many varieties, composed of mango, tamarind, with red pepper, "sámbar" salt, spices, sugar, vinegar, and a number of other ingredients, varied according to the taste of the maker, or according as he wishes to produce a hot, sweet, acid, or pungent "chatni." All these articles are used as relishes by natives with their dál and rice and chapatties.

I have seen people of the lower class make their meal off large coarse chapatties, taking with each bread, as a relish, a morsel of lemon pickle prepared with oil and ground mustard seed.

987.—[3631-3641]. A series of
2 s

* MR. COLDSTREAM on the Products of Muzaffargarh.



pickles from Lahore, exhibited by TEHSILDAR
BARKAT ALI.

Potato (in vinegar), galgal (in oil), lemon, dela
(the fruit of the caper), (in vinegar), mango (in oil),
red pepper (in vinegar), ginger, onion, apple, turnip,

zamin khând, "halela" (in vinegar), aîwla (*Emblic myrobalan*).

988.—[3647]. A jar of pickles. Guj-
ranwalla. LOCAL COMMITTEE.

SUB-CLASS (D). TEA.

The cultivation of tea presents one of the strongest proofs we could wish for, of the advance that has been made within the last few years, from the time when DR. JAMESON first inspected the most promising localities in the Kangra hills, until now, when both in the Punjab, and in Garhwal and Kamaon, the number of tea companies, and individual planters, form a list that would cover several pages were I to enumerate them.

I propose before detailing the specimens exhibited by the various companies and individual planters, both in the Punjab and the North-West, to present a brief statement of the past progress and present state of tea cultivation, gathered from the various reports and correspondence which have been laid before Government, and which are to be found scattered through the published and unpublished records of the Governments of the Punjab and N. W. Provinces.

The idea of establishing tea cultivation in the Himalaya appears to have been entertained from a very early period. DR. ROYLE quotes from a report which he communicated to DR. WALLICH for the information of the Indian Government in 1827,* while in the body of the work itself (which was published in London in 1839), a series of pages full of the most interesting details is devoted to prove that from the similarity of climate, flora and geological structure of the tea districts of China with portions of the Himalayan range, there can be no doubt that the tea cultivation would succeed.

"The flora of the mountains, including that of the most northern parts of China, shows an almost universal identity with the genera found covering the

elevated belt of the Himalaya. If we commence with the bases of these mountains, and pass successively through the several belts, and (analogous to what takes place between the parallels of latitude of 40° and 45°), experience the rapid decrease of mean temperatures and the quick succession of vegetable productions, we shall first find a vegetation similar to that of the southern provinces; the agricultural products consist of rice, millet, amaranth, an esculent *Arum*, ginger, turmeric, a little cotton, and sugar at the season, succeeded by wheat, barley and buckwheat in the cold weather months. Along with plantains, oleander, and some of the orange tribe, we meet also with some species which were long considered peculiar to China, as *Marlea begoniifolia* and *Houttuynia cordata*, with species of *Chloranthus*, *Incarvillea*, and *Hiptage*.

"On ascending we pass through different gradations of vegetation until reaching the regions of the oaks and rhododendrons, which is immediately succeeded by that of pines, we meet another mild region, with a flora which must approximate to that of the mountains of the central provinces of China, for here we find the Chinese genera, *Abelia* and *Eurya*, with *Stauntonia*, *Kadsura*, *Hovenia*, &c. * * * But it is in the midst of similar vegetation that the tea plant is everywhere found. It cannot be a difficult task to transfer from one country to another, a plant which grows naturally and is cultivated extensively in one which possesses so many of the plants which are common to the two, and not found elsewhere."

In a note, DR. ROYLE notices still further the similarity of products of the Chinese tea districts and the Himalayas: he says—"As the camphor, varnish, wood oil, and tallow trees, constitute a part of the natural riches of China, so we have in the Himalayas and at their foot, *Camphora glandulifera*, containing solid grains of camphor in its wood,—*Melanorrhæa usitata* (Wall) yields abundance of excellent varnish, besides *Rhus vernicifera*, the varnish tree of Japan, which is common in the Himalaya. Wood oil is yielded by several species of *Dipterocarpus*: oil is obtained from apricot seeds, and from *Prinsepia utilis* in China as it is in our hills, and paper of the *Daphne cannabina* is also a product common to both—as also the butter of *Bassia butyracea*, which abounds at Almora."

In summing up the arguments he has adduced, he says (p. 126): "Even supposing that the finest flavored teas should not be at first successfully cultivated, an immense consumption would be found among Asiatic nations for even inferior kinds, which would still be superior to what they now use. This would greatly increase the resources of the hill provinces, and give rise to an extended commerce with Northern and Central Asia, as the Tartar nations habitually use it; and all Asiatics, even the natives of India, think so highly of the virtues of tea, as to have recourse to it in cases of sickness.

"But at all events, an article of which the exports amount to about 50 million of pounds in weight, and in value to two and a half millions of money [this was written in 1839], is well worthy the consideration of a Government which possesses territories apparently so favorable for its cultivation."

With regard to the comparison of climate, MR. FORTUNE writes:—In comparing the climate of these provinces with that of China, although we find some important differences, yet upon the whole there is a great similarity. My comparisons apply of course, to the best tea districts only, for although the tea shrub is found cultivated from Canton in the south to Tan-chow-poo in Shantung, yet the provinces of Fokein, Kiansee, and the southern parts of Kiangnan, yield nearly all the finest teas of commerce.

"The town of Tsong-gan, one of the great black tea towns, near the far famed Woo-e-shan, is situated in latitude 27° 47' north. Here the thermometer in the hottest months, namely in July and August, rarely rises above 100°, and ranges from 92° to 100° as maximum; while in the coldest months, December and January, it sinks to the freezing point, and sometimes a few degrees lower. We have thus a close resemblance in temperature between Woo-e-shan and Almorah. The great green tea district being situated two degrees further north, the extremes of of temperature are somewhat greater. It will be observed, however, that while the hottest month in the Himalayas is June, in China the highest temperature occurs in July and August; this is owing to the rainy season taking place earlier in China than it does in India."*

Looking forward from these early predictions to the actual results attained, we find MR. H. C. WATTS in 1853, addressing the Secretary to the Court of Directors of the East India Company as follows:—

"The experiment has proved, beyond a doubt, that the climate and soil of various parts of the Himalayas

are admirably adapted to the growth of the tea plant."

And he goes on to quote the words of DR. JAMESON, in his Report on Tea to the Government of the N. W. Provinces, in 1857, as follows:—

"The tea plant is thriving well from Hazara, in the Sind Sagar Doab of the Punjab, to the Kalie river, the eastern boundary of the British Province of Kumaon in the Himalayas, or over 5° of latitude and 8° of longitude."

The record of such results, so wonderfully in accordance with the early predictions of DR. ROYLE, is not only interesting in itself, but important as a striking proof of the positive value of meteorologic and botanic observations; showing how trustworthy are deductions made from phenomena so recorded.

The principal tea district in the Punjab is the country around the Kangra valley, and in this place it was first introduced from plants already established in Kumaon. As my remarks are intended only to illustrate the growth of tea in the Punjab Himalayas, I am precluded from reciting the early history of the neighbouring plantations of Kumaon and Gurhwal.

In the year 1848,* two small plantations were established in the Kangra valley, under the care of DR. JAMESON, Superintendent of the Botanical Gardens, Saharmpur, and of the tea plantations in Kumaon. In 1852, LORD DALHOUSIE then Governor General, on visiting Dharmasala, saw also the tea plantations, expressed his satisfaction at what had been done, and offered encouragement to further undertakings. This resulted in the establishment of the Holta plantations and factory. The plantation was formed on a tract called Holta from a village of that name in the neighbourhood: it had been left uncultivated from superstitious motives by the natives, and was by the Settlement papers reserved as the property of Government, consisting of 4,000 or 5,000 acres. The site is thus described by DR. JAMESON in a letter to the Secretary to the Government of India, dated March, 1853:—

"When the Most Noble the Governor General visited the valley, there were only two small nurseries formed from plants imported from Kumaon, in localities distant from each other, the one at Nagrota, and the other at Bowarnah in the Palam valley, in order to show that tea could be advantageously grown.

"In these sites the plants are growing with the greatest luxuriance, hundreds being five and six feet high, and from them, last season, 227 lbs. of teas—pouchong, souchong, and hohea—were prepared.

* Selection from Public Correspondence, N. W. Provinces, part 11, page 261.

* 2nd Punjab Report, Indian Records No. VI., p. 194.

Samples of these have been forwarded to Calcutta for transmission to the Hon'ble the Court of Directors, in order that their quality may be tested by the home brokers. In addition to the teas, the nurseries yielded about a ton of seeds. The luxuriant growth of the plant induced His Lordship the Governor General, after personal inspection, to sanction the formation of an extensive plantation; and for this purpose, I selected the waste plain of Holta at the base of the Chamba range, in about north latitude 32° , and longitude $76^{\circ} 30'$, a large highly undulating tract of waste land, bounded on either side by two considerable streams, the Awa to the east, and the Nigal to the west, which take their rise to the north in the snows of the Chamba range. These rivers completely command the plain; and their waters can, at any time, be made available for irrigation when a drouthy season occurs, and it is deemed necessary.

"The plantation is from 3,500 to 4,000 feet above the level of the sea; its soil consists of a rich black vegetable mould, varying in thickness, from two feet to six inches, and rests upon a sub-soil of stiff red clay. In this clay boulders of granite abound, forming a characteristic mark of the valley. These boulders occur of all sizes, varying from fifty feet in height, and three hundred feet in circumference to the size of a pea, and in every locality: to the alkali in the felspar which they contain, is owing, in a great measure, the fertility of the soil. In all places the drainage is good; the whole land being highly undulating, and dipping under an angle varying from 4° to 25° . The plain, if such a term can be applied to a tract of land consisting of a series of small hills and valleys,—spurs issuing from the Chamba range and dipping to the south,—is of great extent, almost entirely waste, and used by the Baiparees for grazing their cattle. On it but few trees are met with, consisting of the cheer (*Pinus longifolia*), oak (*Quercus incana*), elyár (*Andromeda ovalifolia*), &c., characteristic of considerable altitude.

"Here snow falls annually during the months of December and January, and lies for some length of time. The tea already prepared, the produce of leaves of the Nagota and Bowarnah nurseries, is very highly flavored; and as the altitude of these places is much below Holta, I doubt not, but that this plantation will produce teas of a very superior description. The Chinese tea manufacturers, now employed there, state that the leaves grown in the Kohistán of the Punjab, are superior to the produce of Kumaon and Gurhwal for manufacturing teas; and they speak from experience, as they have been working in both places. With their opinion I coincide, and attribute the advantages to the heavy falls of snow and rain which annually take place in the cold weather in the Kohistán. In

China, in the northern districts, where snow continually falls in the cold weather, the teas are found to possess the highest aroma; and, probably, the same will be found to be the case with the Punjab teas, and they will thus command the greatest sale and highest prices."

The subsequent progress of the Holta factory is thus noticed in a letter from the Secretary to Government of the Punjab to the Secretary to Government of India, dated June 11th, 1859.

"Year by year the cultivation has extended, until it now occupies 800 acres, bearing some five millions of plants. It is estimated that the produce of this year will amount to 26,000 lbs. of excellent tea, valued at Rs. 52,000, or £5,200; and that when in full bearing, the yield will increase to so large an amount as Rs. 1,50,000. The expenses are computed at Rs. 16,000; there is, therefore, a very considerable profit, besides which, vast quantities of seeds and seedlings are distributed gratis to the native landholders of the district, with the view of diffusing the culture of the plant."

Since these days the spread of tea cultivation has been extensive, and at the present day, there are both Natives and Europeans producing tea. Of the qualities of this tea I shall speak presently. Some idea of the rapid extension of cultivation and formation of new companies may be gathered from the following passage from a report addressed to the Government N. W. Provinces by Dr. JAMESON. The cultivation has probably now exceeded the limits: in fact every year adds to the number of cultivators and companies.

"In the Pinjore Dhoon, the MAHARAJA OF PUTIALLAH has formed a small plantation, by the assistance of BAHADOOR SINGH, a highly intelligent native, son of the late Chowdree of the Saharunpore gardens, and to him a large supply of seeds and 20,000 plants have been given for extension.

"In the Simla hills, GENERAL INNES and MAJOR GOAD have both formed plantations, and are actively carrying on the cultivation; and to them large supplies have been given.

"At Kotghur, to the north of Simla, a small company, represented by MR. S. BERKELEY, has been formed, and by it a small quantity of fair, marketable tea has this season been prepared by native tea makers supplied from the Government factory in the Kangra valley. To enable them to extend operations a large quantity of seed has been given.

"To the westward, in Kálú, MR. KNOX, the Assis-

tant Commissioner, has formed a small plantation, which is thriving vigorously, and to him, for extension, a large supply of seeds has been given.

"In Mundee, the VUZEER GOOSAIN has commenced the cultivation.

"In the Kangra valley, numerous parties, both Native and European, have taken up the cultivation with vigor and energy.

"At Beijnath, CAPTAIN FITZGERALD, representing a company, has settled, and is actively engaged in breaking up land and planting.

"To the east of Holta, DR. CRAWFORD has established a plantation at Lanode.

"At Bawarna, MR. JUDD has taken up a considerable tract of land, and there formed a plantation.

In the immediate neighbourhood of the Holta plantation, several parties have established themselves.

"To the south, on the waste plain of Holta, the Nassau Tea Company, have established themselves on the land given by Government to MR. ATHERTON, late of the Civil Service, to form a colony of Christians. By him a number of natives were brought in to the Kangra valley in order to cultivate this waste land. Seeing, however, the heavy work before them in order to obtain a livelihood, the native Christians to a man deserted, and thus left the proprietor without cultivators. He therefore sold the land to the Nassau Tea Company for Rs. 3,600. This land, stated by the natives to be unfit for any kind of cultivation, was selected and made over to me by orders of Government in 1850-51, and part of which now forms the Holta tea plantation.

"To the west of the plantation, at Bundlah, the Kangra Tea Company, represented by MR. MEAKIN, have taken up a large tract of country, and are carrying on operations with great vigor.

"Further to the westward, and near Bundlah, CAPTAIN DUFF, representing a company, has settled.

"Still further to the west, CAPTAIN BATT, also representing a company, has established himself.

"In the neighbourhood of Dhurmsala, CAPTAIN YOUNGHUSBAND has formed a plantation.

"At Shahpúr, in the Pálam valley, COLONEL BURNETT has commenced tea operations."

In 1853, the yield of the two original plantations, and the first gatherings of the new Holta plantation, were in all 546 lbs. 8 oz. *

This produce was sold in March 1854, with some additional produce, making a total of 709 lbs., which fetched a total of 977 Rs.

In 1854 to 1855, 1,682 lbs. produce, sold for Rs.

3,140-10-8; and 1855-56, 5,077 lbs.; sold for Rs. 6,854-3-10.

The expenditure on the plantation was then Rs. 8,502 per annum.*

In 1859-60, the out-turn of tea was as follows:—

	lbs.
Black—Souchong,	1,870
„ Pouchong,	22,480
Green,	4,942
	<u>29,312</u>

And in 1861-62, the following quantities are reported:—

	lbs.
Black—Souchong,	7,018
„ Pouchong,	4,007
„ Bohea,	14,056
Green—Hyson,	365
„ Young do.,	491
„ Gunpowder,	81
„ Imperial do.,	41
„ Hyson skin,	475
Total,	<u>26,532</u>

This year, 1861, yielded somewhat less than 1860, but the deficiency was, I believe, owing to unusual drought. The general increase, however, is very remarkable; and there seems no reason why the cultivation should not increase still further. DR. JAMESON says, in the letter above quoted:—"These remarks show that the idea generally prevailing that the land fitted for tea cultivation is limited, is erroneous; and were all the lands in Kumaon, Garhwal, Kálú, Kangra, to be employed, teas could be prepared in sufficient quantities to supply both the Indian and European market." And again:—"The Kangra valley is about 60 miles long, and averaging 10 miles in breadth, of it at least half is well adapted to tea cultivation; much land well fitted for the same purpose is to be met with in Kálú, Mandi, &c., and throughout the western hills." A nursery has been formed at Kanghar in Kálú, and the plants thrive admirably.

The Administration Report† for 1863-64, shows a still further increase in tea. The area under cultivation was brought up to 600 acres, the yield of tea was 24,777 lbs., of which 4,720 lbs. were prepared from leaves purchased from zemindars; this shows an increase from the last year of 8,652 lbs. In the same year 570 maunds of seed were distributed to Europeans, and 191 maunds to native planters; also seedlings to the number of 1,769,000. The price of tea seeds was fixed at Rs. 20 a maund; seedlings are

* 2nd Punjab Report, India Records, VI., 194.

* 3rd Punjab Report, Indian Records, XVIII., 112.

† Report for 1863-64, p. 143, para. 285, *et seq.*

sold at half an anna each, whereas the original plants from China cost Rs. 40 a piece !

In the Report for 1864-65, will be found at para. 408, a summary of the results of the attempted cultivation in the Murree hills, at Seelah, Tret, Shamli, and other localities; they show that the plants live, but the results are not very encouraging.

At the Government factories, the out-turn for the season of 1864 was 40,246 lbs., of which 5,451 lbs. were purchased from native cultivators. The average price realized was :—

Description.	Maximum.	Minimum.	Average.
	R. A. P.	R. A. P.	R. A. P.
1st class green, ..	1 12 0	1 6 0	1 9 8
Hyson skin, ..	0 8 0	0 6 0	0 6 5
Fine souchong, ..	1 12 0	1 8 0	1 11 5
Souchong,	1 10 0	1 8 0	1 8 8
Pouchong,	1 0 0	1 0 0	1 0 0
Bohea,	0 12 0	0 8 0	0 8 9

54 tons of seed were distributed to Europeans, and 16 tons to Native planters, and no less than 1,769,083 seedlings. The Government having now seen the tea culture fully established, has sold these factories to private hands.

SIR ROBERT MONTGOMERY has left on record a Memo. on the Kangra Tea Plantations, which forms Appendix IX. to the Report for 1864-65.

The cultivation of the tea has proved on the whole very acceptable to the hill people. All natives have at first an aversion to anything new, but Government made good terms for zemindars who would grow tea. It distributed gratis large quantities of seed and young plants, and a guarantee for a fixed period was given to the zemindars to buy the leaves they produced at the rate of Rs. 8 per maund. If advances were made to a zemindar, he was bound to continue the cultivation till he repaid in the value of raw leaves.

The cultivation of tea appears to have been taken to in the hills by classes of men who had the most violent aversion to ploughing or any other form of agriculture.

The castes of Rajpúts were of this class. It was estimated in 1853, that there were more than 10,000 of this caste, who were remnants of the Sikh armies, or of bands kept up by the Rajahs of petty states in the hills : they considered it derogatory to their caste to plough, but would work with the spade ; and DR. JAMESON writes, that hundreds of Rajpúts had ap-

plied for employment at Holta, so long as they were not to use a plough. As a large portion of the Holta tract was of necessity broken up by the spade, numbers of these men were employed.

The cultivation of tea appears remarkably simple. A few seeds are dropped into small holes, made at certain distances apart in rows. The young plants require weeding. MR. ROBERT FORTUNE visited the N. W. Provinces plantations in 1851, and remarks that the best soil was a sound, light loam, well mixed with sand and vegetable matter, moderately moist ; that land on the hill sides is to be preferred to low flat lands. MR. FORTUNE remarks on the system of irrigation practised, and asserts it to be injurious. A Chinese manufacturer, who accompanied him, seeing the plants artificially irrigated in the Indian manner, observed that was the way in which they cultivated rice in China.

MR. FORTUNE adds that, when tea will not grow without irrigation, it is a sign that the land is not suited for the crop, but he does not preclude irrigation in a season of drought, or as an exceptional measure.* Plucking leaves from very young plants is highly detrimental, as it weakens the plants and renders them unproductive. With regard to the quality of the tea produced, it may be observed generally that the rapid extension of its cultivation, the high prices at which it sells, and the demand that exists for it among Europeans, sufficiently proves it to be of the best quality.

It is made of all the usual China varieties, of both green and black tea.

The weight of evidence goes to show that green and black tea are of different species, which are distinguished by the names *Thea viridis* and *Thea bohea*. The *Thea viridis* has one distinction, that it is very much harder than the *Bohea* ; it is grown in the northern tea districts of China, where snow and frost is not very unfrequent. This variety has been known to flourish in England in the open air.†

Thea viridis is described as a large strong growing plant with spreading branches, leaves from three to five inches long, very broadly lanceolate, pale green, singularly waved, with the margin reflexed. *Thea bohea* has smaller sized leaves (not above half or two-thirds the size of the former), erect stiff branches, the leaves being perfectly flat, more coriaceous, of a dark green, and the plant cannot bear the frost of an English winter. DR. ROYLE quotes MR. REEVES, to whose opinion he attaches great weight, from his

* Selections from the Public Correspondence of the N. W. Provinces, Part XI., No. 56.

† See ROYLE'S Himalayan Botany, p. 109-110.

long residence in China. The latter expresses surprise, that any one who had been in China, or had ever noticed the difference in color between the infusions of the two varieties, could suppose for a moment that they were the produce of the same plant, differing only in the mode of curing; particularly as they do not grow in the neighbourhood of each other. It appears, however, that black tea, can be prepared so as to form a green tea, which fact has here given rise to an opinion that the two sorts are identical in their origin.

In China the *green tea* district is included between the 29° and 31° north latitude, and the *black tea* district, between 27° and 28°.

It appears that the tea plants may grow luxuriantly as plants, in localities where the leaf invariably turns out so ill-flavored, as to make the cultivation unprofitable. Tea has been tried in Penang, but though the plant grew, the tea was bad; a similar result was experienced when tea was attempted at Rio Janeiro.

This effect of climate and situation is remarkable. The hill teas in the Punjab and North West are very different in flavor from the teas of Assam; and those again from the teas of China. Some of the hill teas have a tendency to become very bitter in infusion; on this account it is a common custom to mix them with the China tea. MR. FORTUNE, in 1851, urged the importance of taking pains to procure from China, seeds and plants of really superior varieties, and stated that the first tea plants brought to Kumaon had been brought from some districts in the south of China, and from very inferior plants, merely owing to the greater facility of obtaining and removing them from the particular locality. Much improvement has been effected since then, but the subject still requires to be kept in view.

There can be little doubt on the whole, that the Kangra and other Punjab hill districts produce trees of the finest quality and aroma. Even in 1854, when the first lot of 709 lbs. was sold, the souchong fetched from Rs. 1-15 to 2-5 per lb; pouchong, Rs. 1-3 to 1-8; and bohea Rs. 0-12 to 0-15; and DR. JAMESON pronounced these teas to be the finest yet produced in North India.*

Before enumerating the exhibited specimens, it is necessary to take a passing glance at the Punjab tea-trade, from China and other sources.

Tea is not a beverage of general consumption in the Punjab, except among the Kashmiris,—colonists who having left their original homes in Kashmir, have settled in the Punjab, in Jalálpur, Amritsar, Ludhiana, and other places, bringing with them their shawl-weaving trade, and their class of Kashmiri pandits who become moonshees and writers: all these consume tea largely. As yet the hill teas have an inconsiderable sale among natives generally; they command prices which are too high for the ordinary class of purchasers. The imports of China tea by Calcutta are considerable. In 1852, 25,000 standard maunds of tea came to Amritsar, of which, about 2,000 passed on to the Kashmir territory.

Kashmir is also supplied from Chángthán *via* Lé, but this tea is principally consumed at Jammú, Kashmir and Ladakh; the last place is dependent on this source.

Black and green tea in cakes, called "dhámún," is imported to Lé from Chángthán, to the value of Rs. 30,000.

Lhasa tea appears to have now become an article of import. The names of the China teas imported by land are—Green, "karakokla," "khushbo" (scented), and "sabad" (green). The black is called "takhta siya."

As before remarked, most natives esteem tea as a valuable beverage by way of medicine; but there is every probability that tea, if cheaply obtainable, would be universally consumed. At present, even the cheaper tea, at Rs. 0-12 a lb., is beyond the reach of ordinary natives; while the good kinds, at Rs. 2 and 2-4, they would not think of buying. The hill tea of the Punjab is hardly at all to be met with in the bazars of the large cities as yet, but China tea imported by sea is used; also, occasionally, brick and other Thibet and Chinese teas are to be seen, which have made their way down from the remote markets before alluded to.

I conclude this sketch with a table showing the existing plantations in the West Himalaya, exclusive of the late Government plantations at Holta and Dharnsala, and those in the Murree Hills.

* 2nd Punjab Report, Indian Records, No. VI., p. 195.



Locality.	Name of owner or manager.	Extent of estate in acres.	Number of acres planted.	Number of acres prepared for planting.
1. Shahpúr, and its vicinity,	Col. Burnett,	250	76	..
2. Dharmsala,	Capt. White,	162	50	..
3. Kanyará (near Dharmsa- la),	Mr. Shaw,	340	120	40
4. Gopalpúr and vicinity (be- tween Dharmsala and Holta),	Kangra Valley Tea Company,	557	No information.	
5. Kusmál (near Holta),	Mr. Mackay,	200	150	50
6. Ditto,	Capt. Batt,	700	150	100
7. Bandlah (near Holta),	Capt. Duff,	1,075	200	50
8. Holta,	Nassau Tea Company, ..	2,960	416	..
9. Near do.,	Mr. Conlan,	57	10	..
10. Bandla,	Kangra Valley Tea Company,	320	No information.	
11. Lanod (near Holta),	Dr. Crawford,	700	60	..
12. Baijnáth, &c.,	Capt. Fitzgerald,	1,120	200	20
13. Dewal,	Mr. Blewith,	198	..	..
14. Ditto,	Mr. Gordon,	389	4	0
15. Sansúl, and other villages,	Dr. Crawford,	495	No information.	
16. Kúlú valley,	Lieut. Knox,	700	400	250
17. Ditto,	Kúlú Valley Tea Company, ..	264	23	13

The exhibited samples of tea were as fol-
lows:—

989.—[3717]. Tea, from Rámpúr,
Simla. Basáhir. MR. TER AERA-
TOON.

990.—[3718]. Tea. China. MR.
STEPHEN BERKELEY.

Chinese tea imported from the Thibet frontier.

991.—[]. Tea, from Kotgurb
plantation. MR. S. BERKELEY.

Souchong—pouchong—hyson—gunpowder.

992.—[3719]. Souchong tea, manu-
factured by GHASITU of
Banauri, Holta.

993.—[3720]. Fine souchong. Do.

994.—[3721]. Tea dried in the sun
without fire. Do.

995.—[3722]. Pouchong tea. Do.

996.—Series of teas by native manufac-
turers, located in the Kangra valley, viz:—

(3723) NARA PAHWARI of Pathiyár.

(3724) BALI RAM of Saliyána.

(3725) RAM of Nagrota.

(3726) JAISHI RAM (late E. A. C. of
Dharmsala).

(3727) JOG RAJ, Jaghirdár.

(3728) CHITU, Lambardár of Púnah.

997.—[]. Tea, at Rs. 2 per lb.
Kangra Valley Tea Co., Bandla Estate.
Manager, MR. NAPIER LENNOX. Manu-
facturer, ISHRU.

998.—Tea, at Rs. 1-8 per lb. Do., do.
(One ½ lb. sample of each).

999.—[3731-32]. Tea, from the Byj-
náth plantation. CAPTAIN FITZGERALD.

1000.—[3733]. Tea, at Rs. 2 per lb.
Bandlah Tea plantation. MR. J. C. FER-
GUSON, Manager.

1001.—[3734]. 53 lbs. pekoe tea.
Nassau Tea Company. MR. R. BAILAND,
Local Manager.

At Rs. 2-4 per lb.

1002.—[3735]. 46 lbs. souchong. Do.
At Rs. 2 per lb.

1003.—[3736]. 46 lbs. pouchong. Do.
At Rs. 2 per lb.

1004.—[]. Caper tea, Kanyará
plantation, Dharmsala. MR. SHAW.

1005.—[3737-3743]. Series from the
Government Factory, Holta. DR. W. JAME-
SON.

(Not sent for competition).

Black, Fine souchong—souchong—pouchong.

Green Hyson—young hyson—gunpowder—imperi-
al gunpowder.

1006.—[3729-30]. Tea, from Kúlú Kulu. Tea Company, Bajaura. MR. MINIKEN, Manager.

1007.—[3744]. Moss tea. ("Sbángja," Lahaul. Thibetan). REV. MR. JAE-SCHKE.

This plant, which looks like a large kind of soft moss, occurs high up on the hills in the neighbourhood of the remote summer pastures, where the poor herdsmen use it as a substitute for tea, preparing it in the same manner as the Thibetans and Mongols do the genuine tea, which it—as almost any plant prepared in this way would do—resembles in taste, but it is disagreeably bitter.

1008.—[3745]. Brick tea, enclosed in the skin in which it is wrapped for protection. (Thibetan, "Japag"). REV. MR. JAE-SCHKE.

Imported from China. It is prepared by pounding, after which it is boiled in water, mixed in a sort of churn with butter and salt.

1009.—[3746-49]. Series of teas, imported from China and Thibet, largely consumed in Kashmir. H. H. THE MAHARAJA.

Brick tea, dhámún; black tea, cha siyah; green tea, cha sabz; fine quality, do.

The following teas were also sent from the various plantations of Kumaon, N. W. Provinces.

(3750-54). Series from the Kousanie Tea Company. Kúsáni in Kumaon. K. McIVOR, Esq.

5 lbs. of souchong, at Rs. 2 per lb.

Brick tea (5 lbs. each brick), at prices varying from Rs. 2, 1-8 and 1 per lb.

5 lbs. hyson, at Rs. 3 per lb.

5 lbs. young hyson, at Rs. 2-8 per lb.

(3755-56). Teas by the Kumaon and Kuttipoor Company. Katyúr, Kumaon. C. J. R. TROUP, Esq.

10 lbs. of pekoe souchong, at Rs. 2 per lb.

10 lbs. of souchong, at 1-8 per lb.

(3757). Warrand-field plantation, Gwáldúr, Garhwál. T. A. WARRAND, Esq.

5 lbs. souchong, at Rs. 2 per lb.

(3758). Lockington plantation. Katyúr, Kumaon. R. STOREY, Esq.

5 lbs. souchong, at Rs. 2 per lb.

N.B.—The great importance of this Sub-class, as well as the distinctive nature of the substances it contains, induced the Central Committee to appoint a special Jury, whose Report on the samples exhibited for competition now follows:—

REPORT ON TEA.

SECTION A. CLASS III.

DIVISION I.

SUB-CLASS (D.)

JURY.

LIEUT.-COL. LAKE,
D. F. McLEOD, Esq., C.S.,
MAJOR MERCER, DEPUTY COMMISSIONER OF AMRITSAR,

DR. W. JAMESON,
MAJOR DENNIS,
WAZIR GUSAIN,
MAJOR-GENERAL INNES.

REPORTER—DR. J. L. STEWART.

THIS Jury have been fully impressed with the responsibility of their task, the gravity of which depends chiefly on two causes, viz., the daily increasing importance of the rising tea-trade of the Himalaya, and the possible mercantile results of their adjudications.

While the cultivation and manufacture of tea by private enterprise in the Punjab Himalaya is but of very recent date, tea is so rapidly tending to become a staple product of these mountains, that it is scarcely possible to exaggerate the bearings of the subject on the future prospects of colonization in them. Six years ago there was hardly an acre of tea land in private hands to the west of the Jumna; now, many thousands of acres have been taken up by planters for the growth of tea, and hundreds of acres—especially in the Kangra valley and its neighbourhood—are already covered with tea plants of considerable growth. Although the qualities of the tea manufactured on the Government plantation, under the superintendence of DR. JAMESON, the creator of tea culture in North Western India, is well known, yet the cultivation of the shrub by private planters in the Punjab Himalaya is so recent, that as yet but little tea manufactured by them has found its way into the market; and, perhaps, this fact rendered it of still greater moment that the Jury should consider maturely the various circumstances on which their decisions should be based.

The qualities of the competing teas, which are most attended to in deciding the commercial value of the article, and which have weighed most with the Jury are the following:—Color of both black and green teas, selection of the leaves as indicating careful gathering, picking and sifting, twist of the leaf, aroma and flavor, and qualities as a beverage when infused. Much attention has been directed to each of these, so as to arrive at a fair adjudication.

The only districts (within British territory) whence teas have been sent are Kangra, Simla and Kumaon, which include most of the tea-growing tracts within easy reach of Lahore.

The kinds of tea sent are the following:—

Black—Flowery pekoe,
 „ Pekoe,
 „ Pekoe souchong,
 „ Fine souchong,
 „ Souchong,

Black—Brick souchong.
 „ Pouchong.
 Green—Hyson.
 „ Young hyson.

In addition to these were exhibited mixed (black and green) tea, and a specimen made by sun-drying without fire; and gunpowder and imperial gunpowder were included, in a complete set of the teas ordinarily made at the Government plantation, Holta, Kangra, sent by DR. JAMESON for exhibition, but not to compete.

MR. SHAW, of the Kanyará plantation, Dharmsala, exhibited a specimen of caper tea, and favored the Jury with an interesting detailed account of the method in which he manufactured it. The flavor is good, and it seems well adapted for a mixing tea; but it is doubtful if it could be manufactured to sell at moderate, and at the same time remunerating, prices. The Jury consider it right to award Honorable Mention to MR. SHAW for this tea, as it is of some importance that the manufacture of “fancy” as well as ordinary teas should be attended to.

The only foreign teas exhibited,—besides some specimens grown in the territories of H. H. THE MAHARAJA OF KASHMIR,—were Chinese tea, also sent by HIS HIGHNESS; and two specimens of “brick tea” (*kaiei cha* in Chinese, *zang cha* in Basáhir), the ordinary form in which the Chinese article is imported *via* Thibet. This, in its unsophisticated state is described as being made in China from the coarsest leaves, and the refuse and broken tea, agglutinated by means of bullock’s blood; but one at least of the specimens exhibited contains 50 per cent. of bits of branches, and little of the remainder appears to consist of genuine tea leaves. Its infusion, prepared in the English method, is extremely nauseous, but it is said to be much relished by the Turanian races beyond the middle Himálaya, cooked and eaten as a broth, with the addition of butter and salt: although Europeans who have tasted it thus made, mention it as far from agreeable. But little Thibet tea finds its way into the Lahore market, where it is seldom sold cheaper than Rs. 2-8 a seer, while the brick souchong, exhibited by the Kousáni Company, presumably for the Thibetan market, is not so dear, is a purer tea, and is unquestionably much more palatable to a non-Thibetan taste.

The REV. MR. JAESCHKE of Lahaul, sent for exhibition a very interesting specimen of what is called “moss tea;” called in Thibetan “sbangja,” from which a beverage is prepared on the Upper Chenab. This consists of the thick rhizomoid roots, and lower leaves (mingled with moss, &c.) of a small herbaceous plant, with scabrous leaves, which in this state it is impossible to identify with certainty.

An interesting article exhibited was a “*masála* for tea,” which has been found by DR. T. E. B. BROWN, Chemical Examiner to Government, to consist almost entirely of carbonate of soda, with a small admixture of chloride of sodium and alum, as impurities. This is used for imparting to green tea what is technically called the “bloom,” and for bringing out the astringency of the article. There is no doubt that the use of such substances heightens the color, beauty and astringency of the tea, and so long as only carbonate of soda



is used no harm is done, as this is quite innocuous, and frequently added to tea by the housewife at home to make it "draw;" but the Jury take leave to deprecate the use by the Himálayan tea manufacturers of alum and other more powerful astringents, the long-continued use of tea having any considerable admixture of which must be most deleterious.

It is worthy of note, that no adulteration by coloring matter was detected in any of the teas sent to the Great International Exhibition of 1862, and the Jury are glad to have it in their power to say as much for the Punjab Exhibition of 1864. Only four specimens of green tea were sent for competition, and the Jury have found some difficulty in deciding on their merits. A Money Prize and Honorable Certificate has been awarded to one of them.

Most of the Himálayan teas exhibited are sent by European tea planters, but a few are contributed by natives. The Jury feel bound to say that the teas sent by the latter are as a rule very much more carelessly prepared than those of the former. Before teas made by native growers become readily saleable at fair prices, much more attention must be directed by them to the *manufacture* of the article, on which so much more depends than on its growth. At the same time several of the specimens sent by natives are very creditable, and as the pains bestowed on these deserves to be encouraged, two Money Prizes have been awarded to the finest specimens, the better of which in particular is a well-made and excellent drinking tea.

The awards of this Jury are as follows:—

"For the best specimen of first class tea, grown and manufactured in the Punjab." MAJOR DENNIS' Special Prize of Rs. 100. Kooloo Tea Company (3729).

"For the best sample of black tea grown in India." MESSRS. McIVOR & Co's first special prize of Rs. 75. Kooloo Tea Company (3729).

"For the best specimen of black tea grown in India." Second prize of Rs. 50. The Telwara Tea Company (MR. WARRAND), Kumaon (3757).

"For the best specimen of black tea grown and made by a native" (3720). LOCAL EXHIBITION COMMITTEE. Kangra Valley (Invoice No., 108), Rs. 100.

"For the second best specimen of black tea grown and made by a native" (3719). LOCAL EXHIBITION COMMITTEE. (Invoice No., 107), Rs. 50.

"For the best specimen of green tea" (3753). Hyson of Kousáni Tea Company, Kumaon, Rs. 50.

"For a specimen of caper tea." Certificate of Honorable Mention to R. B. SHAW, Esq., Kanyará Tea plantation, Dharmsala.

J. L. STEWART, M.D.,
Reporter for Special Jury on Tea.

LAHORE, }
15th April, 1864. }

Memo. on Defect in Packing Tea.

Those only are mentioned which have led to or might cause grave inconvenience.

1st.—Most of the native made teas were sent forward packed in wood and paper, or paper only. This by no means gives the tea a fair chance as to aroma, &c., with those which are properly packed in lead or other metal.



2nd.—There ought to be a label and number inside as well as outside, each box, and the word "top" marked on the side at which it is to be opened in order to prevent confusion. Defects in this respect have caused considerable difficulty to this Jury, and might have led to grave mistakes.

3rd.—Very many of the teas sent for exhibition were by far too new to give them a fair chance in competition with other better seasoned teas.

J. L. STEWART, M.D.

SUB-CLASS (E). INTOXICATING DRUGS.

THIS class is not a very interesting one, nor is there anything in it that is likely to be of any great commercial value, save opium. The principal articles exhibited under this class were :—

Numerous specimens of poppies, or both large and small, and opium.

Bhang, both the leaves and the seed, which is extensively used, being drunk either as an infusion in water, or made up with flour into cakes, and with sugar, &c., into a sweetmeat called "majūn;" both cakes and sweetmeat acquire a dull green color from the bhang juice.

"Charras," the gum resin, exuding from hemp, formed part of this collection.

And, lastly, there was tobacco of several varieties—prepared as tobacco, or in the form of snuff.

It is scarcely necessary to remark that opium is not made a Government monopoly as it is in Bengal; the people are free to cultivate if they choose, only it ranks as a "zabtī" crop and has certain higher charges made upon it: the sale of opium, poppy heads (quite a separate thing), bhang, ganja and charras, which are collectively termed "maskarāt," is restricted, and these articles are the subject of an excise-duty. The right to sell maskarāt is usually farmed out to a contractor, the contract being sold to the highest bidder. The upset price is the estimated value of the duty realizable for the quantities sold in a given district in a year. The contractor has under him various licensed shopkeepers, who arrange with him to receive so much drugs and pay him so much as returns of sale per diem; if they make more than this sum the surplus is their own; if they cannot dis-

pose of all the drugs they have engaged to receive from the farmer of contract, they have to pay him so much in consequence. The sub-contractors or retailers of drugs are sometimes losers, but the contract farmers often make considerable profits: the price at which the drugs are retailed is fortunately very high. The effects of bhang and charras are most deplorable, producing redness of the eyes and a wild ferocious disposition in the drinker. Opium is largely consumed by being sometimes smoked in a huka, to be presently described, called *madhakī*, or else swallowed in little pillules. Those accustomed to it, take it at fixed hours and when they wake up from the effects, take pure milk which is believed to have a restorative effect; people who are habituated to opium cannot give it up without danger.

I have subjoined a table showing the annual revenue derived from the Drug and Spirit Excise, from 1849 to 1865. Up to 1860-61, these two items are given together, so that the table includes both. In 1860-61, for the first time they are given separate. Since then, from 1861-62, when the Sudder Distillery system was introduced, they have always been kept separate.

Year.	Amount yielded by both spirits and drugs.	Drugs alone.	Remarks.
	RS.		
1849-50	2,78,132	...	
1850-51	3,02,452	...	
1851-52	3,33,670	...	{ Balances due was Rs. 8,221-2-10.
1852-53	3,17,510	...	
			Do., Rs. 13,697.

Year.	Amount yielded by both spirits and drugs.	Drugs alone.	Remarks.
	RS.		
1853-54	5,36,795	...	
1854-55	5,37,562	...	
1855-56	6,07,578	...	
1856-57	5,99,393	...	
1857-58	5,04,498	...	This is the amount as given in the Report from 1856-57 and 1858, but in the Report for 1859, the revenue of this year is quoted as Rs. 4,30,502, probably excluding Delhi.
1858-59	{ 6,64,224 6,74,356 }	{ }	The 1st number does not include Delhi, the latter number probably includes the Delhi territory, as the amount is quoted in the Report for 1859-60, page 24.
1859-60	7,45,357	...	
1860-61	6,16,287	2,38,751	
1861-62	5,86,853	2,31,714	Deducted result.
1862-63	5,79,012*	2,37,350	{ Balance due on drugs being Rs. 22,210.
1863-64	6,97,174†	2,60,939	Do. do., Rs. 12,077.
1864-65	7,85,007	3,14,464	Do. do., Rs. 14,869.

1010.—[]. Tobacco (*Nicotiana tabacum*, and other species), tamákú.

This plant is a native of America, and was first known in 1492, by COLUMBUS and his followers. It is remarkable as having the widest range of cultivation of almost any economic plant, and its use even where not cultivated is so universal, that it would be difficult to find a place where it has not reached between Spitzbergen and New South Wales. In the earlier times legislative prohibitions to tobacco smoking were common; but the medicinal virtues of tobacco were admitted and indeed extravagantly asserted.‡ The universal practice of smoking in the East is very remarkable, but it has been introduced: not only is there no indigenous wild species of tobacco in Asia, but there is evidence to show that it was not introduced before the 17th century. LANE says that

tobacco was introduced into Turkey and Egypt in the 17th century, and to Java in 1601.

The Sikhs are the only race whose religion teaches them not to smoke tobacco; they have, however, no objection to other narcotics, opium and bhang. Snuff taking is not so common. Smoking was not prohibited by the first nine Gurús, but only by the tenth Gurú, GOBIND SINGH, whose chief objection to it appears to have been that the habit was promotive of idleness, as people would sit smoking and do nothing. At a time when the Gurú was in great difficulties, and his few followers were flying from the servants of Aurangzeb, he had need of diligence and watchfulness, and could not afford to encourage the too prevalent habit of "baito."

The Mussalmans, in a religious point of view regard the act of smoking as an "act indifferent," being of the class of "biddat"—things which having come into existence after the death of the Prophet, are therefore neither enjoined nor prohibited by him, and hence are accounted "indifferent."

The species of tobacco recognized* are—*N. tabacum*, L.; *N. latissima*, Müller, including *N. fruticosa* L., and *N. chinensis* (Fischer), the source of the large Havannah cigars. *N. rustica*, L., indigenous in America, and found wild in Europe, Asia and Africa, is the source of *Latakia* (Laodicea), *Salonica* (Thessalonica) and Turkey tobaccos. *N. Persica*, Lindley, is the Persian or Shiraz tobacco; *N. repanda*, W., is the source of the small Havannah or Queen's cigars; besides these are the species *N. quadrivalvis*, Pers.; *N. nana*, Lindley; *N. multivalvis*, Lindley.

DR. BIRDWOOD says that *N. tabacum* is cultivated in the Deccan, and *N. rustica*, northwards; also that *N. Persica* has been introduced into Bombay.

At present native tobacco is not used by Europeans, but quite recently an attempt has been made at Jalandhar to grow and prepare tobacco in the European way; and samples of cut cavendish and honey-dew, prepared by MR. E. TAYLOR, formed part of the collection.

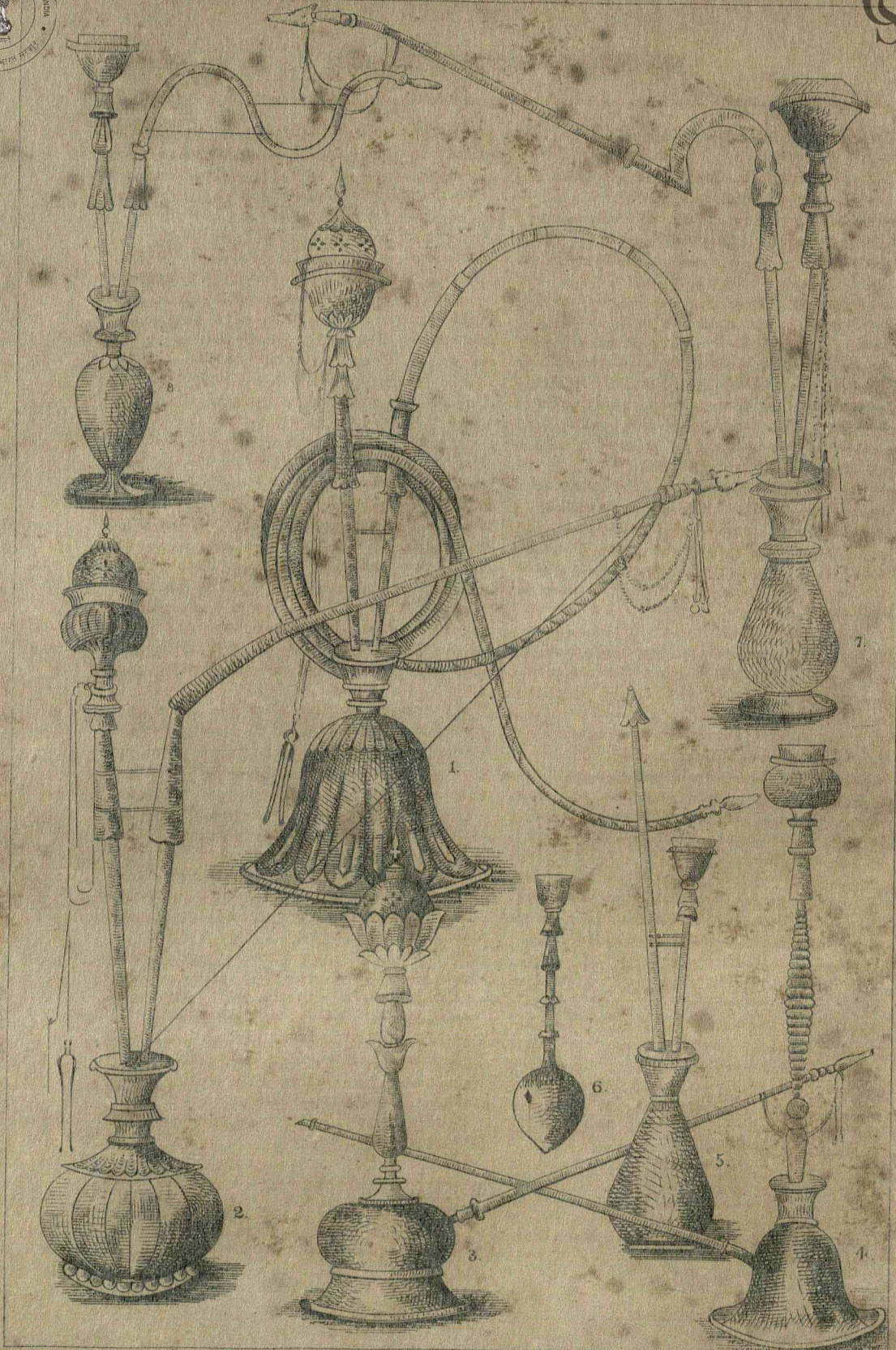
With regard to the introduction of smoking in India, it is stated in the "Khlásat-ul-Tawarikh," that tobacco was introduced by the Portuguese in the latter part of AKBAR'S reign, and the beginning of JEHAANGIR'S. JEHAANGIR in the 14th year of his reign, when at Lahore, forbid the practice, and persons who smoked were to have their lips cut. Tobacco was introduced into Persia about the same time, during the reign of ABBAS II. Several persons in Lahore, who contravened this order were subjected to the process called "tashhír," i.e., riding on an ass with their face

* Balance due on abkari (spirits), Rs. 20,136.

† Balance due on spirits, was Rs. 2,650. (See under "Spirits" in the sequel).

‡ See BIRDWOOD'S Economic Products of Bombay, 211.

* Taken from BIRDWOOD, p. 211.



No. 1. Pechwan.	No. 4. Kalyan Kashmiri.	No. 7. Gurguri derh khamma, or koncdar.
" 2. Necha Chaugani.	" 5. Sulfah.	" 8. Gurguri 'dhai khamma.
" 3. Kuli Marwari.	" 6. Nurgel.	

to the tail, and their visage blackened, this peculiar punishment being inflicted for infraction of imperial mandates! The "Makzan-ul-adwiyah" says it was introduced by the Portuguese from the New World (*arz-i-jadid*). The common people then adopted a primitive method of smoking the plant, by making two holes in the ground, which were connected by any pipe they could get; in one the fire and tobacco were placed, and to the other the smoker lying or crouching down on the ground, applied his mouth and drew the smoke through the channel. After a time an improvement was effected by a piece of bamboo being inserted in the smoking hole, so as to enable the smoker to inhale the vapour without crouching down or bringing his mouth to the level of the ground.

The primitive form of *huka* is the *naryel*, a hollow cocoanut shell half filled with water. On one side of the shell is inserted a pipe,* which is connected with the fire pan and tobacco holder (*chillam*); and on the other side is inserted another tube, which goes into the mouth of the smoker; when the smoker draws, the smoke from the first pipe (the end of which is under water) is drawn up through the water, and thus cooled and purified.

After this *naryel* (which is still in use among *Hindús*) the *huka* was devised, being a much more elegant affair but on the same principle. It consists of a vase partly full of water, with tubes inserted into it, one of which joins the *chillam* or pipe-bowl, the end of this goes below the water, and the other tube is often connected with a long twisted pipe, called "*necha pechwan*," which ends in an amber mouth piece. The drawing-pipe is always called "*necha*," and is often very prettily ornamented, silk and gold thread, being wound round and round the tube, which is made of *sarkanda* grass stems, &c.

The coil or flexible tube (*necha*) is made of a long coil of iron wire covered with cloth and ornamented; this was invented in *AKBAR*'s time. Several "*nechas*" and *hukas* are figured in the annexed Plate.

A small *huka*, with a stiff "*necha*" of a peculiar curve is called "*gurguri*," the pipe is bent as in Fig. 1. The ordinary *huka*, with a stiff *necha*, has the latter only bent once at an obtuse angle, as in Fig. 2; this is called "*changáni khamdár*." A kind of *huka*, in which the smoking tube is not bent, but rises up straight out of the vase, and is called "*sulfah*" (Fig. 3), is much used for smoking "*charras*." Another kind is called "*kallyán*," from the Arabic (*ghaliyán*).

In this, as in Fig. 4, the *chillam* tube is made of *shisham* wood carved all round with rings, and the "*necha*" made also of *shisham* wood, similarly adorned, comes out at the side of the *huka* and not at the mouth.

A *huka* for smoking "*madhak*" (opium), with a peculiar shaped *chillam* is called "*madhaki*."

In the Punjab the lower orders frequently smoke in companies, with one "*hubble bubble*" or *naryel*, or "*kalli*," which are the most ordinary and cheap forms. All sitting round in a ring, the pipe passes from one to another, each taking a few whiffs as it passes. This is never done by the higher orders, nor is it done in *Hindústán*. The "*sulfah*" form of *huka* is the commonest in *Kabul* and *Peshawur*.

The kinds of tobacco which are recognized are:—

1st. Called "*Kandahár kakar*," this is of a yellowish light color, and has small indentations on the leaves like an *Onosma*; with this kind of tobacco molasses or "*gurrh*" is not mixed; but as it tastes sweet, there is probably a small quantity of honey mixed with it previously; it is not twisted into any shape, but the broken leaf is left in little pieces. The stalk of the plant is used in this variety to make tobacco just as much as the leaves; in fact there is more stalk than leaves. *Kakar* tobacco is also grown at other places, and there is "*Lahorí kakar*," and "*Shikárpúrí kakar*," &c.

2nd. "*Baghdádi*," the seed of this is very much sought after by cultivators, on account of the abundance of the produce; it is not imported from the place whose name it takes, but probably came originally from thence.

3rd. "*Noki*," called from its pointed lanceolate leaves (of this there are two sorts, the *noki* and the *desi Panjábi*).

4th. "*Sámblí*," this is a variety of which the leaves only are used, the woody stalk is of no use.

5th. "*Zarda*," this is the best quality of tobacco, being of the kind called "*noki*."

6th. "*Púrbi*," from *Hindústán*, which is chewed with *chunam*, *supári* (areca nut) and *catechu* (*kath*); it is also smoked—but it is expensive.

7th. *Baīngani*; this is very uncommon at *Lahore*; it is so called because its leaves are shaped like those of the *baīngan*, or *Solanum melongena*.

8th. *Súrati*, from *Surat* and *Bombay*; this is rare; it is strong and bitter like "*kakar*."

The varieties of tobacco are easily distinguished by their appearance.*

* Sometimes this pipe is dispensed with, and the smoke sucked through a hole in the side of the shell. This is universally done in *Tibet* at the present day. I have seen it done in the Punjab, where a pipe was not at hand.

* For some of these particulars, I am indebted to DR. STEWART'S Paper on Tobacco, in the Proceedings of the A. H. Society, Punjab, 1865.

The kakar is known by its small size, and the leaves are more round than the others, which have long pointed leaves; the leaves have also a long stalk, whereas in the other species the blade runs down the leaf stalk close up to, and even over, the main stem. The flowers are more decidedly campanulate, are of a greenish yellow, and never pink. This species (*N. rustica*) grows in Chota Lahaul, and the valley of the Chandra Bagha, and even up to Pangl. In ordinary sorts of tobacco the flowers and upper part of the stalk are always removed, as the gardeners say if this is not done the tobacco would be without flavor or strength. But the kakar is not so treated, and the whole plant, leaves, stalks, flowers and all, is made into tobacco. In Lahore, the kakar tobacco is generally later in ripening than the ordinary sorts; in Delhi it ripens 15 days earlier.

The noki tobacco has very large long pointed leaves: the other kind, called *desi*, is very similar in appearance, though stronger in flavor. The former is the same as the *hanir*, and the latter the same as the *gholar* of Hindústán. The leaves of the latter are not so broad or so acuminate as the former.

Baghdádi tobacco is not grown in Hindústán. This has the largest leaves of all, and the leaf is waved and thin; it is the mildest of all, and is smoked dry occasionally.

The tobacco is all prepared alike. On being cut down, the leaves (and in the case of kakar, the whole plants) are massed together in a pit after drying for a couple of days: they are covered with earth and left to ferment: when sufficient fermentation is accomplished, which is known by the earth sinking in at the top, the tobacco is removed. Of the common tobacco, the best leaves are removed and tied up in bundles (*gaddi*), the rest is twisted into ropes: the latter sells for a sixth or an eighth less than the former. The kakar is never made into ropes.

The kakar has been introduced from down-country, it is said within 10 or 15 years past. The kakar of Peshawur and other places, called *Kandahári*, probably came from Kábul.

Its cultivation has been extended on account of the economy resulting from its use: it sells about a rupee a maund above common tobacco, but then it can be mixed up with it, and this makes the weaker sorts go much further: the whole plant also, and not only the leaf is utilized.

DR. STEWART says all the other sorts are varieties of *N. tabacum*.

Every kind of tobacco is either "halka" or "phiká," that is weak or mild; and "kanrá," which is superior, strong and pungent. Tobacco buyers test the strength of tobacco by placing a bit on the tongue, and seeing

whether it produces any irritation. Strong tobacco is heavier than mild.

Pure tobacco is called "sádá," but the common dealers mix up tobacco with molasses and saji, and with the "gul," the cinder which comes out of the chillam after smoking, being ashes of the tobacco mixed with sugar; this is done to increase the weight.

Tobacco when twisted up like a rope is called "gaddi," and when the leaves are merely dried and pressed as they dry, it is called "kabbar;" the latter kind is generally the strongest.

A very highly elaborate kind of tobacco, called "khamíra," is prepared for the rich. The compound consists of tobacco, apple preserved, gulkhand (conserve of roses), pánri,* (pán leaves dried), "muskh-bálá" (a scented wood), and sandal wood, iláchi (cardamoms), kheora, the arak or essence of the flowers of *Pandanus odoratissimus* (comes from Ajmir and Mewár), "kokañber" wild jujubes, occasionally amalás (*Cathartocarpus fistula*), (the interior of the seed pod). A cheap kind is made merely with sandal wood and wild bér fruit, gágál (*Amyris agallocha*, gum), and sells as cheap as 7 seers per rupee. The real "khamíra" is sold by the jar-full, not by weight.

Tobacco is not smoked as in an European pipe, by lighting it and then removing the fire, but is put in the bowl or chillam, and the red charcoal is left in with it; the tobacco being mixed up with molasses and ashes, &c., burns very slowly. When tobacco is sold by the maund, the maund is equal to 52 seers; by custom it is also sold by what is called "ukka," that is so much for a certain superficies of the growing crop, as kanal or begah, &c.

Snuff is made of noki tobacco pounded; the best snuff comes from Kábul and Kandahár, and from Peshawur.

Native tobacco is very different in flavor from the Latakia, Cavendish, and other tobaccos in use among Europeans, which are much stronger.

The exhibited samples of tobacco are catalogued as follows:—

1011.—[3786-87]. Two qualities of tobacco. MUNICIPAL COMMITTEE.

1012.—[3810]. Tobaccos prepared in American method. MR. JALANDHAR. TAYLOR.

* In these places where pán is an expensive luxury, the leaf imported from Hindústán is preserved with great care. Day by day, as the leaf withers at the edges, the drying portions are cut off with scissors, and the shreds are preserved and dried as pánri.

Samples of honey-dew in cake and cut cavendish. Of these MR. TAYLOR writes: the tobacco I sent to the Exhibition at Lahore, was the result of an experiment made by myself to manufacture the common country leaf according to the American mode. I may also add, that the Tobacco Company I was in hope of getting up has not yet come into existence. I have, however, now some South American tobacco seed*, and hope soon to be able to produce something very superior to which I sent to the Exhibition. Should this be the case, I have no doubt that sufficient support from the public to get up a regular Tobacco Company might be obtained.

1013.—Samples from Simla, and from the States—Bhaji (3800) and Kothár (3807); and a sample from Rámpúr of Basáhir (3823). MR. TEE ARRATOON.

1014.—[3822]. “Tamáku talkh,” bitter, *i. e.*, strong, pungent tobacco. Tahsil Kasúr.
LAHORE.
TEHSILDAR OF KASUR.

1015.—[3824]. “Tamáku purbyá kakar” from Hindústán. MR. B. POWELL.

1016.—[3825]. Tamáku (a variety). MR. B. POWELL.

This was a variety from Kandahár, which is considered a very strong tobacco, and is smoked without mixing “gurh.”

There is also in the jungles of Sharakpúr, and other parts, a plant called “gídár tamáku,”† a wild tobacco; it is not used as tobacco, but as a medicinal herb in hæmorrhoids and other cases.

1017.—[3819-21]. Three varieties were sent from Hushyarpúr, called tamáku, and tamáku dhatúra.

The third is not distinguished, it may be only an inferior quality.

Tobacco also was exhibited without specification of the variety, from—

Ambálah (3794); Gújrat (3847); price, Rs. 4 a maund.

Shahpúr, Khusháb (3852); Gugaira (3819).

Muzaffargarh (3854), where it sells for Rs. 5 a seer, grows easily, and produces fine plants.

Dera Ismail Khán (3860).

Dera Gházi Khán (3867).

Kapúthalla (3878).

Kashmír, Srinagar (3884).

There is no sample of tobacco from Múltán, but I find in VIGNE'S travels (p. 22), the following notice. “There are from a thousand to fifteen hundred maunds of tobacco produced around Mooltan annually. The best, which, is called “surkh,” or red, is sold for six annas, equal to about nine pence; inferior kinds are sold from four to two annas, a seer.” The author of the Makhzan-ul-adwiyah mentions Múltáni as a kind of tobacco.

Tobacco in the form of snuff is exhibited from Muzaffargarh (3855), nasúr, “holás.”

Dera Gházi Khán (3868-69), two varieties—one priced at 4 seers per rupee; the other 5.

Peshawur sends snuff.

Snuff is very little used by the inhabitants of the plains, but the Biláchis and Hill tribes of the Deraját appear to use it more frequently. It is preserved in small egg-shaped boxes, with a little ivory stopper; some of them are very prettily carved out of the fruits of *Feronia elephantum*.

Tobacco is cultivated in almost every village, in rich good irrigated land abundantly manured, in the Cis-Sutlej States. MR. WYNYARD informs us, that tobacco usually follows the cotton crop. MAJOR (now GENL.) CLARKE writing of tobacco, in the Rechna Doab,* says:—“This plant is cultivated either on the “goera” lands, or preferentially on some highly-enriched plots of ground, such as are commonly found around villages. The seed is sown in the month Kattak, under the shade of the bér or sisoo tree, facing to the south, that it may have sun during the day, and yet be protected from night chills; as soon as it is sown it is covered with ashes; if a tree cannot be had, it is protected or sheltered from the north wind by any screen; the young plants are transplanted out in Mágh or Phágan; sometimes a part of the land ploughed for wheat is reserved for tobacco, or if not, the land is ploughed in Poh or Mágh, four or five times running, manuring it twice afterwards. The land cannot be too highly manured for this crop, which also requires three hand-hoeings and weedings; when blossoms appear they are all topped off to

* Some American seed from Kentucky and Ohio has been received and distributed; it has succeeded very well in some districts, and specimens of manufactured tobacco have been submitted to the A. H. Society.

† This name has already been mentioned as given to the Philipsea in the Shahpúr district: the plant shown here in Lahore under this name was not Philipsea, but an ordinary looking herbaceous plant.

* The Agriculture of the Rechna Doab, p. 6.

strengthen the plant; of course seed plants are excepted. After the plants are well above ground and have become strong, the crumbling alkaline earth generally found at the foot of old walls in ruinous buildings, is applied to the root of each plant, with a view to improve the quality of the produce.

"The crop ripens in Jeth or Har, according as the sowings may have been in Mágh or Phágan; it is watered fifteen times; before cutting the crop, it is essential to irrigate, for if cut when dry at the root, the produce will be worthless. The tobacco is left on the spot where it grew for one day after it is cut; on the second day the leaves are all turned, and they are collected and kept covered in some secure place, whence they are taken out on the fifth day; the leafy part is then separated from the stalks and coarse fibres, and twisted into hanks or rolls of from one to two seers. The cultivation of tobacco is rather troublesome; it brings a return of twelve maunds per acre. The labor for separating the stalks, &c., from the leafy part is paid for by two twists of the tobacco for each person, per diem."

1018 —[]. Bhang (*Cannabis sativa*, Willd.)

The products of the plant are the leaves dried and called "bhang;" the flower tops with their resin, called "ganja;" and the resin, from the seeds and flower tops, called charras (or *kirs* in Bukhára).

The plant is cultivated in almost every village, as may be judged from the large number of specimens that are exhibited, but only in small quantities for local consumption. DR. ROYLE considers this the same plant as the fibre yielding hemp, which grows wild in the Himálayas, and which he says, "grows to a height of 10 to 12 feet."

Some have assigned this plant to another species, and called it *C. indica*, but without sufficient reason. It is difficult to say of what country the plant is a native. WILLDENOW says Persia; GMELIN says Tartary; while THUNBERG found it in Japan. It appears of very wide distribution, being used by the Chinese, and called "mafuen, chatsar," (AINSLIE). The Malays use it for smoking. The Turks using it for intoxicating purposes, call it *malaeh*; and even the Hottentots use it under the name of *docha*.

It must have been very easily introduced in Northern Europe, for HERODOTUS (Cl. 202) speaks of the Sythians as intoxicating themselves with it,—he says, that the "Scythians never wash any parts of their body except their heads, but then they fumigate themselves, and become intoxicated at the same time, in the following manner—they make holes in the ground in which they place heated stones, over these they erect a goat hair tent; and when the people to be

fumigated have crept inside, the tent is closed over, and hemp seeds are flung on the hot stones. They soon send forth a virulent intoxicating smoke which fills the close tent, and the people inside being overpowered with the intoxicating effects, howl with excitement and delight." The Greek for this hemp is "kannabis;" the Arabic, kinab; Dutch, hennep; English, hemp, also "canvas."

The plant is solely cultivated in the plains for its "bhang." If cultivated for fibre, the crop requires thinning and tending so that the plant may shoot upwards into a tall plant and not bush or run to leaves and flowers, which is of course desirable when the plant is grown for the sake of the drug.

The dried leaves of bhang are sometimes smoked alone or mixed with tobacco; but the more common form of taking bhang is to make it up with flour into a cake, or a majún or sweetmeat which has a green color. There is also a common method for habitual drinkers of "banghi;" viz., of infusing the leaves in cold water in a pestle and mortar, and pouring off the clear liquor through a cloth strainer.

The eating of these sweetmeats by persons unaccustomed to them produces the most violent mania and excitement, and the eyes become red and inflamed.

I recollect at Lahore a case of attempted suicide by a youth, where it appeared he had purchased sweetmeats which contained bhang, of which he was not aware; he had not even taken bhang before. After a time he became almost frantic, rushing wildly about hither and thither, and at last threw himself into a well, whence he was fortunately rescued; after this he fell into a kind of heavy sleep or stupor and then recovered. Persons who are accustomed to the excitement of bhang are not usually so violently excited.

AINSLIE describes "majún," as consisting of bhang leaves, milk, ghi, poppy seeds, dhatura flowers, the powder of nux-vomica and sugar. He adds that an overdose of this has caused total derangement of intellect.*

The common majún to be met with in the bazars is often merely sugar, perhaps with ghi, and the bhang without the other ingredients.

1019.—[3831-38]. A complete series of bhang apparatus, from Lahore. DAROGHA GORI SHANKAR.

Consisting of bhang (the dried leaves), bhang seeds; chapatties made up with bhang; majún, a sweetmeat of thin flat pieces of sugar, flavored with and colored by bhang extract. There is also exhibited the earthen

* Materia Medica, II., 177.

pot or mortar (kunda) in which the drug bhang is placed with water, and a long wooden pestle (dandā) with which it is worked up; and the strainer (sāfā) with which the clear liquid infusion is strained off, when the bhang has been sufficiently infused in the pestle and mortar; the strainer consists of nothing but a small branch of a tree shaped like the letter Y, with two arms trimmed and smoothed, and a piece of fine cloth stretched between them.

Bhang was also sent from all the following districts, showing the prevalence of the cultivation and use of the herb.

Kangra (accompanied by the flower head, or ganja).
Gurgaon (3789).
Ambālah (3793).
Hushyarpūr (3814).
Gujranwalla (3841).
Rawalpindi (3844).
Gujrat (3845).
Shahpūr (3851).
Jhang (3853).
Gugaira (3817).
Muzaffargarh (3856).
Dera Ismael Khān (3859).

Dera Ghāzī Khān (3863-65). Three samples of bhang. The two latter samples, are sent both green and dry, being the bhang of the higher Sulaimāni hills. The Local Committee states that the action of this kind of bhang is so violent that it is completely stupefying and poisonous, and is not sold: ordinary bhang sells at 10 seers per rupee.

Bunnoo (Khost valley), (3870).

Hazara (3874).

Kapūrthalla (3877).

Kashmir, Ladākh (3879).

Jhind (3886).

Bhang seed is sent from Ambālah (3795); Kanai-thi (Simla States); and Lahore (3834).

1020.—Ganja, the flower head of the bhang, from Kangra, where it is used for smoking.

It is said also that when the bhang leaves are picked off and the stalks remain, the little knots which occur wherever a leaf issues from the stem, are picked off and collected as ganja; these contain much resin.

1021.—Charras (*Cannabis indica*).

The gum resin, exuding from the flower heads and also from the seed when ripe. When the seed is gathered, the heads are rubbed with the hands, and thus the charras is collected. In other places, men clothed with leather garments walk about among the hemp plants, brushing up against them. The gum resin

comes off and adheres to the leathers, which are then taken off and carefully scraped.

The finest charras is produced in Yarkand and Kāshgar. It forms an important article of export trade from Yarkand. About 3,000 maunds are annually taken to Lé, whence they are carried to the Punjab and Kashmir.

A small quantity, not above a few maunds, comes from Kandahār through the Bolan pass by the Shikarpūr traders. Through Afgānistān and Turkistān by Peshawur, about 75 maunds, at a value of Rs. 50 per maund, are imported from Samarkhand in Bukhāra.*

There is a kind of charras called "garda" which is much in use, and of this again there are three sorts—"surkhā," "bhanga," and "khāki." When the bhang has been gathered and placed in a store-house, as soon as it is dry, persons go in with their faces covered with a thin cloth, which enables them to breathe without inhaling the dust which results from the process they perform. Next the heaps of dry bhang are covered over with a fine cloth, and the operators putting their hands under the cloth, begin stirring about the bhang, and making hay of it. Soon a fine dust flies out, and filling the room, settles down on the surface of the cloth spread over the heaps. When all the dust has been shaken out and settled on the cloth, the cloth is itself taken out and shaken: a dust falls down, which if of the best quality, and of a reddish color; this is collected and kneaded with a little water into a cake, and forms the best charras, which is called surkhā; more frequently the dirt that is shaken off is of a greenish tint, like the bhang itself, and this collected, forms "bhanga charras." Lastly, the powder which adheres to the cloths, and is scraped and shaken off, forms the worst kind, called khāki.

The specimens were few in number, those few being almost exclusively produced in the hills or else being imported—they were sent from

Lahaul (3815).

Spiti (3816).

Lahore, imported from Bukhāra (3830).

Lahore, imported from Yarkand (3836).

Dera Ghāzī Khān (3862).

Srinagar, Kashmir (3881).

1022.—Poppy (*Papaver somniferum*, L.)

The head or seed vessel (called post or kokwān) has two distinct uses. (1), While growing it yields, on being scarified, the milky juice, which when concreted, is called opium; (2), the fresh or dry heads, when in-

* Appendix XVIII., p. cxxv., MR. DAVIES' Report on Trade Revenue.

fused in water, yield a liquor, which is narcotic and intoxicating. Opium is the most important product.

The manufacture of opium is not under restriction in the Punjab, as it is in Hindústán; it merely ranks as a zabti crop on which a certain cess is imposed. Most districts cultivate the poppy to a certain extent, and produce a small quantity, of indifferent opium for local consumption. Opium of superior quality is imported. This drug is however prepared in the Hill States, and the opium of Kúlú is of excellent quality, and forms a staple article of the trade of that region: it is also produced in Basáhir and Rámpúr, and at Doda Kashtwár, in the Jammú territory. It is secretly exported, concealed in goat skins, to Yarkand, Khutan, Aksú, and other Chinese provinces. Opium was interdicted in China in 1839; but the quantity smuggled in is considerable, and the officials on the road are bribed to connive. About 210 maunds* is the estimated quantity annually exported from Kúlú, Rámpúr of Basáhir, and Jammú. Persian opium is imported into the Chinese provinces through Bukhára, Khokán and Káshgár, but it does not reach the Punjab. Kúlú and other hill opiums are occasionally found in the bazars of the Punjab cities. The quantity of Kúlú and Rámpúr opium exported is given as 150 maunds, selling at Yarkand for Rs. 99,000; from Kashtwár (Jammú), 60 maunds, selling for Rs. 39,600.

In the Punjab the cultivation of the poppy is thus described:—"Poppy is grown on manured land, a portion of the land ploughed for the rabi being kept for this purpose. When about to be made use of, the land is manured, ploughed ten or twelve times, and then levelled; after which it is divided into compartments or beds, and the seed having been previously steeped for two days in milk and water, mixed with some mustard seed and ashes, is then sown broadcast; the sowings take place in Assuh (Sept.-Octr.), and must be watered the two days following the sowing. When the young poppies are above ground, the mustard plants are removed in the process of hand-hoeing, then performed for freeing the roots. Ashes are daily strewn over the young crops. If the seed is without an admixture of mustard seed, it will not do well, and the crop will be bad. The process of hand-hoeing, or loosening the earth at the root, is carefully continued, and the soil kept moist by timely irrigation, usually required every fourth or fifth day. The crop of post is ripe in Chét (March), when it is cut and piled up in the field. After drying some days in the sun the heads are plucked off. Great care is required to cultivate the poppy with success.

The time for extracting opium is in Chét, when the poppy has attained its full size. I may add, that a small flat iron tool, with two or three points, called a "nashtar," is used to scarify the poppy, being drawn longitudinally down the poppy head, so as to scratch it, whereon the milky juice exudes, which, after a certain time coagulates, and is scraped off with a small bent iron tool, like a miniature sickle.

ROYLE says (p. 66), that the poppy was probably introduced into India from Persia: this is likely enough; all the ordinary names for poppy and poppy seeds are Persian, and even the synonym in Sanskrit, "chása" and "apaynam," for poppy seed and opium, sound like corruptions of "*khask-khas*" and "*afyán*." There are two varieties, white and red, the latter appears to grow mostly in the hills. DR. ROYLE says he has seen it at an elevation of 7,000 feet, and mentions that he has no doubt the hill territories of N. W. India would perhaps prove the best of all opium growing districts, because most like the climate of Persia, where the best opium (called in the market, Turkey opium) grows. The superiority of Persian opium appears to be the excess of morphia it contains, which is said to amount to nearly three times more than Bengal opium; but DR. ROYLE gives the quantities which resulted from analysis by DR. SMYTHSON, then inspector of opium at Bombay, whereby it appeared that Turkey opium contained 6½ per cent. morphia; Malwa, 6 per cent; Bengal about 3 per cent.; but some fine Bareilly opium, 8½ per cent.

An accurate account of the manufacture of opium in India is foreign to a catalogue of Punjab products; but the reader will find much information in the Bengal Dispensary, in the Pharmaceutical Journal, Vol. XI., p. 205, and in DRURY'S "Useful Plants of India," p. 339, *et seq.*

An account of the method of making opium, followed in Shahpúr and in Kúlú, will be found appended to the notice of the specimens.

Good opium is not perfectly soluble in water, and if a specimen dissolves, it is not a good kind; good opium is also inflammable, while bad kinds are not so. Some inferior kinds of opium are almost devoid of morphia. The following test is given in the New Edinburgh Pharmacopœia:—"A solution of 100 grains of fine opium macerated 24 hours in two liquid drams of water, filtered and strongly squeezed in a cloth, if treated with a cold solution of carbonate of soda in two waters, yields a precipitate, which weighs when dry, at least 10 grains, and dissolves entirely in a solution of oxalic acid."

Small doses of opium appear to be excitant and stimulant, but languor and sleepiness follow. In large doses it is a violent poison; by habit the effects of opium are diminished. The habitual use of the drug

* Appendix XXIV. of DAVIES' Report, p. ccvi.

produces effects like those of habitual drinking—tremors, paralysis, stupidity and general emaciation; its medicinal effects will be found under the head of opium, in the drug collection. As an intoxicant it is taken in little pills. People who take opium do so at regular times, and retire from life for the period; when they recover, they frequently take a draught of milk, which is a restorative.

An intoxicating liquor is formed by macerating or infusing the poppy heads with water, and sweetening with molasses; this is drunk by fakirs and others at festivals, &c.

Some writers refer the *φάρμακον νηπενθεος* of HOMER to opium, but DR. ROYLE says it is very likely to be "charras."

Pegonium harmala and *Lactuca virosa*, a kind of lettuce, are also said to possess narcotic properties like opium.

HONIGBERGER mentions that he gave lettuce opium to a opium eater, but that it did not affect him. (probably he had been too long accustomed to the stronger genuine opium to be effected by a weaker imitation).

Opium is prepared with a little "pán" or other aromatic substance, and made into small pills for placing in the chillam to smoke with, and is called "madhak."

Poppy heads or seed capsules were sent from the following districts:—

Gurgaon (3788).

Ambálah (3792).

Ludhiana (3796).

Jalandhar (3809). In Jalandhar poppies are grown only for the sake of the capsules, which are used in making "post," a poppy infusion: the plant is raised on ground which has had wheat on it: the produce is about 8 maunds an acre.

Kangra (3811).

Hushyarpur (3818).

Lahore (3826).

Gujranwalla (3840).

Rawalpindi (3843).

Muzaffargarh (3857).

Kapúrbhalla (3875).

Srinagar, Kashmir (3883).

Jhind (3885).

Simla (3801-02), Mahlog.

Máltán. The Máltán poppies are remarkably large, and the Kangra variety (3811) uncommonly small in size.

The collection included a number of samples of poppy seed, which hardly ranks as an intoxicating drug, but is chiefly used as an oil seed.

Simla, Bhaji (3798), Balsan (3806).

Lahore (3835).

Shahpúr (3848).

Bukkur (Shahpúr), (3850).

Dera Ghází Khán (3866).

Peshawur (3871).

The samples of opium were:—

Lahore.

1023.—[3827-29]. Three qualities of opium.

1st. "Afim pukhta." Opium purified by boiling and straining.

2nd. "Afyún pahari" or "kachkará," from the Hills (Kúlá, Simla, &c.)

3rd. "Afyún," from Shahpúr.

The following districts also sent samples:—

Ambálah (3791).

Simla States as follows:—

Jubal (3797).

Bhaji (3799).

Sirmúr (3803).

Kothí 3804.

Kúlá (3812).

Gujranwalla (3839).

Rawalpindi (3842).

Gujrát (3846).

Shahpúr (3849).

Muzaffargarh (3858).

Dera Ghází Khán (3861).

Kapúrbhalla (3876).

Srinagar, Kashmir (3882).

1024.—[3840]. Opium, from Shahpúr.

A bigah of land intended for poppy cultivation is first ploughed eight times, and then the land is divided off into beds ("kyárah"): on these they throw 100 donkey loads ("borah") of manure. They then take half a seer of poppy seeds, and mix it with 2½ seers of sand or fine earth, to ensure equal distribution of the seed, and sprinkle it over the prepared land; this is done in Kátak (October). After sowing, the land is irrigated, and this is continued every fourth or sixth day as may be necessary. After the third irrigation the young plants appear. A week after this the crop is weeded carefully, and if necessary, thinned by removing superfluous plants: it is again weeded after the interval of another week, and if any place in the field appears to have produced sickly plants, (which are known by their pale yellowish color,) ashes and manure, are added by hand, to encourage the growth. In Chét (April) when the crop is nearly ripe, the Khattris buy the crops as they stand. The price obtained varies from 20 to 60 rupees an acre, according to quality and the price current of opium at the time of sale—these are the limits within which prices have ranged in this district for many years past.

Extraction of the drug.—The drug is extracted

by making incisions on the capsules with a three-bladed lancet, called *nashtar*. The incisions are made vertically, about half an inch in length, three strokes being made with the instrument each time, making nine cuts in all; and this is repeated four times after intervals of four days, making 36 incisions in all. The whole operation thus extends over about 13 days. The cuttings of the capsules are made during the middle of the day, as it is found that the heat assists the exudation of the juice. The morning after these incisions, the juice which has exuded (and which is then of a bright crimson color) is scraped off with shells (the river mussel), and collected in cups made of the leaves of the plant itself.

The workmen do not touch the juice with their hands. When they have collected the shell-full of opium juice, they empty the shells together into a vessel, and leave it to dry still further. When dry they form it into balls ("tiká") about 6 or 8 chitacks (nearly 1 lb.) weight, and place it in the shade; those balls are turned every second or third day till they are dry, and these form the opium in use.

Cost of extraction.—It is estimated that one man (women and children are not much employed in this work here as in other districts) can, on an average, incise the capsules and collect the juice of about 10 murlas of the crop. This operation is repeated four times. The laborers are paid in cash, at from 2 to 4 annas per diem, the rates varying according as a larger or smaller area is under cultivation. The cost, therefore, of extraction, varies for 4 to 8 rupees a beegah, or 8 to 16 rupees an acre. The laborers chiefly employed on this work are men of the Arora caste.

The produce of an acre varies from 4 to 8 seers; the selling price from 7 to 12 rupees per seer. In the process of drying the extract loses a fourth of its weight.

The poppy seeds, called "*khásh khás*," are collected and sold—an acre yields from 20 to 30 seers, selling at that same rate per rupee—one-third goes to the laborer for his hire. The seed therefore brings the proprietor of the crop in about 10 annas. It is used for making oil, and the oil is employed principally in the manufacture of soap. In some districts the dry poppy heads are sold for making an intoxicating infusion. Here they possess no such value, and are thrown away.

1025.—[3812]. Opium, from Kúlú.

Of the cultivation of the poppy in Kúlú, the following account has been received from the DEPUTY COMMISSIONER OF KANGRA.

Irrigated land is never used in this district for

cultivation of the poppy, nor is canal water given to assist the first germination of the seeds except as a last resource in a droughty season; rain water is considered better for the plants. The ground is ploughed from October 15th to end of November twice, once to kill the weeds and once to soften the soil for sowing. 100 maunds per acre of animal manure should be ploughed in. Three seers of seed per acre is mixed with 6 seers of fine earth, and sown broad cast. There are two kinds of seed, white and black. The former produces white flowers and is most used; the latter, rose, crimson and purple flowers. The seed will neither germinate nor spoil until rain comes, though it waits three months for it, and the plants will be above ground in a week after rain. Every month the ground is weeded twice, and plants gradually thinned so as to leave them a yard apart. 5 maunds of fresh manure an acre should be added during weeding.

The plants flower in March, and the heads ripen in May and June. In the Hushyarpur district these dates are a month earlier. Ten days before the heads are ripe, they are scratched in the evening with the "*sernoo*" or razor (in some places with needles tied together), and in the morning the congealed juice is scraped off with the "*tosnoo*," a wooden knife; so again after four days, and again after four days further interval. The best heads, destined to yield seed, are spared from this tapping.

There are probably rather above 200 good plants in an acre, which yield rather under $1\frac{1}{2}$ máshas of opium each, or $3\frac{1}{4}$ seers pukka in all. The collectors put ghi on their fingers, or more often spit upon them to prevent it sticking, and roll up the produce in balls in poppy leaves; no other leaf will do. The remainder of the plant is burnt and ploughed in, and the field immediately sown with maize or any other summer crop.

The expenses, independent of rent and profits, may be as follows on an acre :—

3 seers seed,	0	2	0
Ploughing,	1	8	0
Weeding,	3	0	0
Manufacture,	3	0	0
Total expenses, ..	7	10	0
$3\frac{1}{4}$ seers opium,	15	0	0
$2\frac{1}{4}$ maunds seed,	4	0	0
Total receipts, ..	19	0	0
	7	10	0
Profits, ..	11	6	0

Opium improves with age for many years.

Opium is one of the staple articles of trade of Kúlú



and Yarkand. It is an article of great consumption among the Chinese army and gentry ; being a luxury and necessary of life with them, as tea is with Kashmiris. The Chinese smoke it in pipes, and do not swallow it down as other nations do.

There has been a gradual increase in the Chinese trade within the last fifteen years, when it revived after the prohibition of 1839. The police establishment posted at the chokees of Kokiari and Killian, on the route between Yarkand and Lé, are bribed to connive at the unauthorized export.

About 210 maunds is the estimated quantity annually exported from Kulú, Rámpúr (Basáhir), and Kishtwár, in the Jammú territory, all goes to Yarkand. A much larger quantity of Persian opium is believed to be imported into Turkish China, through Bukhára, Khokán and Káshgar.

The annual export from Kulú is about 100 maunds.

1026.—Dhatúra (*Dhatúra alba*), thorn apple.

1027.—[3790]. Dhatúra (dried plant). Rohtak. LIEUT.-COLONEL ROYLE.

1028.—Series illustrating dhatúra as prepared for a poisoning agent. LAHORE MUSEUM.

The series consists of the seeds of the plant in their raw state ; seeds roasted ; essence of the seeds ; atta (flour) drugged with the poison ; sugar do. ; and tobacco do.

The plant is familiar to most people by its beautiful long white flowers, which in Rohtak are used as an offering to the shrines of certain idols. But the

dhatúra has attained a worse celebrity as being the agent used by the "Thugs" to stupify their victims.

Both kinds of the *Dhatúra*, the white and the purple are used, but the white is considered the most efficient. The drug has its medicinal uses, and its value as a curative in asthma, is known both to Europeans and Natives, who smoke the seed in their hukas when so afflicted.

For poisoning purposes the seeds are parched, and reduced to a fine powder ; thus it is easily mixed with sugar, atta, tobacco, &c. Also the professionals distil the seeds with water, forming a powerful essence : ten drops of this is sufficient if put into a chillam of the "huka" to render a man insensible for two days.

The taste is acrid and bitter, and soon followed by a burning suffocating sensation. It is very difficult to detect in a *post mortem* examination.

The victims are usually discovered in a state of insensibility, and breathing hard and heavily : if removed, care should be taken not to expose them to the heat of the sun, which is fatal. The action of the poison is quicker in the hot weather than in the cold : much of course depends on the individual constitution of the victim, but usually in hot weather it begins to work in five minutes, and coma supervenes within the hour. In cold weather it begins to act in a quarter of an hour or twenty minutes.*

* These particulars are obtained from a Circular, No. 125 of 1863, from Assistant General Superintendent Oudh and N. W. Provinces ; a copy of which was sent, together with specimens, to the Lahore Museum by MAJOR CHAMBERLAIN.

SUB-CLASS (F). SPICES.

The class is not a very extensive one; nor are its samples in any way remarkable.

The ordinary spices exhibited are cultivated more or less in every district, while the finer ones—mace, nutmeg, cloves and cinnamon (jauntari, jaiphal, karanful or laung, and dārchīnī), are mostly imported from Bombay; so are also black pepper (kāli mirch), cardamoms, great and small (bari and chote ilāchī), but these two latter articles are also imported from Hindústān. The masticatory areca nuts and pān (*Chavica betel*) are brought up from Bengal and Hindústān. Spices to a small amount form one of the articles of import that come to the Punjab from Karāchī.

Besides these, there are two roots of some value, the best being hill produce, viz., ginger and turmeric: the latter acts both as a spice and condiment, giving the yellow color to curries, and is used also as a dye stuff. Spices, and especially red pepper, are considerably used by natives, as their ordinarily flavorless, farinaceous and pulse diets, demand the addition of a stimulant. When meat is used, it is generally not as the substance of the meal, but as a relish, in which case it is often cooked with spices and flavoring substances. Spices are much esteemed in medicine; every one in this catalogue may be found in the native pharmacopœia, with special virtues attributed to it. Besides “pān and areca” (pān supārī), which are not very common in the Punjab (on account of the difficulty of obtaining them), cardamoms and other spices are constantly chewed by the people.

The specimens exhibited were as follows:—

GINGER.

1029.—(*Zinziber officinale*, *Amomum*

zinziber, L.). Synonyms—Zanzabīl, soñth (dried ginger), adrak, ādā (Sanskrit, “srin-gavera,” which ROYLE considers to be the origin of the other names). Persian “shang-viz.”

DR. ROYLE mentions that the cultivation of ginger and also of turmeric extends in the Himālayas to an elevation of 4,500 feet. The ginger of the Kangra hills is different from that of Simla. Ginger is brought down from these hills in considerable quantities. When dried in the sun, it is called soñth; its use as a spice, as a stomachic and stimulant, is universal: it enters into various compositions of pickle and preserve.

The following specimens were exhibited:—

Simla States—Dhāmī (2777), Bhaji (3902), (fresh ginger), Kothar (3903), Mahlog (3904), Sirmūr (3906), Baghal (3910).

The following account of the cultivation of ginger has been received from the Hill States adjoining the Ambālah district. Ginger is principally produced in Matūr, Māsā, Patrā, Dārrā, Kothī, Kotahī, Bāgal, and Jayāl. The best pieces of last year's harvest are selected, and placed in the corner of a house, in the month Phāgan; the heap is then smeared over and covered with cowdung to keep the roots from drying up. In Hār month, when the first rain falls, they plough up the land two or three times. They divide off the land into beds with a little raised edge round each bed, taking care to make openings to let superfluous water run off, for if water stands on the crop, the roots will rot. They then bury little pieces of the roots, 3 inches deep in the soil, at intervals of 9 inches: they next cover over the field with the leaves of trees, which keeps the soil moist, and over the leaves they spread manure, to a depth of half an inch. When it rains the water impregnated with manure filters readily through the leaves to the roots. Artificial irrigation is not employed while the rains last, but from Assuh to Poh it is necessary. In the month Poh the plants are about 2 feet high, for every one shoot there are eight tubers or parts of the root—these are dug out, and buried in another place for a month; then they are taken out, exposed to the sun for a day, and are then fit for use. In the months of Sawān, Bhadon and Assuh, three times, the field is weeded. A begah of

land requires 8 maunds of ginger to plant it, and yields 32 maunds for a first rate crop.

Ginger fit for planting again sells at 8 to 10 seers per rupee; that for use only, at 24 seers to 32 per rupee.

In order to dry ginger into "soñth," the fresh roots are put into a basket which is suspended by a rope, and then two men, one on each side, pull it to and fro between them by a bit of rope attached, and thus shake the roots in the basket; this process is carried on for two hours every day for three days. After this, the roots are dried in the sun for eight days, and again shaken in the basket. The object of the shaking together is to take off the outer scales and skin of the root. A two days further drying completes the process, and soñth sells 3 seers to 4 seers per rupee.

Turmeric is cultivated in the same manner, when ready it is dug up, steeped in hot water a day and a night, and then dried.

MR. MELVILLE, in his Settlement Report, further informs us that, ginger is of two sorts—"ghár," or close grained; "fálsar" or fibrous. It is a most valuable crop: it is calculated that 7½ maunds go to sow a kucha begah. The average produce is 30 maunds. The green ginger (adrak) sells at 1 rupee a kucha maund, so that you have Rs. 22 produce after deducting the next year's seed. This gives Rs. 88 for a pukka begah, two-fifths of this would be Rs. 36, and if you deduct a third from this, there would still be, as the "Hakim's" share, Rs. 24 per pukka begah.

1030.—[3913]. (Adrak), from Kangra.

Ginger in the Kangra district is thus noticed by BARNES, in his Report:—

Ginger is cultivated across the Beás in talúqnas Seeba and Chinore, of pergunah Haripúr. It is a different species from the ginger of the Simla hills. The root is smaller, the color red, and the fibre delicate and palatable.

A sample also was sent from Hushyarpúr (3924).

TURMERIC.

1031.—(*Curcuma longa*, Roxb.). Haldi, Zardchob (Pers.)

Tumeric or "terra merita," has two uses—as a condiment and as a dye—the kinds, however, that are best suited for dyeing are not so good for eating, and *vice versa*.

There are several varieties, called "púrbi" (from Hindústán), "pahári" (hill turmeric); besides these ROYLE mentions "moela" haldi and "jowala" haldi, which latter kinds are best for dyeing purposes. The name

"amba haldi" is also applied to the dyers' turmeric.*

Turmeric is grown like ginger, from cuttings or sets which are little pieces of the fresh root cut up and planted.

Turmeric is supposed when fresh to be anthelmintic, and always to be cordial and stomachic; the root is applied to recent wounds and bruises, and the powder of the dry root is considered a good application to cleanse foul ulcers.

The specimens were as follows:—

Simla States—Jabal (4471), Bhaji (4473), Bágál (4474), Baghat (4475), Dhámi (2778); Kangra (3914).

In the Kangra district turmeric is reared in parts of Nadaun, Haripúr and Núrpur. It is cultivated on low moist soils and requires much care and manure. It is planted in May, and is not matured till the end of November. The tubers are then taken up and dried, partly by the action of the fire and partly by exposure to the sun. It is considered quite as remunerative a crop as sugar, and has this advantage, that it occupies the soil only six months. These few localities supply turmeric for the consumption of the whole district.†

Samples were also sent from Hushyarpúr (3923); Kapúthalla (3959); Jálándhar (4480); and Kashmir, Jammú (3964).

In connection with this species of *Curcuma*, I take occasion to include several others which, though used more as medicines than as condiments, yet from their botanical affinity and aromatic and fragrant properties, seem suitable for mention; such are the following:—

KACHUR.

1032.—[3932]. (*Curcuma zerumbet*, Roxb.), kachúr, zarmbád. Lahore bazar.

The kind called "pahári kachúr" (*Curcuma kuchoo-ra*) is noticed by ROYLE as being more like *C. montana* than *C. zerumbet*.

This is planted in April, and the root is ready for use in November. The roots are scalded in boiling water, and then shaken in baskets till the fibril and

* It is remarkable, as noticed by ROYLE, that in the "Tuhfat-ul-Múminin," the description given by Dioscorides of *Chelidonium majus*—(Greek, *χελιδόνιον το μεγα*) is translated and applied as the description of turmeric, the Greek name of which is erroneously given as "khaldoonion to magha." In the "Makhsan-ul-Adwiya," this erroneous Greek name is also given, but the description is correct. See ROYLE'S Illustrations, p. 358.

† BARNES' Settlement Report of the Kangra District.

outer skin are rubbed off.* In Kangra we have the following account of kachúr.

It is grown over the whole district, but in very small quantities, as its uses are limited. The root is a pale yellow, warm and aromatic like turmeric, but bitter. It is given as a carminative medicine internally, and applied on the skin as a plaster to remove pains. The powder made of the dry root is used by natives in the Hái festival; a third variety is grown simply for the black round seed it produces, which are strung together and sold for necklaces at the Jawálá mukhí fair. This species is called "Sndarshan"† (*Hedychium coccineum*). *Amaryllis grandiflora* is also called sukhdarsan. I found the kachúr root one of the ingredients supplied by the Lahore druggists for scenting oils.

The name kachúr is given in JAMESON'S Catalogue, 1854, to both *Zinziber elatum* and *Curcuma longa*.

Closely allied to the "kachúr" is the jadwár, or nirbisi (nirvisha), that is referred to zedoary (*Curcuma zedoaria*, Roxb.) This is also called "ban haldi," and "ambi haldi."

Some have supposed this to be the long zedoary of the shops, but the point is doubtful. ROXBURGH supposed that the short zedoary was not another species, but merely the long zedoary roots cut and pared.

In DRURY'S "Useful Plants," ambi haldi and ban haldi are referred to a species *Curcuma aromatica*, Salisb., identical with ROXBURGH'S *C. zedoaria*, the species *C. zerumbet* not being recognized. Kachúr is placed under *C. zedoaria* of ROSCOE.

AINSLIE (I, 490) makes the "round zedoary" to be the *Kampheria rotunda* (*Zedoaria rotunda* of BAUHIN), the "long zedoary," jadwár, nirbisi, to be *Curcuma zedoaria*, Roxb. (*C. aromatica*, Salisb.), and the "kachúr," to be *C. zerumbet* of ROXBURGH. ROXBURGH refers the zedoary of English druggists to his *C. zerumbet*, thus identifying it with kachúr, and says, that this is the long zedoary.

The round zedoary is called by ROXBURGH *C. zedoaria*.

It seems pretty clear that there is a distinction between round and long zedoary, since the best zedoary comes from Ceylon. Now *C. zerumbet* grows in Ceylon; as does also *Kampheria rotunda*, which latter plant is called in Singhalese *sau kenda*.‡ The plant has purple and white flowers, appearing in March or April, leaves radicle, oblong, no stem, root biennial.

The best variety of that zedoary called nirbisi or jadwár does not come from Ceylon but from Naipál, whence it is imported into Lé, to the extent of about 3 or 4 maunds a year. Of this quantity about 20 seers go to Yarkand, and the rest to Kashmir and the Punjab. At Lé its value is about Rs. 5 to 15 a seer, but picked specimens are worth their weight in silver; and at Yarkand, the finest sell for double that price.

This plant is described as a great beauty, having its flowers in large tufted rosy spikes rising from the ground, leaves broadly lanceolate, entire, the root, biennial and tuberous. Hence there must be a difference between this nirbisi zedoary and that kind which is extolled as the produce of Ceylon.

With regard to nirbisi, natives say that it grows where "bish" or aconite the poison does, and that it is a remarkable provision of nature that where the "bish," a poisonous root grows, there also should be found another (zedoary) which is an antidote to it; and so they call the latter root nir-bishi, the "anti-poisonous."

1033.—Kapúr kachri (*Hedychium spicatum*).

The roots are pounded up with tobacco and smoked.

CARDAMOMS.

1034.—(*Elettaria cardamomum*), iláchi.

The botanical name given is ascribed to the small white cardamoms "choti iláchi," which have black seeds inside and are commonly chewed; it is the custom to offer these to visitors in native houses.

There is also the variety called "barí iláchi." These latter have nine winged capsules, the skin is rough and brown instead of smoothly striated and white as in the small ones; they are used in cooking and to make "arak" or essence in medicine, but are not eaten. This variety is the produce of *Amomum maximum* Roxb., or ROXBURGH'S *Alpinia cardamomum*, the middle sized cardamoms, which are called in Bengal "do-keswa," or Bengal cardamoms. ROYLE mentions that *A. sericeum* is also called "doi-keshwa."

AINSLIE ascribes his "barí iláchi" to *A. granum paradisi* of Linnæus.

There are many varieties of cardamoms known to commerce, though not in this province; such are the Sumatra or cluster cardamoms, Madagascar cardamoms, grains of Paradise, Melegnetta pepper, and the "moráng iláchi" of the Eastern frontier of

* Illustrations of Himalayan Botany, p. 359.

† BARNES' Settlement Report.

‡ ROXBURGH'S Flora Indica, I., 15.

* DAVIES' Report, Appendix XXIV., page cccxxviii.



Bengal (*A. aromaticum*); also the rough fruited cardamom (*A. villosum*), and a Silhet bari iláchi (*A. dealbatum*). The varieties differ chiefly in size, in color, and in the markings and divisions of the seed capsules. The *Elettaria* is abundant in the hills along the Malabar coast, and the fruit is largely imported into the Punjab from Bombay. The fruit is accounted carminative and stomachic.

In Travancore, where quantities of cardamoms are produced, the plant grows wild in the higher hills, and the cultivators merely clear a portion of the woody hill side of its trees, just before the June rains; after three months the cardamom plant springs up of itself. The plant grows to its full height in four years, and if cut down the stumps sprout again and yield fruit.

CORIANDER.

1035.—(*Coriandrum sativum*). Synonyms—*Dhanyāñ*; *kashniz* (Pers.).

This seed, or more properly fruit (for this spice consists of the whole, small, round fruit, and is not the seed contained in the centre of a capsule), is like the last in its properties, carminative and stomachic. It is much used in curries and for flavoring spirits, as well as in medicine. There is a strong flavored essential oil obtainable from it.

It is not unfrequently cultivated in the Punjab. Specimens were sent from Ambáláh (3895); Simla States—Bhaji (3898), Balsan (3909); Jalandhar (3912); Kangra (3916); Hushyarpúr (3921); Lahore (tahsil Chúnian), (3931); Gujranwalla (3937); Shahpúr (3940); Gugaira (3921); Muzaffargarh (3945); Dera Gházi Khán (3946); Bunnoo (3950); Peshawur (3955); Kapúthalla (3958), Jhind (3965).

CUMMIN SEED.

1036.—(*Cuminum officinale*), *zíra safed*.

Specimens were sent from Delhi (3887); Gurgaon (3891); Simla, Basáhir (3908); Rawalpindi (3938); Peshawur (3951); Hazara (Kághán), (3956); Kapúthalla (3961); Kashmir (3963).

BLACK CUMMIN.

1037.—(*Cuminum cyminum*), *zíra síya*. Synonyms—*Shauniz* (Arab.); *siah dána* (Pers.) In Egypt it is called *hab síndi* (Indian seeds).

This is called black cumtin; it is very common in the hills. DR. CLEGHORN mentions it at Kanáwar as an article of trade, selling for 6 seers to the rupee.

Some of the "*kálá zíras*" are called caraway seeds or *Carum nigrum*, which latter name is also applied, but not definitely, to the Kanáwar produce by DR. ROYLE. (Illustrations, p. 229). *Nigella sativa* is also called *kálá zíra*, and *Vernonia anthelmintica*, *kali zíri*.

Specimens were exhibited from Gurgaon (Palwal), (3892); Kangra (3917); Lahore (3929); Bunnoo (Khost valley), (3949).

ANISE.

1038.—(*Pimpinella anisum*), *anisún*.

From Gurgaon (Jhársah), (3890); Bhaji (Simla), (3899); Mahlog (Simla), (3905); Peshawur (3952); Kangra (3915); Lahore (3930).

AJWAIN.

1039.—(*Ptychotis ajwain*).

From Delhi (3889); Balsan (Simla), (3911); Shahpúr (3939); Gugaira (3922); Muzaffargarh (3943); Peshawur (3953).

DRIED MINT.

1040.—(*Mentha sativa*), *puđína*.

Is more commonly used by Europeans than natives, but is esteemed as a medicine by the latter.

Samples were sent from Ambáláh (3897); Hushyarpúr (3922).

MUSTARD SEED.

1041.—(*Sinapis ramosa*), "*rai*."

Samples were exhibited from Gujranwalla (3935); Sirsa (3893); Ambáláh (3896).

This is the best kind of mustard seed (white seed). It is, however, inferior to Durham and other European mustards. The number of samples of mustard both black and white varieties, is very great under head of oil seeds; and it is principally produced for the sake of the oil. Natives do not use mustard powder mixed into a paste for a condiment as Europeans do, but they add mustard seed to curries and chutnies, or occasionally to pickles. They also pound the seed and mix it with oil or water, and spread it over pieces of vegetables which they intend to pickle, and then leave them to ferment till they are acid.

CHILLI.

1042.—(*Capsicum frutescens*), red pepper, *lál mirch*.

This is very extensively used by natives, both pickled and boiled up with their pulse, &c. Their

insipid farinaceous diet requires much more of this kind of condiment than an European diet does.

A sample of the fruit, both as a pickle and as a conserve with sugar, was exhibited from Lahore. Natives do not usually reduce it to powder for "cayenne pepper," as Europeans do.

There is considerable variety in the size of the capsicums exhibited, leading to the opinion that there may be several species.

There is a small round fruit from Lahore. This may be the species called *C. minimum*, called in Hindústání (so says AINSLIE) dhánmirch. Again, the Shahpúr sample is of remarkably long and large fruits.

The recognized species are *C. annum*, *C. baccatum* (bird pepper), *C. grossum*, the large round kind, often seen in pickles (I have gathered enormous specimens, almost as large as an apple, at Malta), *C. frutescens* (the commonest, known by its shrubby growth, *C. annum* is herbaceous), *C. minimum* (BLANCO), *C. nepalensis* (DR. OWEN), and *C. purpureum*. Besides these there are many less common varieties belonging to various countries, *C. pyramidale*, *conoides*, &c., &c.

Red pepper is esteemed in medicine as a gargle for faecal ulcers, as a liniment for paralytic limbs, as a general stomachic and stimulant. (AINSLIE).

The exhibited samples were from—Ambálah (3894); Bháji (Simla), (3960); Sirmár (3906); Hushyarpúr (3920); Lahore, chillies (3927); round chillies (Kasúr tahsil), (3928); Gujranwalla (3936); Shahpúr (Uchálí), very large capsicums (3941); Dera Ghází Khán (3947-48), two varieties; Gugairá (3320); Dera Ismail Khán (3377); Kapúrhalla (3960).

CINNAMON BARK.

1043.—[3957]. Dárchíní; taj. Bakót, Hazara. DEPUTY COMMISSIONER.

This is a cassia cinnamon produced by *Cinnamomum albiflorum*, or some allied species. It is not the genuine Ceylon cinnamon of commerce (*C. zeylanicum*). DR. BIRDWOOD observes: "It is remarkable that while the Indo-German races prefer Cinnamon, the Mongolian races prefer *Cassia lignea*, the more refined bark being unsaleable amongst the latter." HERODOTUS, in speaking of the spices, (iii. C. 111), distinguishes between cinnamon and cassia. Cinnamon is by no means common at Bakót; the sample exhibited was of the same color as ordinary

cinnamon, and had a pleasant taste. Genuine cinnamon is imported by Calcutta and Bombay.

TEJPAT.

1044.—(*Cinnamomum tamala*), tamálpátr.

TEZBAL.

1045.—(*Cinnamomum albiflorum*). Lahore bazar.

Much used as a flavoring aromatic substance as bay leaves are in Europe. It grows very largely in Kumaon.

NUTMEG.

1046.—(*Myristicha moschata*), jaiphal. Jauz-ut-trib (Arab). Lahore bazar.

Imported *via* Calcutta and Bombay.

MACE.

1047.—"Jauntari."

The aril of the foregoing fruit is called mace: it is red when fresh picked but dries tawny yellow. It is imported from Bombay and Calcutta.

CLOVES.

1048.—(*Eugenia caryophyllata*). Synonyms—Laung, karanfal.

The dried unexpanded flower buds. Its use is well known.

ARECA NUT.

1049.—(*Arecha catechu*). Amritsar bazar. LOCAL COMMITTEE.

The sample box contained whole betel nuts and also nuts sliced up ready to form ingredients with the little triangular packet of pán leaf and betel, which is made up to be chewed as a masticatory. The practice of chewing is not very universal, though no doubt it will largely increase when the railway opens up to Amritsar, thus facilitating the export of leaves of the pán. As it is, betel nuts are largely imported, and the pán leaves are brought up most carefully packed by traders, who are solely occupied in this business. The real Chavica plant will not grow in these provinces, though there is some kind of substitute which is occasionally cultivated and called pahári pán. The real pán is brought up from the nearest locality where it will grow. The leaves are packed and kept moist; the trader watches and inspects his leaves with the utmost care; as soon as the edge begins to show



symptoms of decay, he carefully cuts away with a pair of scissors the dying portion, and then re-packs them. The leaves are of a smooth, rather thick and even succulent texture: they keep fresh some time, even after being clipped and clipped in the manner described, till but little of the shape of the original leaf remains. The shreds so cut off are not wasted, they are collected and dried into "pánri," which is mixed with tobacco, &c.

The leaves and nut are prepared with chunam and cardamoms, just as in Bengal. They are offered on taking leave at a visit of ceremony.

Ceylon is a locality producing areca nuts in abundance, but Travancore appears to be the great place. In that province there are over a million trees, producing each from two to three hundred nuts a year, and sometimes more. The nuts ripen in November, but are often gathered in July and August; the husk in which the nuts are enclosed are removed, they are then boiled till soft, and taken out and sliced: the water in which they were boiled turns red and starch-like, being impregnated with the catechu an astringent principle; this is inspissated and rubbed on to the slices of the nut, which are then dried in the sun and become of a black color. The nuts however, that come to the Punjab are generally entire, and without having been boiled. When the nuts are treated to produce the catechu of commerce, they are boiled in water, which becomes discolored and thick: when this is inspissated and dried, and it forms "kossa," the catechu of the greatest astringency; but the best catechu, of a red or brown hue, is derived from the second boiling of the nuts; when the first boiling is accomplished, the nuts are removed and boiled in fresh water, which is then inspissated as before. There is a wild species of an areca (*A. Dickensonii*) which grows commonly in Travancore—the nuts are used by the poorer classes.

The *Charica betel* or "pán," is cultivated extensively in Bengal in moist rich soil, the gardens being completely covered over at the sides, and all over the surface with mats of grass or reeds to protect the plants from the dews and from the sun. The effects of this leaf are described as stimulant to the salivary glands and digestive organs. The leaf and nut when chewed discolour the teeth much, imparting to them a red color; but natives assert that the gums become strengthened and the teeth fixed by the use of this article; the flavor is strongly astringent, pungent, but not otherwise unpleasant.

SAFFRON.

1050.—[3962]. (*Crocus sativus*), zá-frán; kesar (Hind.) Srínagar. H. H. THE MAHARAJA.

1051.—A fine sample of Kashmír saffron. Lahore. PANDIT MANPHUL, E. A. C.

The Arabic name of this plant is "karkam," which has been converted into the name "Curcuma," and applied to turmeric. It is stated that the species is indigenous to Kashmír and also to Persia where it has been, and is, largely cultivated.

It has been naturalized in Western Europe and in England, and we have a town called "Saffron Walden."

This is used by natives in confectionery as it is in Europe; and we must confess, in spite of DR. BIRDWOOD* (who considers the use of this spice as "an evidence of uncleanness and low taste"), that neither the flavor of saffron in moderation is disagreeable, nor the odour offensive.

As a dyeing agent it is very little in use.

Saffron is prepared for the market in two ways, either the stigmata of the flower are compressed and dried into cakes, in which state they form cake saffron, or else they are dried loose and separate, when they form the hay saffron.

DR. ROYLE states that the former kind is usually prepared in Persia and bears the higher price, and that hay saffron is made in Kashmír. I have never seen any cake saffron from the latter place, and believe that it is not made there.

It is a considerable article of trade, both East and West; it is esteemed medicinal in the East, with all sorts of virtues ascribed to it.†

In European practice it is still regarded as stimulant and antispasmodic; it is not a very powerful medicine, but it appears that dogs have been killed by giving them a very strong infusion of it.

A sample of saffron is sent from Dera Ismail Khán as a dye stuff, but was probably imported into that district.

Under the Class of Dyes, (head Saffron), the reader will find some further information as to the cultivation and growth of saffron.

* Products of Bombay, 305. † AINSLIE, I., 384.

SUB-CLASS (G): SACCHARINE SUBSTANCES (INCLUDING HONEY).

This class contains two descriptions of goods.

- (1). Sugars, raw and manufactured.
- (2). Sweetmeats and confections.

The first are very extensively produced, but the kinds are few and the method of preparation rude. The demand for sugar is very great, and the export trade, both of sugar and molasses, very considerable. In no branch of useful manufactures is improvement more required, and in none is it of more easy application. We have all the materials at hand for producing the finest white granular crystalline loaf sugar, and all the other varieties of sugar used at home.

In the second class the sweetmeats are innumerable, and they form a large portion of the food of the people:—the insipid flour cakes and boiled pulses, just as they induce an increased consumption of stimulants, spices and pickles, so they give the people a taste for sweet things, which not only gratify the palate but also supply the large amount of carbonaceous matter requisite, especially when they are prepared, as they often are, with ghi. The sweetmeats are generally uncolored, or else adorned with silver leaf, and made into various shapes; but beyond the addition of cardamoms, rose water, and occasionally lemon, they are mostly excessively sweet, and that is all; the delicate flavors of European confectionery are unknown, and perhaps would not be appreciated if they were.

SUGAR-CANES, AND SUGAR THEREFROM.

1052.—Synonyms — Kumád; nai shakar (Pers.); Ganná; Ukh (Hindustán).

The first thing to be done is to describe the culture

of the sugar-cane, and the way in which the juice is extracted and converted into sugar.

In the Lahore district I obtained five kinds of sugar-cane; some of these were merely varieties. There is a purple cane, called "kumád kálá;" a hard thin cane, called kumád Lahorí; another called "kátá;" and others the plants of which were obtained from Jálándhar and Saháranpúr. The principle difference observable is in the size of the canes: one sort is very thick and succulent, and is principally used for eating: it is cut up into pieces, peeled, and sold in the streets: contrary to what one would suppose, the thin hard canes yield the greatest quantity and the best syrup: the succulent ones are too watery.

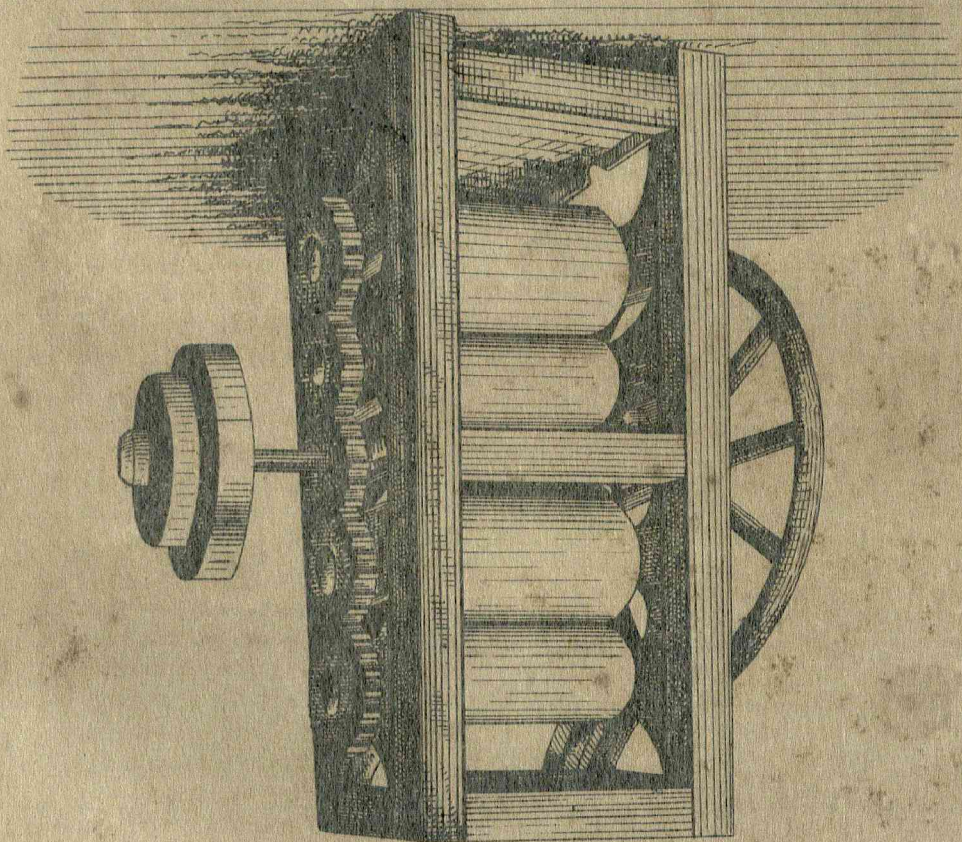
In Gujranwalla, MAJOR (now MAJOR-GENERAL) CLARKE mentions three kinds of cane: "Daulá," "treda" and "chinkha." Daulá, or white, is the best; treda is yellowish; chinkha, which is reddish and small, produces good kand and chíní, moist sugar. The tops or leaves of the cane are useful as fodder.

"The sugar-cane is best placed on manured land. The first ploughings and levellings are given in the beginning of Bhádon, (along with the lands intended for the rubee crops,) after which the land lies fallow throughout the cold season; should the rains have been favorable, these primary ploughings will be only one or two. In Phágan the land is again ploughed three or four times, and setting commences sometimes within the same month, sometimes in the succeeding one. The cane intended for setting is cut in Magh for fear of injury from cold, it is then kept under cover of earth whence it is not taken, till the land which is to receive it be ready; the cane is then stripped and cut into bits of quarter yard long, and planted after the last ploughing, manure is used once before, and once after sowing, the earth at the roots must be loosened thrice, with a hand-hoe the fourth, and last time, with a spade. The more finely pulverized by ploughing, the better the crop. As a general rule, it may be said that land for sugar-cane should be, and is, ploughed fourteen or fifteen times, and levelled four or five times. The crop is watered every eighth or ninth day if the rains fail, otherwise every fifteenth or sixteenth day. In this pergunah (Háfizábád) the crop ripens in Magh, when the juice is extracted and boiled into goor. A machine called a "belna" is used to express the juice. The kolhoo, or oil-mill is not used for



CSL

SUGAR MILL.



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the purpose, as is the case in many parts of Hindustan. It is well known that a *good* crop of cane yields at the rate of two and a half maunds of goor for every ten murlas, forty maunds per acre, the produce of one-eighth of an acre can be passed through the belna in twenty-one hours. To make the goor, the cane is first stripped of its loose outer coating, called "chúf" by men called *chelas*: the peeled canes are then made up into bundles of fifty or sixty each, called "dubthá." They are then carried to the belna or mill, which a pair of bullocks turns: two men are seated on either side of the mill; the business of one of whom (the "dhora") is to feed the mill with the bundles of cut cane, and the other ("agoo") to free the pressed cane, a third man standing by ("khanchee") passes this back to the "dhora" or feeder, who again puts it in the mill or press, and this process is repeated, till no more juice will come from the cane. Besides these, a man is needed to drive the bullocks, a choora or sweeper to keep the fire going while the juice is being boiled, and a third man to skim the juice while boiling. Several other day-laborers are also employed; the pressed cane serves for fuel; some zumeendars have their own press and boiling pans, others are obliged to hire. The daily expense of manufacture is as follows:—

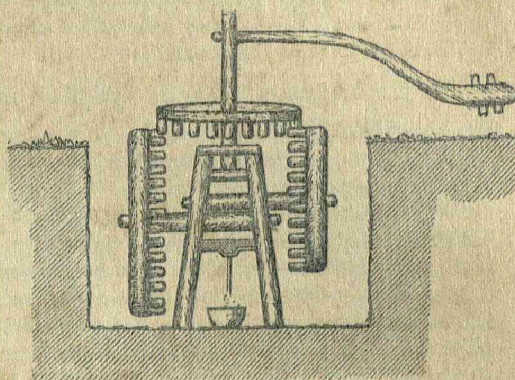
Hire of a pan for boiling, per day,	-	As. 2
Hire of a belna or mill, ditto,	-	5
Pay of dhora or feeder, ditto,	-	3
Do. of agoo, or man who frees the cane from the mill,	-	3
Do. of "khanchee," or go-between,	-	2
Do. of choora or fireman,	-	2
Carpenter, one seer of goor,	-	1
Potter, ditto	-	1
Blacksmith, ditto,	-	1
Soap and oil for greasing the mill wheels,	-	1
Total Rs.,	-	1—5

Perhaps the *average* crop is in—
Khadir lands, 18 maunds per acre.
Bangur lands, 20 do.
Bordering the bar, 24 do.

Some zumeendars plant sugar-cane in Baisakh, after the wheat is off the land, two ploughings only being given, but the return is a poor one. When the crop is of inferior description it is only used as fodder for cattle. Cane is not planted in "Chet," or if it be so, worms or maggots, which then come forth in numbers, are apt to injure it. The poona or pownra cane is not produced in this part of the country.

The belna is a sufficiently simple affair, a capacious pit or well is first sunk, with a ladder or steps

leading down to it: the mill itself is in the pit, and the oxen who turn the wheel which gives motion to the mill rollers, move round the mouth of it; the mill consists of two stout rollers terminated at either end by parallel toothed wheels made of wood. These wheels



are put in motion (and the rollers with them) by a horizontal toothed wheel, placed with the teeth downwards above the rollers, so as to catch its teeth in both of the parallel wheels. The horizontal wheel which comes up slightly above the top of the pit is fitted with a long bar, to which oxen are yoked for the purpose of drawing it round and round.

The rollers are thus set in motion, and the juice expressed is conveyed away by a sloping trough leading to a reservoir.

The "belna" is by far the most usual method of obtaining cane-juice, but in some places a mill is used similar to the kolú or oil mill. This consists of an immense wooden mortar, in which is placed a proportionably stout wooden pestle; the pestle is pressed against the edge of the mortar, and then by bullocks or men (through a lever attached to the upper end) is pulled all round the circumference of the mortar, the end of it remaining at the bottom of the mortar, but working about and crushing and pressing any material that comes between it and the floor and the sides of the mortar. This mill, though universally used for oil, is not commonly used for sugar. In some parts of the Hills a lever beam is used, the long end of which, armed with a weight, is let fall with repeated blows on the canes, just as paper fibre is crushed by the lever "janda;" such an apparatus, which is the rudest of all methods, called in the Simla States, "sál," and is described by Mr. MELVILL.*

"The machine for extracting the juice from the sugar-cane, is highly unique, it is called the "sál."

* Northern Amballa Settlement Report.

Two men run up a long balanced plank and by throwing all their weight on the end of it, bring it down to the ground. This forces down a block, which presses the cane that had previously been cut up into small pieces and placed under it. The juice runs down an inclined board, into an earthen jar prepared to receive it below. This is a very rude kind of affair, and requires a great deal of human labor."

The preparation of sugar is described in the following extract.

The kinds of sugar usually met with are :—

- 1st. Gúr—molasses, black-brown.
- 2nd. Shakar surkh—also molasses, paler color.
- 3rd. Kand or shakar tari—coarse moist sugar.
- 4th. Búra or chini—amorphous white moist sugar.
- 5th. Misri—refined sugar, more or less crystallized : it is either "kúza misri," which is like candy crystallized in kúza or earthen pots, so that the sugar comes out like a hollow globe, crystals inside ; or "tavá misri," a flat disc of sugar, crystallized in a granular crystalline mass in a tavi or iron dish ; this sugar is broken up into lumps for use. These sugars may be of different qualities and colors, according to the degree of refinement effected.

"There are different processes for separating the sugar from the cane-juice in different countries. The following is the method which obtains in the East Indies. The liquor, after being strained so as to separate the coarser feculencies, is boiled down in a range of open boilers heated by a long flue, into a thick inspissate juice, the scum which rises during the operation being removed. When it is sufficiently evaporated, it is removed into earthen pots to cool, and in these it becomes a dark colored, soft, viscid mass, called goor or jaggery. Sometimes a little quick lime is added to the juice before boiling, which, by partly clarifying it, renders it capable of being formed into cakes or lumps. In general, however, if intended for subsequent clarification, the juice is merely boiled down, and sold in pots in a granular honey like state, to the boilers or refiners. These separate much of the molasses or uncrystallizable part of the juice, by putting the goor into a coarse cloth and subjecting it to pressure. The sugar, which in this state is called shakar or khand, is further purified by boiling it with water, with the addition of an alkaline solution and a quantity of milk. When this has been continued until scum no longer rises upon the liquor, it is evaporated, and sometimes strained, and afterwards transferred to earthen pots or jars, wide at the top, but coming to a point at the bottom, which is perforated with a small hole : this, at the commencement of the operation, is stopped with the stem of a plantain leaf. After it has been left

for a few days to granulate, the holes in the pots are unstopped, and the molasses drains off into vessels placed to receive it. The sugar is rendered still purer and whiter by covering it with the moist leaves of some succulent aquatic plant,* the moisture from which drains slowly through the sugar and carries with it the dark colored molasses. After several days, the leaves are removed, and the upper part of the sugar, which has been most purified, is taken away and dried in the sun. Fresh leaves are then added, by which another layer of sugar is whitened in like manner ; and the operation is repeated until the whole mass is refined. The sugar thus prepared is called chini, and is that which is commonly sent to England."

Sugar when concentrated is highly anti-septic, and owing to its possessing this principle it is frequently employed in the preservation of vegetable, animal, and medicinal substances. Dried fruits are often preserved a long time by reason of the sugar contained in them. In cases of poisoning by copper, arsenic, or corrosive sublimate, sugar has been successfully employed as an antidote, and white sugar finely pulverised is occasionally sprinkled upon ulcers with unhealthy granulations. The Hindús set a great value upon sugar, and in medicine it is considered by them as nutritious, pectoral, and anthelmintic.

The collection of sugars, enumerated in the order of their quality and refinement, are as follows :—

1053.—Molasses, "gúr," "kand síyah."

Rohtak (3980) ; Hushyarpúr (3996) ; Sealkot (Zaffrowál), (4001) ; Lahore (4005) Gujranwalla (4019) ; Gujrát (4020) ; Shahpúr (Bhera), (4024) ; Muzaffargarh (4028) (value, 9 seers per 1 rupee) ; Pesháwur (4031) ; Jhínd (4033) ; Dera Ismael Khán (3379).

RED SUGAR.

1054.—(Coarsest moist sugar), shakar, "shakar surkh."

Rohtak (3981) ; Hushyarpúr (3997) ; Sealkot (4000) ; Lahore (4006) ; Gujranwalla (4018) ; Gujrát

* *Vallisneria spiralis* and *Hydrilla verticillata* are employed by sugar refiners for this purpose.

(4021); Muzaffargarh (4029); Peshawur (4032); Kaparthalla (4034); Jhind (5037).

KHAND.

1055.—Coarse sugar, or shakartari.

Sealkot (3999); Bunnoo (4930); Kangra (shakartari).

CHINI.

1056.—Moist sugar.

Delhi (3974); Rohtak (3979); Ambalah (3985); Ludhiana (3987); Hushyarpur (3995); Kangra (bura), (3990); Gurdaspur (3998); Lahore (4004); three varieties of chini, of three degrees of refinement, observable principally in color, beginning with "shakartari" up to white sugar; these are imported from Sujampur and Pattankot (Kangra); Gujranwalla (4017); Gujrat (4022).

The best kind of refined moist sugar is called misri, as is also loaf or lump sugar, which generally consists of sugar crystallized (granular crystals) in a huge iron pan, which forms, when the process is complete, a large disc of sugar, called "tavi misri;" this when pounded or broken into lumps, forming misri in lumps or grains.

Specimens are as follow :—

Delhi, refined sugar, misri (3973).

Lump sugar (3976).

Sirsa lump sugar (3982).

Kangra (Bawarnah misri), (3992).

Lahore "tavi misri," large disc or flat circular mass of crystallized (granular) sugar, as it comes from the "tava," or crystallizing pan.

Gujranwalla "misri" (4016).

Gujrat (4023).

Shahpur, from Khushab (4025).

CANDY SUGAR.

1057.—"Kúza misri."

This is sugar allowed to crystallize in its natural crystals around the sides of a globular earthen vessel, and on threads suspended for the purpose, within the said vessel. When the process of crystallization is complete, the liquid syrup remaining is poured out, and the jar with its inner sides and suspended threads, covered with crystals of sugar, inverted to drain and dry. After this is completed, the earthen vessel is gently cracked, and the pieces picked off, leaving a hollow globular crust of crystallized candy sugar, having its inside filled with cross threads, also incrustated with crystals, this is called "kúza;" they are made of all sizes, from small globes the size of an orange, which are often brought as presents on the occasion of a

visit, to the large masses of Bikanair sugar. The kúza sugar varies in whiteness according to the degree of fineness of the syrup employed for crystallization.

BIKANAIR CANDY.

1058.—"Kúza Bikanairi."

The most esteemed variety of the sugar is the white transparent kúza sugar of Bikanair, which is imported into the Punjab, and is to be found principally in the district of Hissar, and others close to Bikanair.

Of this sugar, two fine samples were sent from Hissar (3977), enclosed in the earthen kúzas in which they were crystallized, and which would be broken off as above described. The samples are equal to the best white sugar-candy of European confectioners.

The following account of the method of making this sugar was communicated by the Vakíl of the Bikanair State.

The best and purest quality of moist sugar is dissolved and made into syrup—this is recrystallized into "khand" (moist sugar, becoming purified by this repeated boiling and crystallization). The khand so obtained is once again converted into syrup, with clear water, and this is now sufficiently pure to crystallize finally. Accordingly, a globular earthen vessel is taken, and a number of threads suspended in it, and into the vessel so prepared the syrup is poured. This is allowed to stand perfectly quiet, and in a place free from dust for three or four days. At the end of which the crystallization will be completed. The inverted "kúzas" are then placed mouth downwards over other vessels into which they drain. The outside of the kúzas, and the place where the mouth meets the vessels over which they are inverted are carefully smeared over and luted with clay, to keep out the dust. In this position they are left from five to seven days, at the end of which, the clay coating is carefully removed, and the kúza lifted up. The sugar in the kúza will be found to be crystallized white and dry, and then the earthen jar containing it is gently struck so as to crack it, the broken pieces removed, and the hollow globe of candy can be either preserved in that shape, or broken into pieces for convenience.

The superfluous syrup that runs off is available for re-crystallization with other sugar.

The best kind of sugar sells in Bikanair for Rs. 1 per seer; and the second quality 1½ seers per rupee. The Vakíl adds that there is no regular export trade in such sugar, but that many private persons purchase it and carry it to different parts.

He gives his opinion also, which he says is the common one, that there is a peculiarity in the

water of Bikanair, favorable to the purification of sugar.

From this account it appears that with care and cleanliness, sugar equal to Bikanair might be produced anywhere in the Punjab.

Sugar-candy was exhibited also from the following districts:—

Delhi (3976); Hushyarpur (two qualities), (3993-94); Lahore, three qualities, differing in color from brown candy to white candy (4003); Kapurthalla (4033).

1059.—[3983] Jalá, an aquatic plant from Bawarna, in the Kangra district. LOCAL COMMITTEE.

This is a water plant (*Potamogeton?*) sometimes given as *Lemna cruciata*, which is used in the process of refining sugar. The plant when placed in the syrup, from its slender green spreading leaves, disperses itself through the liquid, forming a reticulated mass, which quickly attracts and catches all impurities floating in the syrup, and sinks with them to the bottom, leaving the clear syrup above.

HONEY.

1060.—“Saht” or “shahd.”*

A number of specimens were exhibited as follows:—Ambálah (3984).

Rohtak (3978), in the comb. LT.-COL. VOYLE.

Shahpur (4039), from the Salt Range.

Jhang (4027), (Sho:kot).

Kashmir, Srinagar, (4035). H. H. THE MAHARAJA.

Faridkot (4036). H. H. THE RAJA.

SWEETMEATS.

1061.—Sweetmeats, “halwa,” “mithai.”

It would be impossible to close this account of sugar without referring to sweetmeats, which are so universally consumed by all classes of natives, and are made of an almost infinite variety of forms, all distinguished by their proper names.

The number actually exhibited was very small, for most of them are of a perishable nature, or else being prepared with ghi and butter, are excessively greasy or sticky, and unsuited for exhibition.

* I have not included this among animal substances. The bee appears to act merely as the collector of nectar from flowers, while it does not appear that the substance itself undergoes any change or manipulation by the agency of the bee, honey frequently retains the fragrance of the flower from which it came, whenever there is a large growth of one kind of flower in the neighbourhood of the bees, as in the case of heather honey.

An ingenious manufacturer at Lahore and Amritsar prepared a number of articles of sugar, which were colored to imitate the real articles. These were as follows:—

1062.—Sugared almonds.

Almonds covered with sugar, like European confectionery.

1063.—Walnuts (imitation).

The shells being made of sugar and the kernel by that of the real fruit.

1064.—Almonds in their shells.

Prepared in a similar manner. Cardamoms and grains of rice (these, however, ingeniously imitated in wood and ivory) accompanied the specimens.

1065.—Dried dates.

Imitated in colored sugar.

1066.—A cup and saucer.

This is ingeniously modelled in opaque white sugar, in which a carefully copied Etruscan pattern is drawn into with crimson lake or cochineal.

1067.—Kernel of a cocoanut.

Also imitated and colored.

Several samples by the same maker were sent also from Amritsar.

The following is a list of some of the common kinds of sweetmeats in use in the Punjab.

1068.—[4007-15]. “Batásha,” a Lahore sweetmeat. Lahore bazar.

These are made in two sizes: they are light sweetmeats, in appearance like “ratifia cakes;” they are made by dropping a quantity of thick syrup on to a hot iron plate, just before the drops hardens, a minute portion of potash or soda, “batásha,” is put in, which acting like yeast puffs out the drop which then hardens.

Barfi.—There are two kinds—one made of máwá (or “khohah,” i. e., milk boiled till it becomes reduced to one-fifth of its bulk, and quite thick), and the other súji (or rawah). The first kind forms diamond-shape flat cakes, often covered with silver leaf for ornament, it consists of máwá and sugar mixed; the súji kind is made by taking súji (flour) and mixing it with ghi, the mass is fried till it turns reddish-brown, and then “cháshni” (syrup) is poured over it in a plate: when cold it is cut up into diamond-shaped pieces.

Perá.—Made of máwá and chini, in equal proportions, into flat round cakes.



Laddú.—Of two kinds, one called “búndi ka,” the other is “sádá” plain, or “maidá ká.” The first is made of “besan” (gram flour) and ghí and chini, made into balls of a yellow color; the second kind is made of maidá (fine flour) instead of besan, and is white colored.

Bedánah.—Of two kinds, made either with “maidá” or “besan;” the flour is made into a thin paste and dropped through the holes of an iron cullender into hot ghí placed underneath: thus small grains, likened to “quince seed,” are formed; these are afterward sweetened by dropping into syrup.

Búndi.—This is made like the last, only the grains are smaller, and always of “besan.”

Jalébi.—Is exactly like vermicelli, it is of two kinds—either the threads of paste are dipped once into sugar, or if dipped twice, it is called “dobára.”

Pethá.—Slices of pethá fruit (*Benicasa cerifera*), which are first boiled, then dried between cloths, and then dipped in syrup, made very thick; but another kind of pehtá is made usually with flour and ghí, to look like the real. It is a pleasant confection.

“*Gul bihisht*.”—Sugar and ghí and flour, cut into sticks or long thin pieces, colored with saffron.

Kálá kand.—Is in square cubes and dried.

Shákar párah.—A cake is made of maidá and water dough, which is cut up into square pieces and put into hot ghí, and after cooking, thrown into syrup.

Bádám kandí.—Very like “barfi,” only pounded almonds are added to flavor.

Pista kandí.—The same with pistachios.

Guláb kandí.—The same, with rosewater flavor.

Khajúrán.—Made either of rice flour or of maidá: a cake is made of the dough, and then heart-shaped pieces are stamped out with a wooden stamp.

“*Akbari*,” or *Bálá shahi*, or *Khurma*.—Maidá made into round cakes, covered with sugar afterwards.

Jehángiri.—Just the same, except that rice flour is used in lieu of maidá.

Khatár.—Sugar and maidá and ghí, in equal parts are mixed together, and heated by being placed in a covered dish, over which a pan containing fire is placed.

Amrisah.—Often made with rice flour, and gár and ghí; made into flat thin cakes.

“*Pakanrás*.”—Almost the same.

Sitta.—Sticks of sweetmeat made with máwá and sugar, covered with poppy seeds.

“*Jáman*.”—Is the same made into the shape of the jáman fruit.

Halwa Pashmak.—Made of maidá and chini, drawn out into little threads.

Phéni.—Consists of vermicelli-like threads twisted in a bundle into shapes; it is eaten with milk and sugar.

Kewar.—Made of maidá, ghí, and chini, into large cakes.

Pápar.—Sugar (chini) made so as to be transparent, and then formed into a large pyramid.

Luchhi.—Maidá and ghí, made into very thin cakes.

Halwa.—Ghí and sugar, is put in a pan and maidá is stirred into it: it is amorphous.

Pári.—Made into cakes.

Chárma.—An amorphous sweetmeat.

Sambbosa.—Formed into the shape of solid triangles (but taste salt).

Parákari.—The same in semi-circular pieces; sometimes it is made sweet.

Mathi.—Like “chapattis,” with a little salt and ghí.

Kachauri.—In form of little cakes, inside of which a little powdered dāl, called “pithi” is placed.

Phul kachauri.—Somewhat larger and puffed out.

Mongrá and *pakoura*.—Made of “besan,” ghí and salt.

Badyán.—Sugared seeds of “soñf.”

Khas khas.—Poppy seed, is prepared in same way; so is nakhúd, “gram.”

SUB-CLASS (H). WINES AND SPIRITS, AND SUBSTANCES USED IN DISTILLATION; ALSO VINEGARS, THE RESULT OF LIQUIDS FERMENTED TO ACIDITY.

THE samples in this class are few. Most districts thought it foreign to the purpose of the Exhibition to send such spirits—nor is this to be regretted. The manufacture of native spirits is almost the same everywhere, resulting in the production of a kind of rum, which is either white or a yellow color, being distilled from sugar-cane juice, and occasionally flavored with the flowers of the khavi grass (*izkhar*), (*A. schœnanthus*), coriander, and other substances, especially the bark of the babul (*Acacia arabica*). Formerly, on our assuming the Government, spirit making was merely taxed: various persons were licensed to make spirits, and paid a fee for the licence and the tax besides. This continued till 1861-62, when, after the introduction of the Sudder distillery system in Oudh, it was experimentally introduced into ten districts of the Punjab. It is now almost universally adopted. The system is fully described in the Circulars of the Financial Commissioner under the head "Abkâri." (This term means literally the making (*kâr*) of liquor or water (*âb*), and is applied to the whole system of excise arrangements generally). The principle of the Sudder system is to authorize only one distillery (or more if requisite), which is under control of authority; this is enclosed with walls and carefully watched; all spirits issuing thence are taxed according to quality and strength. The strength is ascertained by hydrometers; the temperature of the spirit tested is also ascertained by a thermometer; every distillery is furnished with these implements. No other person is allowed to have a still under any circumstances what-

ever. All spirits sold are made within the walls of the distillery, and special rules for its sale, &c., are enforced. Spirits are sold to licensed vendors in the cities and villages.

As before remarked, under the head "Drugs," the revenue derived from spirits has been up to 1860-61, realized in a general account, as "Excise," but the "Abkâri" receipts since then have been as follows:—

Year.	Amount in Rupees.	Remarks.
1860-61	3,77,535	(Result obtained by deduction from gross revenue under all heads).
1861-62	3,55,139	(In this year balances amounting to Rs. 51,366 were due).
1862-63	4,16,662	Do. do. Rs. 20,136.
1863-64	4,36,235	Do. do. Rs. 2,650. In this year the cost of establishment was Rs. 53,709.
1864-65	4,70,543	The cost of establishment was Rs. 65,347.

When the success of the experiment of Sudder Distilling was established, it was introduced in 1863 into all districts, and the revenue is now beginning to equal that obtained under the old system.

As nearly all districts follow the same method of manufacture, there is necessarily little variety in the out-turn, and all fancy varieties of wine are quite unknown. In Kâbul, and other places where grapes grow, a spirit is distilled. The distillation was formerly practised in Lahore, in **RANJIT SINGH'S**

time, who used to drink the spirit often too immoderately.

The use of spirits is not very general, and by no means so with the agricultural population; some classes of natives are often drunk, and apparently esteem it no harm to be so,—with persons of the castes of Dhobis and Saises this is very common. Drinking is strictly forbidden to the Mussulmans; but it is to be feared the prohibition is often disregarded. To Brahmins and the higher castes of Hindūs, spirits are an abomination. It must be confessed, however, that if all classes kept to these injunctions of their creed respecting spirits, the quantity consumed would be much less than it actually is.

A great advantage attained by the Sudder distilleries, is that the spirit is rendered at least pure and free from deleterious admixture, and quite unlike the filthy thick substances that may be seen in the hovels of the Black Town of Calcutta, under the names of "toddy" (tári) and "arak." Tári is never made in the Punjab; and, consequently, the palm trees are not hacked into step-like notches as they are in Calcutta and Bengal generally. The Hakíms occasionally extract from jasmine flowers, orange flowers, and other substances, essences or weak liquors; a large collection of these, from the Lahore district, was exhibited under the head of Drugs, to which class they exclusively belong, being only taken medicinally. They have generally a white color, with the taste derived from the essential oils of the substances used in making them.

I shall conclude with a brief account of the contents and products of a Sudder distillery, my information being derived from the Sudder distillery in the Lahore bazar.

The apparatus of a native distillery is very simple. A small furnace, a few vats, a large "deg" or earthen vessel, in which the distilling liquid is heated over the furnace, and several earthen pots, complete the whole.

The spirit is made thus :—

"Shíra" (treacle) or "kandsiyah" (molasses) is put

into a wooden vat (pípa), together with certain spices and flavoring ingredients, which will be enumerated presently.

Some "lahn," or lees of wine, previously made, is then added, and a third part of water is poured in; this mixture is allowed to stand for three or four days. When it is fermented, the vessel is filled up with water, and after standing two or three days more, the liquid is turned into the still.

The still consists of a large copper "deg," the mouth of which is closed with a hollow earthen pot inverted over it, and the joint luted with a mixture of flour and water. On one side of the cover, there is a hole, into which the still pipe (necha), made of bamboos, is inserted; the necha or pipe, leads to a "pakka," or copper vessel placed in water, to keep it cold. Thus a rude still is made, into which the liquor previously described is poured, and the fire in the earthen furnace beneath is lighted. The first spirit that passes over is called "phál" and "ekátshá," or once distilled. This is collected in a vessel and distilled again in another still, when the spirit passes over it, is called "doátshá," or "double distilled." This is of two qualities, according to strength.

The spirit is now tested by a hydrometer. The strength of the first is from 75° to 100°, and the other less than 75°. The licensed vendors on presenting their "rawánahs," or passes, purchase the tested spirit, having paid on it the duty, (mahsúl,) so much per gallon, according to the strength.

Each distillery is furnished with a hydrometer, a thermometer, to ascertain the temperature at which the spirit is tested, a standard gallon measure, a trial glass, and a measure called "sharáb náp wán."

The spices and flavorings, or "masálah" used in distilling, are the following :—

1. "Sak" or bark of the kikar, which is often erroneously supposed itself to yield a spirit on distillation; it is only added to promote and accelerate the fermentation of the molasses, &c.
2. Triphalla (the three *Myrobalans*, mixed together as an astringent).
3. Rose leaves.
4. Lotus flowers (nilofar).
5. Kabzabán (*Cacalia kleinii*).
6. Violets.
7. Badyán (anise seed).
8. Limes and lemon peel (sangtará).
9. Saffron.
10. Sandal wood, red and white.
11. "Mundi buti" (*Sphaeranthus*).
12. Kashniz (coriander).
13. Adrak (ginger).
14. Iláchi (cardamoms).
15. Múslí.
16. Dárchini (cassia or cinnamon).
17. Gájar (carrots), dry and fresh.
18. Motya (jessamine).
19. Seb (apples).
20. Náspati (pears).
21. Shir (milk).
22. Raughán (ghí).
23. Meat (?).
24. Misri (sugar).
25. Tamál patr (aromatic leaves).
26. Taj (aromatic flavoring leaves).
27. Bedmusk (willow flowers).
28. Kastúri (musk).
29. Ambar (ambergris).
30. Khawí (*Anatherium murica-*

tum). 31. Khas (root of the latter). 32. Chobchini (*Smilax china*). 33. Salep misri.

Some of these are purely for flavoring; others as triphalla, nilofar, &c., for their medicinal, cooling, and restorative properties; they are added several, or all, according to the fancy of the manufacturers. With regard to the addition of the astringents in distilling, I may add that the same is done in wine making in Spain. The twigs and stalks of the cluster of grapes, as well as the skins of the grapes are highly astringent; and I have been told by a maker in Portugal, that it is impossible to make good wine unless the stalks and skins are trodden out with the grapes, and that he tried to make wine by preparing only the pulp of the fruit by itself, and the result was a complete failure.

1069.—[3872]. Country spirits. Peshawur. LOCAL COMMITTEE.

Distilled from Kábul grapes.

1070.—Common spirits. Lahore bazar.

The produce of the Hill breweries is represented as follows:—

1071.—[2921]. Beer and porter. Simla brewery, Simla. MESSRS. HAY & Co.

1072.—[2921B]. Beer and porter. "Kussowlie Brewery," Kasauli. MR. JOHNSON.

Of fermenting materials we have—

1073.—[3815]. Phao," from Lahaul.

A substance, which put into the mixture called "lágri," when the fermented materials are placed on the still.

1074.—[3816]. A drug, from Spiti.

Used to promote fermentation: its local name is not given.

1075.—Chang. Spiti.

A liquor is distilled in Spiti from barley, and called "chang," and is sold at 30 puttahs for the rupee. A "puttah" is a liquid measure of 2 seers = $\frac{1}{4}$ of a

pucka seer. "They consume," writes CAPTAIN HAY, "large quantities; and one man is said to drink on occasions of festivity as much as four puttahs." "Chang" can be made from other grains besides barley, that made from rice is superior, the wealthier classes in Spiti, &c., use a weak spirit, called arak, which is distilled from rice.

VINEGAR—SIRKAH.

Only three samples of vinegar were exhibited.

1076.—[4045]. Vinegar. Peshawur. LOCAL COMMITTEE.

1077.—[4419]. Vinegar (brown) from Lahore. sugar-cane.

1078.—[4420]. White vinegar, from grapes.

The vinegar obtained from sugar-cane juice is generally a poor stuff, and does not contain more than 2 per cent. acetic acid; but at some places it is made well, especially at Delhi. A large number of bottles of vinegar sold in the country, with the ticket and capsule of "CROSSE AND BLACKWELL," are in reality bottles which once contained the real article, but when emptied, are refilled with country vinegar, and sold a little cheaper under the above name. I have seen however really excellent vinegar from Peshawur which was made from grapes: it was quite fit for table use.

This Sub-class closes the collection of Division I. of Class III., viz., Substances used in Food. Separate Jury Reports on Sub-classes A. and D. were prepared, owing to the magnitude and importance of the classes; but Sub-classes B., C., F., G. and H., forming the remainder of the division, fell to the lot of one Jury, whose Report here follows:—



REPORT ON SUBSTANCES USED FOR FOOD.

SECTION A. CLASS III.

DIVISION I.

SUB-CLASSES (B), (C), (E), (F), (G), AND (H).

JURY.

MR. R. EGERTON,
DIWAN BAIJNATH,
FAKIR SHAMS-UD-DIN,
RAHIM KHAN,

MUHAMMAD HUSAIN,
MR. JONES,
DR. J. L. STEWART.

REPORTER—DR. J. C. PENNY.

THE Jury took into consideration all the Sub-classes of the food division of Class III., with the exception of the very large, and to a great extent distinct class of Agricultural Produce, and also that under which tea was exhibited. These were very properly considered and reported on by separate juries.

The subjects considered by the present jury, therefore, are the following :—

- Sub-class (B). Products of the ground, other than grains, which are used as food.
- „ (C). Dried, preserved, and pickled fruits, &c., &c.
- „ (E). Intoxicating drugs.
- „ (F). Spices.
- „ (G). Saccharine substances (including honey).
- „ (H). Wines and spirits, and substances used in distillation.

It is a matter of regret that some of the more perishable of these articles were considerably damaged by flies and other causes, before the jury could assemble for their consideration; and in a future exhibition the subject of devising some better means of preserving such specimens will require attention.

The first Sub-class contained all miscellaneous roots, tubers, greens, mushrooms, berries, &c., that are occasionally or commonly consumed by the population of the districts producing them.

Some of these are the produce of the common jungle or waste lands, others are regularly cultivated; but among the most remarkable were the products of the Thal or sterile sandy portions of the Muzaffargarh district. The berries of the *Salvadora*,—the seed pods of the jhand (*Prosopis spicijera*), which are ground up and made into bread, when dry,—the acid berries of the *Withania coagulans*, used to curdle milk with,—the shoots of that singular plant, which is occasionally found in jhand and pīlu thickets, the *Boucerosia edulis*,—and also dried mushrooms,—were among the edible products of the district.

The jury consider this collection worthy of Honorable Mention.

Included in the class of miscellaneous products were some very fine potatoes, which deserve especial notice; they were grown in Hazara.

There was also arrowroot (3966), exhibited by MR. TAYLOR of Jalandhar: the cultivation and preparation of the root is an object greatly to be encouraged in the Punjab. The jury award a Silver Medal to MR. TAYLOR for the sample. A bottle of well prepared arrowroot was also exhibited by DR. JAMESON from the Dehra Dhoon, together with a series of the tubers of *M. Arundinacea*, as they are dug up from the soil.

A curious yellow concrete of the pollen for the dhúb grass (*Typha elephantina*) was exhibited from Dera Ghází Khán: the powdery pollen is collected and formed into lumps apparently with sugar.

Some Kábul salip was sent from Peshawur: this deserves attention, as it is a most pleasant and highly nutritious article of diet. A small quantity (about a desert spoonful) of the powdered root, stirred into a quart of boiling milk and sweetened to taste, makes a delicate flavored diet for invalids, &c., very superior to arrowroot in nutritiousness. Though an expensive article to buy, it is really economical enough, for a little goes a great way.

The next Sub-class contained a very fair assortment of fruits, in all the different kinds of preparation—dried, preserved and pickled.

Considering, however, this part of the collection as a whole, it is evident that the contributors in the several districts aimed rather at illustrating the nature and extent of their productions as they are, than furnishing evidence of any special or general effort being made to improve them by art or cultivation.

There were many samples of hazel nuts, walnuts, and the jujube fruit, which were ordinary of their kind, and need no special remark. The dried "amlok" fruits, from Hazara, are uncommon.*

The whole subject of the cultivation of fruits in India is far too extensive to be taken up here; but it is one which needs great attention. The list of fruits, so called, that grow in the Punjab, is a lengthy one, but the number that deserve the name of fruit is small.

Mangoes are only to be obtained of any excellence in a very few places.

The India plums (alúcha) are mere apologies for the grateful fruits of Europe that pass by the same name. Grapes and plantains may be added to the list of fruits, which are capable of great improvement.

Some progress has however been made. Attempts to cultivate the cherry have not been altogether without success; and this year (1864) a single cherry—the first in the Punjab—has ripened in the garden of CAPTAIN (now LIEUT.-COLONEL) ELPHINSTONE, at Jalandhar. Samples of dried currants were sent from Simla and Kangra; the latter were perhaps the best, but they are badly packed and preserved, and not nearly equal to those produced in the Mediterranean. Attention to picking, drying and packing could be easily given, and would result in rendering this much used fruit far more marketable, as well as pleasant for use. There is an acid currant, called by the natives "zirishk," equally with the sweet currants; it is, however, the dried fruit of the berberry.

The tamarinds from Ambálah were very fair: but the fruit is very seldom produced in the Punjab, and the tree is altogether out of its zone in the upper parts of the province.

* The fruit of *Myrica sapida* is not uncommon in the Hills. MR. FORTUNE observed in visiting the tea plantations in 1861, that there was a variety of this fruit in China as large as the Orleans plum, and very superior in quality: it might easily be introduced in the Hills if grafted plants were preserved.



The next Sub-class contains intoxicating drugs. The most elaborate collection is exhibited by DAROGA GORI SHANKAR. The collection contains the following—Bhang, ganja, charras, and opium—these articles are included under the term “muskarat,” and are only sold by persons who have licences. Tobacco is sold without restriction. Dhatura is not commonly to be met with, and is considered as a poison: it is this narcotic drug which was formerly employed by the Thugs to stupefy the victims of their intended robbery.



In the Punjab there is no restriction placed upon the cultivation of opium, bhang,* &c.; only, as before remarked, the sale of these articles is subject to regulation. Bhang is exhibited from nearly every district where it is cultivated exclusively for the sake of the drug and not for the valuable fibre which the plant affords. There is hardly any difference between the various samples. Bhang is prepared for use either by mixing up the dried or powdered leaf with flour and water into thin cakes, or else it is macerated with water in a pestle and mortar, and the decoction after being strained is either made the ingredient of a sweetmeat or is drunk plain. A whole series illustrating this process is exhibited by DAROGA GORI SHANKAR. The jury award to this collection a Certificate of Merit. The specimens of charras exhibited were imported from Bukhára and Yarkand. There were 18 samples of opium. Most districts in the Punjab produce a little opium, generally of rather an inferior character, but only for local consumption. The best opium comes from Kálú and Rampúr; a good deal is produced in the district of Shahpúr. Among the collection before the jury no sample was worthy of particular notice, although the specimen from Gujrát was clean, and had a fine aroma. A very fair sample was forwarded by H. H. the RAJA of KAPURTHALLA. There were a great many specimens of poppy heads, whose only difference was in their size—some being very large, and some being quite small.

Of tobacco there were a large number of samples, all prepared by the leaves being rudely tied up in bundles, or twisted together in the usual manner. Native dealers value tobacco according to its strength; the best tobacco is strong (karwa) enough to bear mixing with an equal weight of "gúr," to prepare it for smoking. This mixture of gúr is necessary, because in the chillam of the húka the tobacco is put on the top of hot charcoal, and left there; and some damp substance is necessary to prevent the tobacco being consumed all at once, as it would be if put in the chillam plain. A very fair specimen of "Cavendish," prepared in the American manner, from native leaves, was exhibited by MR. TAYLOR of Jálándhar. The same gentleman exhibited tobacco in cakes, like honey-dew; to these samples the jury award a Prize of Rs. 20. It is understood that MR. TAYLOR contemplates forming a company to grow and prepare tobacco. The experiment is an interesting one: tobacco grows easily and well in manured lands all over the Punjab; if attention were given to its cultivation, and to the selection of good seed, whether of the esteemed Persian or American and West Indian varieties, there can be no doubt that a first rate leaf might be produced, and then the introduction of American methods of preparation would easily follow. Still the getting a good leaf is the matter of primary importance, and perhaps no district offers greater facilities than the rich and fertile Jálándhar Doab.

The next Sub-Division, containing spices, had hardly anything in it worthy of remark. There were a large number of boxes of coriander, all alike; and the white and black cummin seed and carraway seed. There were also 11 samples of capsicums; those of Shahpúr being particularly large and fine.

Ginger and turmeric represented the Hill produce; and cardamoms, areca nuts, and black pepper, are all imported spices.

There was one sample of cinnamon, or rather cassia bark, from Bakót, in Hazara; it was a good sample, the flavor of the bark being scarcely inferior to the real cinnamon, and forming an agreeable spice.

THE SUB-CLASS containing wines and spirits was scarcely represented at all, save by some

* On poppy fields an acreage is charged.



samples of Hill beer and porter, and the spirits by some native spirit distilled at Peshawur, from Kábul grapes.

The beer and porter from Simla did not give satisfaction; but this was very probably owing to bad corking.

The Kussowlie beer was full bodied and very good; specimens were sent to the Chemical Examiner to determine the proportion of alcohol.

THE MOST EXTENSIVE Sub-class was that containing saccharine products. The manufactures in sugar in several parts of the Punjab are extensive; and the exports, especially to the south-east, are considerable.

In this class some fancy works in sugar were exhibited, and also a very large number of specimens of sugar in its various forms,—molasses, unrefined and refined, the latter including misri, chíní, kand, lump and loaf sugar.

The crystalline masses of sugar candy, of which there were 14 specimens, were all of good quality. Lastly, there were some curious sweetmeats of Lahore, imitating walnuts, almonds, cardamoms, rice, a cup and saucer, and a cocoanut.

The best specimens of refined sugar, *misri*, were those numbered (3988), exhibited by the JALANDHAR COMMITTEE, and (3991), produced at Bawarnah, and contributed by the KANGRA COMMITTEE; they were pronounced to be equal in point of fine grain, purity and merit generally.

The best *chíní* was that contributed by the TEHSILDAR of Pathankote, and bearing the Catalogue number (4004).

The sugar candy sent from Hissar (3977), was by far the best sample of this form of refined sugar: it was imported from Bikanair, where this kind of sugar is made to a great extent.

There was also a fine large flat plate or disc of crystallized sugar from Lahore, it is called "tavi" sugar, from the large iron pan (tavi) in which crystallization goes on; this form of sugar when broken into lump is that commonly used for household purposes.

Notwithstanding the great excellence of many of the samples of sugar exhibited, there is still great room for improvement. The best samples of loaf sugar are quite inferior to the beautiful snow-white, granular, crystalline manufactures of Europe; but there seems no reason why the manufacture should not be carried to perfection here, since every appliance is at hand.

The Bikanair sugar is equal to the white candy-sugar of English confectioners; but why should not the manufacture be established in the Punjab? the only requisites appear to be pure water, and great care in refining the syrup, by crystallization and re-solution, till the required degree of purity is attained. The JALANDHAR MUNICIPAL COMMITTEE have taken up the subject with such interest, that these matters are well worth their considering. Every effort should be made to secure great cleanliness of vessels, &c., and water; great care in cleaning the boiling syrup, and sugars quite equal to European might be produced.

With regard to the Prize of Rs. 100 offered by the JALANDHAR MUNICIPAL COMMITTEE for the best refined sugar, it is found that the sample (3991) from Kangra, and (3998) from Jalandhar, are equal in merit, the prize should therefore be divided, and half awarded to each exhibitor.

The jury award also to the Lahore collection of fancy articles in sugar, made by ABDULLAH, a Prize of Rs. 20; and a similar prize to the samples (4004) and (3977).

CLASS III. DIVISION II. DRUGS.

*General Remarks on the Vegetable Drugs in the Exhibition at Lahore.**

In drawing up the accompanying description of the vegetable drugs, great assistance was afforded by DR. STEWART, whose botanical skill and acquaintance with the flora of most parts of the Punjab, enabled him recognize a considerable number of drugs which would not have otherwise been easily determined by the jury.

The vegetable *Materia Medica* of the Punjab appears to be principally derived from the native wild and uncultivated plants growing there, such as—"shahtara" (*Fumaria parviflora*); "Isfand Lahori" (*Peganum harmala*); bahuphalli (*Corchorus depressus*); ber (*Zizyphus jujuba*); &c., the properties of which have probably been learnt by repeated trials.

But, together with these, are a considerable number of drugs not produced in the Punjab, but which are articles of ordinary trade among Eastern nations, such as the spices—cloves, cinnamon, nutmeg, &c.,—coming from more tropical regions; and rhubarb, musk, and assafetida, the produce of the more northern mountainous districts.

A third class of drugs might probably be formed, of those which were introduced by the Mahomedan hakims, who had studied from the Arabian school of medicine who, themselves, derived their knowledge from the Greeks. To these, without doubt, are owing the use of a few drugs which are not native to India, such as *Hellebore*, *asarabacum*, *Pæonia coralina*, &c.; but it is now certain, that in the Punjab at least, most of these medicines, although resembling somewhat the drugs used by the Greek physicians in appearance, are widely different in nature, and are generally derived from plants which are really natives of India. Thus it will be shown that the specimens called "kālī kūtkī," which in most books on Indian medicine is termed *Helleborus niger*, is in reality exactly similar to "kaur," the produce of the *Picrorhiza*; while the "asarūn," which even in the native name, attests its resemblance to the *Asarum Europæum*, is probably a species of Valerian.

A fourth class which, however does not include many of the drugs shown, may consist of those plants which are used from a fanciful resemblance of some

part of the plant to some part of the body, and the consequent supposition that the drug was intended to benefit that part when affected with disease. Thus the *Helicteres isora* is supposed to resemble in its coiled up fruit the convolutions of the bowels, especially when afflicted by the twisting pain of cholera; and "sālap misri" has been considered not only by Indian, but by European herbalists, to be of especial benefit to that part of the body from which the name of the order to which it belongs is derived. This idea has been commonly employed for the selection of medicines in Europe as well as India, and is called the Doctrine of Signatures, it being supposed that each drug was signed by its appearance for the function which it might affect in the body; but it is needless to say that this assumption is not confirmed by experience.

Among the collection of vegetable drugs there were but few which merited especial notice from their peculiarity of appearance; but there are some which may be referred to either as having been hitherto incorrectly named, or as being not unfrequently confounded with other drugs on account of the resemblance of their native names. These will be first alluded to, and then all the drugs will be arranged according to the natural system of affinities generally used in European botany; the use of each, as far as it is known, either in European or native medicine, is also added.

The first drug to be mentioned is the "kālā zīra," (or jīra.) This is sometimes confounded with the "kālī-zīri" (*Serratula anthelmintica*) or the "kālā zīra" (*Carum gracile*); but on sowing the seeds the plants which were produced were easily distinguished, and it at once appeared that the "kālā jīrah," a small triangular aromatic seed produced a plant which belonged to the natural order *Ranunculaceæ*, and which proved to be the *Nigella indica*, also called "kalonja"; while the "kālī jīri" produced a plant which evidently was included in the *Compositæ*; and the "kālā zīra" germinated, forming a plant which resembled one of the *Umbelliferae*.

There has also been some confusion between the

* The whole of this division is written by DR. BURTON BROWN, Chemical Examiner; occasionally additional matter from other authorities has been added to his description.

names of chiraita, "keraita," and "chitra," with various modifications, such as "cherra," "chitra mál," &c.; after some examination it was found that "chitra" was usually applied to a branched pinkish root, the tincture of which gave a red precipitate with magnesia, and which in this as in other respects resembled the *Plumbago zeylanica*, while the "chiraita" was applied to some square stems with opposite branches which belonged to the useful tonic *Ophelia chiretta*, and which is now admitted into the British Pharmacopœia. There remained several yellow root stocks, with the bases of circular stems attached which were variously designated "karaita," "cheraitra," "chitra mál," "chitra pahári," "chari," and which evidently resembled a root called "phali-jari," previously recognised to be that of the *Thalictrum foliosum*.

Another substance on which the natives appear to set great store, the "mámraín," resembles closely both in appearance and color the stalks of the "phali-jari;" and has, therefore, been referred either to that or some other species of *Thalictrum*.

Another substance, "sat gilo," is worthy of notice, being as an attempt by the natives to obtain an extract of a valuable drug, but unfortunately from their faulty method of manipulation, they have only succeeded in obtaining what is little more than boiled starch. It is said to be made by boiling the root for twelve hours in water, then straining and evaporating to dryness. A much more efficient preparation would be made if cold spirit was used instead of boiling water, as then only the active principle would be taken up and none of the starch; but the objection to use spirit in preparing medicines renders most preparations which do not contain the solid remedy, of but little power.

Todri. This name has frequently been applied to mallow seeds, but in the specimens sent to the Panjab Exhibition, it was applied to seeds which evidently belonged to the order *Crucifera*, both from their external appearance and from the plants which they produced when sown. There appears to be two principal sorts—"todri lál," or "súrkh," or "zard," which is the seed of the wallflower (*Cheiranthus cheiri*), and "todri safaid," "níla," or "náfarmáni," which are the seeds of the common stock (*Cheiranthus annuus*), and which produced plants evidently belonging to this species.

One specimen of "todri súrkh" was apparently the seeds of common cress (*Lepidum sativum*); but this was in all probability sent by mistake, as all other specimens of cress were named "halm" or "táratezak."

Zirishk. Some confusion still existed respecting this name, but the specimens in the present exhibition evidently show that there are two totally dis-

similar kinds—one, "zirishk shirin," is evidently a species of raisin, derived from the *Vitis vinifera*; the other, "zirishk talkh," is a very austere berry, which resembles the fruit of the berberry (*Berberis lycium*). The wood of this tree was said to be called "chitra," but neither of the specimens sent to the Exhibition bore that name, while the specimen styled "chitra," *Berberis*, proved to be *Thalictrum foliosum*: as this root resembles the wood of the *Berberis* in color, though not in form, it is possible that the name of *Berberis* has been sometimes applied to it by mistake.

Musli. This name has been variously applied to a variety of roots—1st, a tawny red light-textured root, resembling that of the cotton tree (*Bombax heptaphyllum*), has been called "musli sembal" or "musli safaid;" but the latter name has been more frequently used to a fluted white semi-translucent long narrow stem, resembling the "sátawar" (*Asparagus racemosus*); while the third kind is a small cylindrical blackish root, which is called "musli siyah," and is attributed to the *Commelina scapiflora*.

Mocharas. Some difficulty exists respecting the drugs which have been sent under the name of mocharas. Many of them consist of a resin of a bright red color, which has been attributed to the *Bombax heptaphyllum*; others are more translucent and pinkish, and resemble to a great degree the resin of the sohánjua tree (*Hyperanthera pterygosperma*); while a third set are more similar in structure to an excrescence, having apparently an epidermis. Further enquiry is necessary to ascertain the exact relation of these apparent galls to the genuine gum resin.

Helicteres Isora. This substance is a singular twisted fruit of a plant belonging to the natural order *Byttneriaceæ*: it is used for the cure of cholera and diarrhoea, on account of the supposed resemblance between its twisted and convoluted carpels and the coils of the intestines, especially in the former disease; and is one of the examples of the application of the doctrine of signatures already referred to.

Peganum harmala. The seeds of this plant are often called "Ispand Lahori," as well as "harmal," but the former name is often confounded with "Ispand" (*Withania somnifera*); this plant is said to be the source of the "harmala red," sometimes used in dyeing silk pink, and might therefore become an article of commerce as it is in many places a very common weed. It has been supposed that it derives its name "harmool," from its connection with the $\mu\omega\lambda\upsilon$ of HOMER, but this is very doubtful.*

* See Odyssey X., 305. Where Hermes gives it to Ulysses as a countercharm to the spell of Circe.

Mucuna pruriis. A very good specimen of the pods, with the peculiar hairs of this plant was shown (No. 1348) from Hushyarpur. Formerly the hairs were much used in England as a mechanical anthelmintic for tape worm, but the hair of the "kamla" (*Rottlera tinctoria*) has lately been substituted for these in Europe, as it has long been in India employed in this affection.

Assafetida. An interesting specimen of the root of the *Narhex assafetida*, obtained from its most southern habitat in the Pangi valley, was exhibited by DR. CLEGHORN. The root on being sliced, gave out distinctly the odour of the drug.

There was also a very interesting specimen of the root of the *Angelica archangelica* from Simla, called "chora."

Babunah. This drug, though stated in books to be the chamomile (*Anthemis nobilis*) was evidently in this Exhibition replaced by the flowers and stalks of the common *Matricaria chamomilla*, and it is at least probable that this substitute generally occurs.

'Akarkarha. This drug is also stated to be the *Anacyclus pyrethrum*, (Pelletory of Spain,) but the drug, as well as "pokarmal," resembles in taste the lower end of the stalk of the *Spilanthes oleracea*, a common composite plant in gardens.

Gokru. This name is applied to several, more or less, spiny fruits. The most common is the "gokru chota" or "khurd," which is the spiny fruit of various species of *Tribulus*, which is occasionally used as food in time of scarcity. Another kind, with four angles, is the fruit of *Pedañum murex*, and is sometimes called "gokru kalai, large gokru;" while one specimen proved to be the mucicated capsule of *Momordica muricata*, one of the Cucurbitaceae.

Manna. Several kinds of manna used in native medicine were exhibited, but all much inferior to the European drug. One of these in small dark grains is the "turanabin," said to be derived from the *Alhagi maurorum*; another somewhat whiter, is the "sherkhist" or "shaklu," which is believed to be produced by a species of *Fraxinus* in Kábul; and lastly, the "shakar taghar," which is a round cell, resembling in shape a small gall; this is said to be produced by the puncture of an insect on the *Calotropis procera*, "akh" or "mudár"; it has a sweet taste.

Ustákhádus. This odoriferous labiate plant has generally been attributed to the *Lavendula stachas*, but its appearance evidently proved that it was a species of *Prunella*.

Kaspat and *Uglá.* These two triangular sorts of seeds, evidently of the same kind, produced when sown a plant which was recognised as the *Polygonum fagopyrum*, used principally as food in the hills.

Asarín. Several specimens of a root having this

name were sent, but on careful examination they appear more similar to the roots of the *Valerian*, both in taste and smell.

Hussan Yusuf (1975), Lahore. This is a very interesting specimen of the *Siliceous frustule* of one of the Diatomaceae. It is of a pyramidal form with a convex base, and on each triangular face is a prominent rounded knot; these markings are not affected by acids, and remain after heating to redness. When heated in a reduction tube, it gives off a peculiar smell and combustible gas, showing that it is quite in a fresh state, otherwise it appears somewhat similar to a fossil. Hussan Yusuf is collected in lakes and ponds in the hills around Srinagar in Kashmir. It floats on the surface and is skimmed off and dried.

The medicinal use of preparations of vegetable drugs has been for a long time of the greatest importance, and until a comparatively recent period the number of drugs obtained from plants and animals greatly exceeded that of preparations from the mineral kingdom. This depended on the fact that until chemical knowledge was fixed on a firm basis, it was only with great difficulty and after many failures, that chemical products could possibly be obtained; while on the other hand, the different parts of plants to which a medicinal use was assigned were easily distinguished, and procured without much trouble. In Europe, owing to the progress of science, mineral preparations are now most extensively made and used for medicinal purposes, and many of our most valuable drugs are derived from this kingdom. But in India, the knowledge of chemistry is confined to those among the natives who have been instructed by Europeans; and, therefore, medicinal substances procured from the mineral kingdom are comparatively seldom made or used, excepting by those who have been so taught; or those mineral articles are used which are procurable without much skill in preparation; they are often of little efficacy, as the list of mineral drugs already given will show. The use of vegetable drugs would probably be the first to recommend itself to those seeking relief from pain and disease, both because plants are every where at hand, the number of different kinds of plants are very great, their forms are distinctive and often peculiar, and in some cases they have been supposed to bear a more or less obscure resemblance to certain parts of the body, either in health or when diseased. Thus, in olden times, we find in HOMER that NESTOR used a poultice of onions, cheese and meal, mixed with wine to MACHAON'S wounds: and the former substance, a kind of which, under the name of "janghi pyáz," was shown in the Exhibition, was used by the ancient Egyptians in cases of dropsy. The hellebore of Anticyra was long extolled by the Greek writers,



and is said to have been used by MELAMPUS of Argos, to cure the daughter of KING PROCLUS of melancholy. It is stated in many books, that hellebore, under the name of "kala kootki," is used in India, but this has been found to be erroneous as far as the Punjab is concerned, since "kala kootki" is here applied to a different drug. It has also been supposed that opium was the Nephenthe of HOMER.

Enough has been adduced to prove the antiquity of those simples or Galenical preparations as medicinal drugs derived from the vegetable kingdom; and it is better next to consider in what manner the use of drugs was probably commenced. The use of each vegetable preparation was probably at first brought about by the experience of individuals, each of whom had found that certain plants were useful in the diseases which afflicted himself or his neighbours, and this knowledge was more rapidly spread owing to the ancient custom of placing the sick in public roads and markets, so that passers by might communicate information respecting such remedies as were employed in similar cases. As observed by HERODOTUS, in this way a knowledge of a great number of medicines would be gradually acquired; at first, chiefly of those which were indigenous to the country, but gradually, the drugs of other countries would become known, especially those which were found to be of undoubted efficacy in the disease for which they are used.

Hence it is to be expected that there will be found a larger number of substances, which are inert or nearly so in a *Materia Medica* which comprises indigenous plants only, than in a collection of drugs brought from a distance. Moreover, as the imported drugs must always be more costly than the indigenous ones, there will always be a tendency to substitute some indigenous substance which may resemble the foreign one in appearance or action, especially as the description of the drugs or of the plants from which they are derived, was formerly much less carefully attended to than now. Thus it will be seen, as above stated, that an Indian plant *Picrorhiza kurroa* has been substituted from the more remote Hellebore of the Greek physicians.

Similarly a kind of *Valerian* takes the place of *Asarabacca*, and fruits of *Gardenia* that of the juniper. This substitution would certainly bring the kind of remedy in which it was employed into disrepute, as the substance used for adulteration would differ greatly from the original drug in its powers and mode of action.

Besides the above modes of ascertaining the natures of remedies, which being founded on actual experience, must be termed improved methods, there

is another mode, already referred to, called the DOCTRINE OF SIGNATURES. This is founded on the belief that every natural substance possessed of medicinal virtues indicates by its external character the disease for which it should be employed. Thus turmeric, rhubarb, and other roots which have a brilliant yellow color, were supposed to be especially useful in jaundice and disease of the liver. *Cassia fistula*, "amaltás," from the peculiar septa of the fruit, resembling the valves of the intestines, is supposed to be especially destined for the cure of disease of these organs; and, similarly poppies, from the shape of their capsule, were supposed to be useful in diseases of the head; and roses, from the color of their petals, to the blood. Many small red or yellow seeds, especially those of Cruciferous plants, were supposed to be useful in cases of gravel, the deposit of which they somewhat resemble in appearance; and "sálap misri" is used in diseases of that organ, to which the name of *Oreohis* (applied usually to the plant) is assigned; the convoluted pod of the *Helicteres Isora* is employed in cholera, since it is supposed to resemble the twisting of the coils of the intestines. But although it is probable that the use of different drugs was commenced in some of the ways already spoken of, yet at the present day the native physicians have adopted, with some modifications, the idea of GALEN respecting the method of operation of medicines; this was, that the uses of all medicines were derived from their elementary or cardinal properties,—namely, heat, cold, moisture and dryness; and that all diseases could also be classed under the above heads, but that in the treatment of disease a medicine should always be employed which was of a contrary nature to the disease treated; thus a cold disease requires a hot remedy, and the converse. It is probably that ignorance of the attachment to this theory, (which is well known to native patients and hakims,) is often an obstacle to the employment of European medicines in the hands of European practitioners among natives, as either a remedy which they consider hot is employed for a disease which is also considered hot, or the prescriber does not state whether the remedy given is a hot or cold one even when asked. Although the theory that medicine acts by being hot or cold only is entirely erroneous, yet it has so strong a hold on the confidence of many natives that without some attention to it, it would be difficult in many cases to induce them to take the medicine ordered.

The following is a list of some of the drugs employed, showing their nature according to native ideas, and also the real use in European medicine.



COLD MEDICINES.

Scientific name.	Native name.	Use.
Phyllanthus emblica,	Amla,	Astringent and acid purgative.
Rosa,	Gul surkh,	Astringent.
Rosa,	Guláb,	Astringent and purgative.
Citrus aurantium,	Narangi,	Astringent, tonic.
Tamarindus indica,	Imli,	Refrigerant.
Terminalia chebula,	Halela,	Astringent.
Rhus coriaria,	Samák,	Astringent.

HOT MEDICINES.

Semecarpus anacardium,	Bhiláwa,	Acrid.
Corylus avellana,	Findak,	Demulcent.
Dracocephalum Royleanum,	Bálangú,	Aromatic.
Zingiber officinale,	Sonth,	Aromatic.
Moschus,	Mushk,	Aromatic.
Aquillaria agallocha,	'U'd,	Tonic.
Caryophyllus aromatica,	Karanful,	Aromatic.
Amber,	Kahruba,	Tonic.
Narcissus tazetta,	Nargas,	Acrid.

DRY MEDICINES.

Prunella sp—,	Ustákhúdús,	Aromatic.
Raw Silk,	Abresham,	Inert.
Centaurea Behmen,	Báhman,	Tonic.
Polypodium,	Bisfaij,	Tonic.
Dracocephalum Royleanum,	Bálangú,	Aromatic.
Psoralea corallifolia,	Bábchi,	Tonic.
Laurus cinnamomum,	Dárchini,	Aromatic.
Laurus cassia,	Taj,	Aromatic.
Pastinaca,	Shakákul,	Demulcent.
Crocus sativus,	Zafrán,	Inert.
Mentha sativa,	Pudina,	Aromatic.
Myristica moschata,	Jaiphal,	Aromatic.

MOIST REMEDIES.

Phyllanthus emblica,	Amla,	Astringent.
Tamarindus indica,	Imli,	Purgative.
Silica,	Tabáshir,	Inert.
Vitis vinifera,	Zirishk,	Demulcent.
Camphora,	Káfúr,	Aromatic.
Onosma sp—,	Gauzabán,	Tonic.
Coriandrum sativum,	Dhanyán,	Aromatic.
Rosa,	Gul surkh,	Astringent.
Nymphaea,	Nilofar,	Inert.
Citrus aurantium,	Narang,	Aromatic.



From the above list it will be seen that many of the cold remedies, are what are used in European therapeutics astringent medicines, while the hot remedies are principally aromatics; but that very various remedies are classed under the terms moist and dry.

The drugs are prepared for administration in comparatively few ways. The smaller seeds, &c., are usually given entire, but many others are reduced to powder by crushing them either with a large pestle and mortar, or in a mill. The powder is sometimes given by itself, at other times it is made into a confection, "májún," by mixing it with sugar or "gur," or in the hill districts, with honey; or the powder is mixed with gum water and made into a pill, "goli." Very often powders of several drugs are first mixed together, and then prepared for use in one of the above ways. If the drug is only intended for external application, the powder is either rubbed on the part alone or mixed with oil or butter to form an ointment, "mulaim;" sometimes wax is added, and thus a cerate is formed.

If the medicine is of great power, as in the case of "kúchila" (*Strychnos nuxvomica*), it is often first boiled in milk and allowed to soak for the space of a night, and thus part of the active principle is removed and poisonous effects are avoided.

When a liquid medicine is to be prepared, sometimes the drug is made into an infusion, "khesándah," either by simply steeping it in cold water for 8 or 12 hours, or by pouring boiling water over it and allowing it to cool.

At other times a decoction, "joshándah," is prepared, by boiling the medicine with water, which is poured on the drug at the ordinary temperature. In a few instances extracts are made by filtering the decoction and evaporating it to dryness; in this way "rasaunt" and "kath" are prepared. Another somewhat similar preparation is the extract made from plants which contain much starch, by boiling them for some time in water, thus dissolving the starch and straining off the woody matter, and then evaporating the decoction to dryness, thus "sat gilo" is prepared. But one of the most common methods of preparing medicines used by the natives is the distilled water called "ark;" this is made by putting the powdered drug with water into a still, and then applying heat. The volatile constituents of the drug are alone drawn over. When the drug is an aromatic stimulant, the "ark" must contain the most important part, but when as in other cases, the active principle of the drug is fixed, it is obvious that the "ark" can possess no great efficiency. The native hakíms do not employ alcohol in any form in the preparation of medicines, hence neither tinctures nor spirituous extracts are ever used by them, nor is acetic acid, in the form of vinegar, employed

to extract the active principles of drugs; although occasionally used to form a sort of poultice with sugar. Linseed meal poultices are not used, nor in fact any other sort; and for blistering hot water is employed instead of cantharides. Plasters also are not used, or very rarely so.*

In describing the vegetable drugs, the following method has been adopted:—

1st. There is a systematic index, showing the various plants used,—arranged according to their natural orders, on De Candolle's system, each family of plants containing drug-herbs being described in detail.

The general vernacular index at the end of the volume will furnish a key to all synonyms, as well as to the botanic equivalent for any given native name.

THALAMIFLORÆ.

RANUNCULACEÆ.

1079. Delphinium sp.—? Vern.—Isbarg.
(4528) Amritsar.

(4657) Peshawur.

The yellow flowers, dried: used as a dye. Consists of dried stalks, flowers, leaves and fruit, of a pale yellow color.

1080. Anemone sp.—? Vern.—Brámí.
(2127) Lahore.

A much divided leaf, not in general use. Plants acrid and irritating; used as sialogogues and for gout and rheumatism.

1081. Nigella indica. Vern.—Kalonjah;
kalungí; kálá zirah; siya dánah; tukhm-i-gandaná.

(645) Gurgaon.

(1150) Ambálah.

(1369) Amritsar.

(1211) Jálándhar.

(1454) Amritsar (called probably by mistake shau-níz).

(1584) Gurdaspúr.

(1999) Lahore.

(2443) Kashmir (tukhm-i-gandná).

(2492) Nábhá.

(2297) Kashmir (siya dána).

Small triangular black aromatic seeds having internally a white albumen, which contains from 5 to 10 per cent. of oil.

It is considered by natives a warm dry medicine; used in phlegmatic and in choleric diseases, and all swellings. It assists digestion, but is principally

* HONIGBERGER describes a man who brought him a plaster made of litharge, which he brought from Bukhara, and was supposed to possess wonderful virtues.

used for horses. It is also used as a spice; and formerly was employed as a substitute for pepper. A stimulant aromatic tonic, useful in indigestion. It is believed to increase the secretion of milk, and to be useful in rheumatism, spleen diseases, and fever. It is also said to preserve woollen cloths and shawls from insects.*

Dose.—6 māshas, or from 10 to 30 grains. Price, a rupee a seer.

1082. *Aconitum ferox*, *luridum*, *nappellus*, or *palmatum*.

(All these have similar properties, and are said to be mixed).

Vern.—Bish, bikh, bikhma, bishnāk; ati singyā, mithā bish, mithā teliya, mithā zahr (mithā dodya, somewhat different), mishri bish, muhūra, kala mohra, long teliya, singya jar, singya khār.

(765) Amritsar.

(685) Gurgaon (mitha mora).

(1724) Lahore.

(1079) Delhi (mitha dodya, a white variety).

(1658) Lahore.

A dark brown wrinkled conical root, with either a black or white centre, very brittle; contains much starch. Taste irritating and acrid, causing a persistent tingling sensation.

A virulent acronarcotic poison, containing from 50 to 90 grains of *Aconitine* in a pound. Of this alkaloid one-tenth of a grain may prove fatal. It produces tingling and numbness, debility and contraction of the pupil. Used by natives and Europeans in rheumatism and neuralgia, but seldom given internally; by the latter also employed in tetany, rheumatism, gout, and heart disease; also leprosy and cholera fever. It is a very valuable remedy, but requires great caution in its use.

It is said to turn black by being dipped in the urine of cows, but in reality it is torrefied.

Dose.—By the natives, a piece the size of a grain of "moth;" rarely used alone. Price, a rupee a seer.

1083. *Aconitum heterophyllum*. *Vern*.—Atis, patis, batis.

(1325A) Delhi.

(1300) Jalandhar.

(1726) Lahore.

(1727) Lahore (patis).

(5095) Simla (batis, a small variety).

(1209) Jalandhar.

Small irregularly conical ash-colored pieces, white

internally; taste bitter, but not numbing. It contains much starch.

It contains no poisonous principle, but acts as a bitter tonic and febrifuge. Said to be pungent, astringent and heating.

Used by Europeans and natives in the treatment of fever, debility, and diarrhoea. Used by natives in debility, diabetes, gonorrhoea, gleet, hæmorrhoids, and irritability of the stomach; also to women after labor, or uterine hæmorrhage, mixed with others drugs; and in dyspepsia and dysentery: also employed as a tonic and in coughs.

Dose.—Half tolah, or from one drachm. Price, Rs. 1-4 a seer.

1084. *Thalictrum foliosum*. *Vern*.—Phalijari, chitra māl, keraita, chera, chireta? chitra.

(1011) Delhi (in vernacular catalogue, phalli jari?)

(1281) Jalandhar (chireta?)

(1359) Hushyarpur (cherayta).

(1522) Lahore (chitra).

(1228) Lahore (chitra māl).

(2475) Kashmir (chahra).

A yellow rhizome, with a circular concave basis of fistulous stems. It probably contains Berberine.

The roots are said to be substituted for rhubarb, in double doses. The *Thalictrum majus*, "poor man's rhubarb," is so used in England.

A bitter purgative and diuretic.*

Dose.—2 chitaks. Price, 5 annas a seer.

1085. *Thalictrum* ? *Vern*.—Mamirā, or māmīrān.

(1948) Lahore.

(2349) Kashmir.

Small cylindrical roots, brown externally, with a yellow medullium; resembles much the former, but is of a brighter color. There are two kinds, the small, which is the best, and a large sort. Very much valued by natives as an astringent application to the eyes in chronic ophthalmia. In the Kashmir list it is called māmīrān Chīnī (or Chinese), and said to come from Yarkand. The "Makhzan ul Adwiya" says: there are three kinds—Hindī, Khurāsānī, and Chīnī. Hindī is blackish yellow in color; Chīnī is dull yellow; Khurāsānī is dark and greenish.

Called *Glaucium citrinum* by HONIGBERGER.

1086. *Pæonia corallina*. *Vern*.—'Ud sālāp.

(1723) Lahore.

The *Pæonia παονια* or *Παυκισθη* of DIOSCORIDES.

Irregular, flattened, woody masses, with a brownish

* These seeds are liable to be confounded with *kālī zīrī* (*Serratula anthelmintica*) or *kālā zīra* (*Carum nigrum*), which are also stimulant aromatics; or with *kālādāna*, which is a purgative.

* This root is liable to be confounded with *charaita*, a bitter tonic, or *chitra*, or *lal chitra* (*Plumbago zeylanica*); also *chitra*, stated to be a species of *Berberis*.

epidermis and fibrous coating, with numerous fissures radiating from the centre.

Used by natives for weakness, palpitation, and asthma; and to fasten round the neck of children to prevent asthma.

Root believed to be antispasmodic and to stimulate the secretion of milk and menses. It is said to become more efficacious the longer it is kept.

Dose.—1 māsha. Price, Rs. 2-4 a seer.

MENISPERMACEÆ.

1087. *Tinospora cordifolia*. Vern.—

Gilo, gulanch, gularich, gūrcha. *The extract*, sat gilo.

- (646) Gurgaon.
- (1030) Delhi.
- (1188) Ludhiana.
- (1203) Simla.
- (1245) Jalandhar.
- (1352) Hushyarpūr.
- (1406) Amritsar.
- (1576) Lahore.
- (1684) Do. (Chāniān tahsil).
- (1021A) Delhi.
- (2184) Rawalpindi.
- (2263) Dera Ghāzi Khān.
- (2325) Kashmir.
- (2479) Jhīnd.
- (2330) Kashmir.

A root covered with loose papery bark and wood, composed of distinct wedges, separated by depressed medullary rays.

Used by natives for colds and fever, in doses of 6 mashas, in cold infusion; also in leprosy and skin diseases. Contains much starch, and a bitter principle. A useful demulcent tonic; a substitute for calumba or *Cetraria* in the treatment of dyspepsia; also diuretic and febrifuge. Used in intermittent fevers, in which it is said only to diminish the cold stage; also in chronic rheumatism and debility after fever, and, as a general tonic. Said by some to be as powerful a febrifuge as Peruvian bark.

The extract of the root "sat gilo" is made by boiling the root 12 hours in water, then straining and removing the woody fibres, and evaporating the liquor to dryness. Said also to be made by squeezing out the juice of the cut root, adding water, allowing it to stand, and collecting and drying the sediment. The substance is white, very brittle, irregular lumps. Contains a large quantity of starch. Specimens were sent from—

- (3) Pattiala.
- (1996) Lahore.
- (2300) Kashmir.

Used in fever and urinary disease.

1088. *Cocculus villosus*. Vern.—Pathā. (2080) Lahore.

A broad stalked rotundate, cordate, reticulate,—veined leaf. Use not clearly known.

PAPAVERACEÆ.

1089. *Papaver somniferum*. Vern.— Post, koknār.

HEADS.

- (1120) Delhi.
- (1378) Amritsar (koknār).
- (1250) Jalandhar.
- (1590) Gurdaspūr.
- (2312) Kashmir.

A whitish ovate capsule with a radiated sessile stigma, large parietal placenta, and small seeds; it contains both meconic acid and morphia, which are more abundant when not quite ripe.

Used as a narcotic by natives in cases of cough; also by Europeans, especially in diseases of children, also as a soothing external application for sprains, bruises, &c.

Dose.—1 chitak. Price, 4 annas a seer.

SEEDS. Vern.—Khash khās.

- (1546) Amritsar (white seeds).
- (1371A-1371 B) Amritsar (black seeds).
- (1885) Pattiala.
- (1283) Jalandhar.
- (1021) Delhi.
- (2211) Dera Ghāzi Khān.

The two kinds of seeds are believed to be either distinct species, or well marked varieties. The seeds are small, reniform, rugose, and very oily.

The natives consider the white as articles of food, but that the black are more powerful, and are used in coughs and special diseases.

Dose.—1 tolaḥ. Price, 2 annas a seer.

In European practice the seeds are considered oily demulcents, and are not used alone.

POPPY OIL. Vern.—Khash khās ka tel.

- (1365) Hushyarpūr.

OPIUM. Vern.—Afīm, afyām.

- (1037) Delhi.

Pattiala.

Most of the specimens of opium were included in the intoxicating drugs.

There are said to be four kinds—"Chaum," white "maum," black; a yellow sort; "sauri," mixed.

On analysis of Punjab opium by DR. HAINES of Bombay in 1862, shows the following results:—

	Morphia. per cent.	Narcotine. per cent.	Water. per cent.
Punjab, No. 1, ...	4.44	3.17	8.73
" No. 2, ...	9.26	2.73	8.67
Patna, 1850, ...	4.53	4.90	3.23

From this it is evident that the Punjab opium examined, was quite equal to the Patna, and the specimen No. 2, much superior. *

Opium is most extensively used by the natives, especially in eye diseases; in which it is either applied with a pencil of antimony, or fixed on the temple with plaster. Its applications in disease are too numerous to detail. Opium, by Europeans, is considered a most valuable narcotic and anodyne. It at first acts as a stimulant, afterwards it relieves pain and produces sleep. It diminishes the secretion of the bowels and kidneys, but increases that of the skin; and therefore acts as a diaphoretic.

It is used in insanity and delirium tremens; also in peritonitis, ulcers of the stomach, diarrhoea, and dysentery. It is occasionally used in fevers, epilepsy, asthma, bronchitis, phthisis, and disease of the heart; also in cholera, strangulated hernia and calculus; in cancer and diseases of the ovaries and uterus, and in syphilis.

Price, 4 tolahs for the rupee.

1090. Argemone mexicana. Vern.—
Siálkánta; bhatnail; satya nasa; bherband.
(1026) Delhi.

A cylindrical four-valved thorny capsule, opening by valves at the apex. Said to be the "fio del inferno" of the Spaniards, who consider the seeds more narcotic than opium. The infusion is said to be diuretic, and the oil purgative: the juice is said to be a substitute for ipecacuanha. Requires further trial.

This plant is a native of Mexico, but is now found abundantly in Asia and Africa, over a very extended area. The stalks and leaves abound with a bitter yellow juice like gamboge, which is used in chronic ophthalmia. The seeds are used in the West Indies as a substitute for ipecacuanha. An oil is also pressed from them, which in South America is much used by painters, and for giving a shining appearance to wood. It has also been employed as a substitute for castor oil, and is applied externally in headache by the native practitioners.

The juice of the plant in infusion is diuretic, relieves strangury from blisters and heals excoriations. The seeds are very narcotic, and said to be stronger than opium. SIMMONDS says, "the seeds possess an

emetic quality. In stomach complaints, the usual dose of the oil is thirty drops, on a lump of sugar, and its effect is perfectly magical, relieving the pain instantaneously, throwing the patient into a profound refreshing sleep, and relieving the bowels." This valuable but neglected plant has been strongly recommended as an aperient anodyne, and hypnotic by DR. HAMILTON and other experienced practitioners in the West Indies.* Samples of the oil were produced at the Madras Exhibition. It is cheap and procurable in the bazars, being used chiefly for lamps. AINSLIE, LINDLEY, SIMMONDS, &c. †

ANONACEÆ.

1091. Anona squamosa. Custard apple.
Vern.—Sharifa.
(1008A) Delhi.

Long conical brownish red seeds with a remarkably runcinated white albumen.

Are considered acrids, and used to destroy insects, hence the powdered seeds applied to the hair; also in itch. It is employed internally in depression of spirits, and spinal diseases.

1092. Guatteria longifolia. Vern.—
Debdará.
(1033) Delhi.
A white wood without bark.

MAGNOLIACEÆ.

1093. Illicium anisatum. Vern.—Bad-
yán khataf.
(1014) Delhi.
(1972) Lahore.
(2388A) Kashmir.
(1234) Jalandhar.

Fruit star-shaped, of 6 to 10 rays, with deep red follicles, containing single oval seeds, taste aromatic. Seeds contain an essential oil.

Said to come from Khataf, or China: also, says the "Makhzan," from Naipál hills, and from a certain island called Zerbát, and to resemble anise in flavor and effect. Principally used in coughs and cold, and as a carminative in flatulency.

A warm aromatic stimulant: the oil is used largely in Europe as a substitute for anise, than which it remains fluid at a lower temperature.

Dose.—Of the fruits, 2 mashas. Price, Rs. 1-8 a seer.

1094. Michelia champaca. Vern.—
Chamúti, champa.
(1344) Hushyarpúr.

* Vide Pharmaceutical Journal Vols. VI., V., and XII.

† Drury's Useful Plants of India: sub voce. Argemone. The plant is not common in the Punjab, it is one of those species which are gradually extending their habitat; it is I believe to be seen up as far as Delhi.

Large flat oval legumes, with the hardened pericarp generally divided longitudinally; marked externally with white dots, each fruit contains two oval red seed.

The flowers and fruits used in dyspepsia. It is considered a bitter and cool remedy, useful in nausea, difficulty of passing urine, and fever. It acts as a tonic and antiperiodic in fever.

Dose.—Of the fruit, 1 masha. Price, 1 rupee per seer (where procurable).

FUMARIACEÆ.

1095. *Fumaria parviflora*. Fumitory.

Vern.—Pápra; shitraj (Ar.); pit pápra; shahtara.

(1184) Ludhiana (pit pápra).

(1595) Gurdaspur (shahtára).

(636) Gurgaon.

(1132) Hissar.

(1142) Ambálah.

(1266) Jalandhar.

(1137) Sirsa.

(1412) Amritsar.

(1728) Lahore (shitraj, Arab).

(2202) Gujrat.

(2239) Dera Ghází Khán (called surápis in the original list).

(2301) Kashmir.

Indigenous, common.

The dried herb, with much divided green leaves, wedge-shaped leaflets, and small flattened achenia on a raceme.

It is extensively employed as an anthelmintic, and is used by natives to purify the blood in skin diseases; also as a diuretic, diaphoretic, and aperient, and in mania. In Europe it was considered bitter, slightly diaphoretic and aperient; and was formerly used in diseases of the skin and liver, and in scrofulous affections, and especially in leprosy, herpes and scabies.

Dose.—2 chitaks. Price, 2 annas a seer.

CRUCIFERÆ.

1096. *Cheiranthus cheiri*. Wall-flower.

Vern.—Todri surkh or lál.

(978) Delhi.

(1500) Amritsar.

(1198) Lahore.

(2445) Kashmir.

Small linear acute reddish seeds. Flowers said to be cordiac and emmenagogue: used in paralysis.

1097. *Cheiranthus annuus*. Stock.

Vern.—Náfarmáni, todri safaid.

(1510) Amritsar.

(1698-1714) Lahore (náfarmáni).

(2428-4145) Kashmir.

Small disk-shaped white or reddish seeds with a membranous wing. Used as a tonic.

The natives state that there are five kinds of todri seed, distinguished by the color of their flowers. Lal, or surkh, and zard, which appear to be wall-flower seeds; safaid, náfarmáni and nilá, which are stock seed.

Dose.—2 máshas. Price, 12 annas a seer.

1098. *Lepidium sativum*. *Vern*.—

Hálím, hálún, táratezak.

(632) Gurgaon.

(1090) Delhi.

(1130) Hissar.

(1567) Gurdaspur.

(1256) Jalandhar.

(1420A-B) Amritsar.

(2211) Gujrat (hálún).

(1703) Lahore (táratezak).

(2437) Kashmir.

Pattiala.

(1958) Lahore (hálím, the dried plant).

Small ovoid reddish mucilaginous seeds. Action laxative and antiscorbutic. Used as an application to bruises and a tonic internally; in full doses a stimulant and aperient.

Considered by natives hot and dry; useful to remove hiccough and wind, and disorders of the blood; also in special diseases.

Dose.—3 máshas. Price, 2 annas a seer.

1099. *Sisymbrium irio*. *Vern*.—Kháb

kalán; khákshí.

(638) Gurgaon.

(1084A) Delhi.

(1132) Hissar.

(1164) Dera Ismael Khán.

(1462) Amritsar.

(1699) Lahore.

(2173) Rawalpindi.

(2208) Gujrat.

(2473) Kashmir (khákshí).

Pattiala.

Small oval bright yellow seeds. Used for coughs, but seldom. Formerly used as a pot-herb in England.

Dose.—3 máshas. Price, 8 annas a seer.

1100. *Raphanus sativus*. Radish. *Vern*.

—Múli, tukhm-i-turb (Pers.).

(1162) Ambálah.

(1214) Jalandhar.

(1702) Lahore.

(2269) Dera Ghází Khán.

(2624) Gujrat.

(2452) Kashmir (tukhm turb).

Middle sized angular red seeds. The seeds act as diuretic and laxatives, and contain much oil. The

roots are diuretic and laxative. Used as a tonic in special diseases, and for calculus by the natives.

Dose.—1 tolah. Price, 4 annas a seer.

1101. *Farsetia Hamiltonii*. *Vern.*—Farid bāfi.

(1683) Lahore.

A common indigenous plant, rarely used in medicine. Leaves and stem glaucous pilose, with pink cruciferous flowers, and broad flattened siliquæ.

1102. *Brassica rapa*. *Turnip. Vern.*—Shalgham (or shaljam, Pers.), gonglū.

(1811) Jalandhar.

(1873) Amritsar.

(1701) Lahore.

Pattiala.

Small globular brown or reddish seeds, containing much oil. Used as a tonic by natives.

Dose.—1 tolah. Price, 2 seers a rupee.

1103. *Brassica oleracea*. *Cabbage. Vern.*—Sāgkarm or karamb.

(2449) Kashmir.

(2010) Lahore.

Seeds diuretic and laxative, also stomachic. The leaves form a very useful vegetable, and are said to be good applications to wounds, and in gout and rheumatism. The seeds are said to be used for expelling intestinal worms. The leaves are said to dispel intoxication and prolong life. (AINSLIE).

1104. *Brassica eruca*. *Vern.*—Tārāmīra.

(1920) Lahore.

(1364) Hushyārpūr (tārāmīra oil).

Rawalpindi.

(2439) Kashmir.

Brown or yellowish red, irregularly disk-shaped small seeds. Less pungent, but more oily than mustard. Chiefly used to make oil.

1105. *Brassica campestris*. (*Sinapis alba*, Linn.) White mustard. *Vern.*—Sarsoñ, sarōñ : rai or (Pers.) sarshaf : khardal (Arabic).

(1042-1089) Delhi.

(1305) Jalandhar.

(1409) Amritsar.

Peshawar.

Middle sized bright yellow pungent seeds. They contain fixed oils, and an acrid principle called sulpho-sinapisine.

Less energetic than black mustard : used to make incantations by throwing it on fire ; also as a rubefacient. Considered by natives hot and useful in disorders of the mouth and worm.

Used by Europeans as a rubefacient externally, and an emetic and purgative, internally : in large doses as a tonic, and stimulant in smaller ones. Princi-

pally used as an emetic in cases of poisoning, especially by opium and alcohol ; also in apoplexy and epilepsy, as a tonic in dyspepsia and fevers.

Price, 3 annas a seer.

1106. *Brassica juncea*? (*Sinapis nigra*). Black mustard. *Vern.*—Rai, kálā sarsoñ : sarōñ khardal (Arabic) ; sarshaf.

(1072) Delhi.

(1269) Jalandhar.

(1451) Amritsar.

(1700) Lahore.

(1949) Lahore.

(1198) Simla.

(1362) Hushyārpūr (the oil).

Irregular globular, very unequal brown or reddish seeds. They contain myronic acid, and an albuminous substance, called myrosine ; these, when in solution are decomposed and form an acid volatile oil containing sulphur. They also contain fixed oil.

Seeds acrid, bitter, stimulant and diuretic ; in large doses, emetic.

Both this and the former are used by natives in powder as rubefacients, and as tonics in phlegmatic diseases. The black rai is considered the strongest : both are hot and dry ; useful in mucous and bilious disorders, and leprosy.

It is largely employed to form sinapisms, or mustard poultices ; but these to be useful, should be made with cold water, as hot water coagulates the myrosine. Mustard poultices are largely employed in all cases of subacute inflammation, in many cerebral affections, as apoplexy and paralysis ; also in cholice, coughs, and sore throat.

Dose.—1 māsha. Price, 2 annas a seer.

DIPTEROCARPEÆ.

1107. *Shorea robusta*. *Vern.*—Rāl safaid ; dhamar (this word is not used in the Punjab).

(987) Delhi.

(1069) Delhi (rāl kálā, rāl siya).

Flat yellowish opaque pieces, with longitudinal ridges. Sometimes these are black or brown, and then the resin is called, "rāl siya."

Used principally to form varnishes ; but also applied to ulcers or chillblains, and taken internally in special diseases. It acts as a stimulant. By Europeans it is principally used to form plasters, and as an application to indolent ulcers ; also occasionally as a styptic to wounds : it combines easily with litharge to form a plaster.

Dose.—7 māshas. Price, 8 annas a seer.

1108. *Vateria indica*. *Copal. Vern.*—Kahruba (this is properly applied to amber), sundras.

(1091) Delhi.

(1845) Lahore.



The resin which exudes from this tree is often substituted for amber, and is boiled with oil to prepare varnishes.

Used as a stimulant for rheumatism and chronic ulcers, and in special diseases.

It is said to resemble copal : while fluid it is called the *Pœnæ* varnish ;* it is sometimes made into candles, which give a fine clear light, and diffuse an agreeable fragrance.

TERNSTROMEACEÆ.

1109. *Cochlospermum gossypium*.

Vern.—*Katirā gond*.

(1074) Delhi.

(1697) Lahore.

(2345) Kashmir.

(4170) Peshawar.

Used as a demulcent for coughs and special diseases, an excellent substitute for tragacanth.

Dose.—6 māshas. Price, 6 annas a seer.

BARRINGTONIACEÆ.

1110. *Barringtonia acutangula*. *Vern.*

—*Samundar phūl*.

(1915) Lahore.

Root bitter : said to be similar to cinchona in its action ; but also to be cooling and aperient.

Seeds very warm and dry. Used as an aromatic in cholera and in parturition ; also in ophthalmia.

Dose.—3 mashas. Price, 4 annas a seer.

1111. *Careya arborea*. *Vern.*—*Vākamba*.

(1965) Lahore.

XANTHOXYLACEÆ.

1112. *Xanthoxylon hostile*. *Vern.*—

Tej bal ; *kaḥāba*.

Hab. Hills, Kābul.

(2021) Lahore (kaḥāba).

(1512) Amritsar.

Seeds are used as an aromatic tonic in fever, dyspepsia, cholera ; and the bark also.

The small branches are used as tooth-brushes : the larger ones to triturate the hemp plant ; also they are employed in toothache and catarrh. The capsules and seeds are said to intoxicate fish.

Dose.—Of seeds, 2 mashas. Price, 8 annas a seer.

NYMPHÆACEÆ.

1113. *Nelumbium speciosum*.

SEEDS. (*Vern.*)—*Kaul-dodah* or *kañwal-dodah* ; *kañwal gatha*.

(679) Gurgaon (kañwal gatha).

(1060A) Delhi.

(1146) Ambālah.

(1182) Dera Ghāzi Khān (kawal doda).

(1280) Jālandhar.

(1416) Amritsar.

(1719) Lahore.

(2431) Kashmir.

Pattiala.

A large oval black seed, about the size of an olive. Both the seeds and roots are used by natives as food, either raw, roasted or boiled ; also as a cold remedy in cholera and indigestion. A demulcent, said also to be diuretic and cooling. (See No. 920, at p. 263 Class. III., Div. I., Sub-class (B)).

Dose.—3 mashas. Price, 2½ annas a seer.

STALKS OF ABOVE. *Kañwal kukri* ; *kañwal gatha* ; *nalru ? bheng ?*

(944) Dera Ghāzi Khān.

(1147) Ambālah.

(2017) Lahore.

Circular fistulous stems, divided by radiating membranous septa.

Used in special diseases, and as a diuretic in dysuria.

1114. *Nymphœa lotus*. *Vern.*—*Nilofar* ; *gulhar*.

(644) Gurgaon.

(1186) Ludhiana.

(1139) Sirsa.

(1065A) Delhi.

(1219) Jālandhar.

(1415) Amritsar.

(1580) Gurdaspur.

(1720) Lahore.

(943) Dera Ghāzi Khān.

(2199) Gujrat.

(2230) Muzaffargarh.

(2412-2522) Kashmir.

(2482) Jhind.

Pattiala.

The halved dried flowers, consisting of numerous yellowish thin petals.

It is considered by native writers to be a dry and cold astringent remedy, used in fever and cholera, bilious affections and piles ; also in diarrhoea and eruptions of the mouth.

The root is mucilaginous and demulcent ; used in piles.

Dose.—1 māsha. Price, 2 annas a seer.

FRUIT. *Vern.*—*Nāpā bīj* ; *kumud bīj*.

(1139) Sirsa.

(1121) Lahore.

(2163) Lahore.

(2431) Kashmir.

Used similarly. Considered by natives cool, and

* Sometimes written "Piney" varnish. The tree is called *Peinamarun* in Malabar, where it grows : hence the name.

used as an antidote for poisons ; in skin diseases and leprosy.

Dose.—2 mashas. Price, 8 annas a seer.

1115. Euryale ferox. *Vern.*—Makhānā phūl ; makhānā.

(1935) Lahore.

The seeds are baked and eaten by natives. They are considered strengthening, but are in reality only demulcent.

The drug is considered cool ; useful in affections of the mind and special diseases ; also after labor.

The seeds are farinaceous ; they were reputed poisonous, but are not so really.

SAPINDACEÆ.

1116. Sapindus detergens or acuminatus. *Vern.*—Rītha ; aritha ; haritha.

(1102) Delhi.

(1294) Jalandhar.

(1492) Amritsar.

(1715-16). Lahore.

Used to wash clothes, as it forms a soapy admixture with water. In medicine, used externally to pimples and abscesses ; internally in cases of headache ; also in epilepsy and as an expectorant ; if pounded and thrown into water it destroys fish. It is also recommended as an expectorant and for the cure of chlorosis ; also to stop epileptic fits by placing its powder in the mouth.

1117. Cardiospermum Halicacabum. *Vern.*—Hab-ul-kalkal.

(1998) Lahore.

It is said to be useful as food : root aperient, juice a demulcent in gonorrhœa and in pulmonary affections. (AINSLIE.)

Used as a tonic in fever, and a diaphoretic in rheumatism.

Dose.—4 mashas. Rupees 2 a seer.

1118. Pavia indica. *Vern.*—Janz mukad-dar ; bankhor.

(2466) Kashmir.

Used for horses in cholic. Recommended as an external application in rheumatism.

Dose.—1 fruit. Price, 4 annas a seer.

BERBERIDEE.

1119. Berberis lycium (Asiatica or arisata). *Vern.*—Dār hald ; chitra ?

(1731) Lahore.

(1488) Amritsar.

A bright yellow fibrous wood : considered by natives hot and dry ; useful in affections of the skin, eye, and ear. Lāl chitra is often sent instead of berberis, but is at once distinguished by its pinkish color.

It contains an alcaloid berberine, which is of a bright red color, and very bitter.

EXTRACT OF BERBERIS. *Rasanūt* (called *raswal* in Multan and elsewhere).

(1205) Simla.

(1291) Jalandhar.

(1013A) Delhi.

(1515) Amritsar.

(1728) Lahore.

(2289) Kashmir.

Pattiala.

A blackish red astringent extract, made by evaporating a decoction of the wood, containing much berberine.

A powerful astringent tonic ; considered by some only second to quinine in fever, than which it is more diaphoretic ; also extensively used externally in ophthalmia, and internally in diarrhœa and dysentery ; and in debility after fever and rheumatism.

It is a valuable application in ophthalmia, if mixed with opium, alum and water, and dropped into the eye.

By natives it is used for ophthalmia, piles, and inflammatory swelling : also in intermittent fever.

FRUIT. Zarishk talkh.

(1494) Amritsar.

(1734) Lahore.

(2289) Kashmir.

SEEDS. (Tukhm-i-gāwah-zīmij).

(2434) Kashmir.

The berries form a useful astringent and refrigerant drink in fever.

CAPPARIDACE.

1120. Capparis aphylla. *Vern.*—Karil.

(1704) Lahore.

(1705) Lahore (pinjā).

Used occasionally as food.

Considered by natives hot and aperient, useful in boils, eruptions, swellings, as an antidote to poisons, and in piles ; also in affections of the joints.

1121. Cleome pentaphylla. *Vern.*—Hul-hul kā bij, chauni ajwain, bhagra : bhogra.

Considered by natives hot and pungent ; useful in cholic, dropsy, ulcers, swellings, and leprosy : very beneficial in piles, and earache ; also in convulsive affections and continued fever. Stimulant and sudorific ; used in low fevers and rheumatism.

1122. Polynisia viscosa. *Vern.*—Dānad-hol ; tukhm-i-kasūs.

(679) Gurgaon.

(1706) Lahore.

(2045) Lahore.

(2247) Dera Ghāzi Khān (lūgan būti, the herb).

(1558) Gurdaspūr (called "harhar" in original Catalogue).

A counter irritant and vesicant. The root said to be a vermifuge. The seeds are considered carminative and anthelmintic. The juice of the leaves is useful in deafness. (AINSLIE).

VIOACEÆ.

1123. Viola serpens. FLOWERS. Banafsha.

(1119) Delhi.

(1273) Jālandhar.

(1465) Amritsar.

(1696) Lahore.

(2179) Rawalpindi.

(2814-92) Kashmir.

(5091) Simla.

(85) Pattiala.

By hakims it is used as a diaphoretic, an aromatic, and laxative. Flowers used in Europe for their coloring matter. The seeds are said to assist the passage of gravel and calculi, probably on account of their resemblance in appearance.

Roots. Bekh banafsha.

(2392) Kashmir.

Said to be emetic in full doses, and to resemble ipecacuanha in its action; also to act as a purgative.

It is said to contain an active principle, violine, resembling emetine, and to be especially useful in skin diseases of children.

Dose.—Half a drachm to a drachm.

1124. Oxalis corniculata. Vern.—Amlīka; amrūl.

(2051) Lahore (plant).

(2429) Kashmir (tukhm-i-humāz, seeds).

(2432) Kashmir (turshak, leaves).

A very acid plant, containing salts of oxalic acid; it acts as a refrigerent in fever, and an antiscorbutic. Its juice may be used to remove inkspots, as it rapidly dissolves most compounds of iron.

It is principally used in fever, as a refrigerent, and scurvy; also externally to remove warts, proud flesh, and fibres over the cornea.

LINACEÆ.

1125. Linum usitatissimum. Vern.—
Alsi (bazz kaitān, Arabic).

(983) Delhi.

(1181) Ludhiana.

(1370) Amritsar.

(1762) Lahore.

(2276) Dera Ghāzi Khān.

(1258) Jālandhar.

Small flattened ovoid acute reddish seeds, very oily; shining dark brown on the surface, white within.

By natives it is considered hot, and used in phlegm. Very demulcent and oily; extensively used in powder, both in European and native practice, to make poultices; also taken internally in inflammatory affections, and in catarrh, diarrhoea, dysentery, visceral inflammation, and special diseases.

Poultices should be made by first adding a little of the linseed meal to a small quantity of hot water, and then alternately more water and more linseed meal, with constant stirring until the required thickness is obtained. They are principally used in abscesses to promote suppuration, and in inflammations of the chest, abdomen, and joints, to relieve pain.

TAMARICACEÆ.

1126. Tamarix gallica. Vern.—Pilchi.

(1788) Lahore.

The bark is bitter and astringent, and its ashes contain a large quantity of sulphate of soda.

1127. Tamarix dioica. Vern.—Jhau; farwān; harwān; farās.

(1936) Lahore.

Used for purifying the blood.

Dose.—6 mashas. Price, 1 anna a seer.

1128. Tamarix orientalis, galls of. Vern.—Māñ chote; and māñ barī; jhan phalli: said to be of *Tamarix furas*.

(1183) Ludhiana (janphalli).

(1937-38) Lahore.

Considered by natives warm and dry. Used for dyeing and tanning; also as astringents in diarrhoea, dysentery, and mucous discharges; also affections of the throat. The largest are preferred.

Dose.—4 mashas. Price, 1 anna a seer.

MALVACEÆ.

1129. Malva rotundifolia.

SEEDS. Khubāzi.

(1047) Delhi.

(1392) Amritsar.

(1175) Ludhiana.

(1708-1980) Lahore.

(2198) Gūjrat.

(2431) Kashmir.

(1212) Simla.

Pattiala.

FLOWERS. Vern.—Gul-khaira; kangī?

(1121) Delhi (gul khubāzi).

(2027) Lahore (gul khaira).

(676) Gurgaon.

(1186) Ludhiana (gul khaira).

(978) Delhi? (todri).

LEAVES, called kangī ka sāg.

Mucilaginous and emollient; used to form poultices; said to be inferior to *Althæa*. It is used internally by Europeans, though rarely, in inflammations of the lungs and bladder, and externally in skin diseases. By natives it is considered useful in piles; also in ulcerations of the bladder and cough.

1130. *Althea rosea*.

SEEDS. *Vern.*—Tukhm-khatmī.

- (1095) Delhi.
- (1215) Jālandhar.
- (1143) Ambālah.
- (1391) Amritsar.
- (1710) Lahore.
- (2197) Gūjrat.
- (2266) Dera Ghāzī Khān (tukhm gul khairā).
- (2450) Kashmir.

ROOT. *Vern.*—Resha khatmī.

- (1095) Delhi.
- (1713) Lahore.
- (1179) Ludhiana.
- (1509) Amritsar.
- (2290) Kashmir.
- (2323) Kashmir (gul khatmī).
- (1017) Delhi (gul khairā).
- (1436) Amritsar (ditto).
- (2027) Lahore (ditto).
- (2232) Muzaffargarh (ditto).
- (2251-2266) Dera Ghāzī Khān (ditto).

1131. *Malva mauritiana*? *Vern.*—Khatmī safaid.

- (1217) Jālandhar.

It is considered by native druggists to be a very valuable demulcent, especially in affections of the chest. All the parts of this plant contain much mucilage, and acts as demulcents.

1132. *Abutilon indicum*. *Vern.*—Atipalā.

- (2161) Lahore.
- (2075) Lahore (khiratibalā).

The whole plant is mucilaginous and demulcent, and is a substitute for *Althæa*.

1133. *Sida cordifolia*. *Vern.*—Bijband; baryāra.

- (2125) Lahore.

Considered by natives as cool and dry. A useful demulcent in dysentery with rice; also in special diseases.

1134. *Gossypium herbaceum*. *Vern.*—Kapās (the plant entire); banaula (seed); rūi pamba (cotton).

- (1711) Lahore (banaula, seed).
- (1711) Lahore (rūi.)
- (1179A) Ludhiana (kapās ke patha).

Cotton consists of fine white tubular hairs, which become flattened and twisted on drying.

By Europeans it is used as an application to burns, and to cover over inflamed parts. The root and leaves are demulcent and tonic, and are used in Bengal in the treatment of fever and dysentery. The root is said to be emmenagogue, and to be useful in gravel and strangury. By natives the seeds are said to be moist, and to increase the secretion of milk and bile; also to cure epilepsy and thrush; and to be an antidote to narcotic poison. The wool is said to cure headache and disorders of the head, by removing offensive matter if stuffed into the nose.

1135. *Abelmoschus moschatus*. *Vern.*—Hab-ul-mushk.

- (1124) Delhi.
- (1334) Jālandhar (mushk).

Action: cordial and stomachic; said to be an antidote for the bites of serpents; also an emetic, and used in chronic dyspepsia. In Arabia it is said to be used to give a musky odour to coffee. (LINDLEY).

1136. *Hibiscus cannabinus*. *Vern.*—Sannī ka bij.

- (1086) Delhi (tukhm-i-bhang).

Demulcent. Fibres used for cordage; fruit said to be acidulous.

1137. *Hibiscus mutabilis*. *Vern.*—Shālā-pāpra (Hindī).

- (2115) Lahore.
- Demulcent.

1138. *Hibiscus*, red. *Vern.*—Rakt japā (Hindī).

- (2095) Lahore.

The leaves are emollient and useful in strangury. The root is used in menorrhagia, and the flowers are employed to give a red color to spirituous liquors. (AINSLIE).

1139. *Hibiscus*, white. *Vern.*—Shwet japā (Hindī).

- (2056) Lahore.
- Flowers astringent.

1140. *Hibiscus striatiflorus*, blue. *Vern.*—Nīl japā (Hindī).

- (2055) Lahore.
- Demulcent. Rarely used in Hindūstāni medicine.

BYTTNERIACEÆ.

1141. *Bombax heptaphyllum*.

ROOT. *Vern.*—Mūsli sembal, mūsli safaid.

- (688) Gurgaon.
- (1946) Lahore.
- (1933) Lahore (mūsli safaid).

There are three sorts of mooslie root represented in the Exhibition. Mūsli sembal, above mentioned; mūsli safaid, which is apparently an immature specimen of *satāwar* (*Asparagus ascendens*) and mūsli siyah.

Musli sembal is a light woody fibrous root, of a brownish color, with a thin epidermis, easily detached, and a very fibrous thick tuber. It acts as a stimulant and tonic, and some consider it in large doses, emetic. It is said to contain 10 per cent. of resin.

Dose.—6 mashas. Price 8 annas per seer.

LEAVES. Shálmali (Sanskrit).

(1213) Lahore.

The root of the sembal is supposed by natives to have great power in preventing the access of old age, if taken daily, and no acid swallowed.

1142. Mocharas. Gum resin.

(1093) Delhi.

(664) Gurgaon.

(1312) Jalandhar.

(1356) Hushyarpur.

(1934) Lahore.

(2352) Kashmir.

Pattiala.

A reddish brittle gum. It is sometimes stated to be derived from the *Moringa pterygosperma*. Considered by the natives a temperate remedy: used as an astringent in diarrhoea and special diseases; also for pain in the loins and cholic. Usually given moist.

Dose.—6 mashas. Price, 6 annas a seer.

1143. Helicteres isora. Vern.—Maror phalli; marori.

(1931) Lahore.

(981) Delhi (marori).

A capsule composed of five long cells, twisted in a spiral manner, round the axis, each containing numerous small seeds.

Used in cholic, because, according to the doctrine of signatures, it is supposed to resemble the convolutions of the intestines; also, for a similar reason, it is used in diarrhoea and griping pains.

Said by natives to be hot and dry. Useful in indigestion and flatulency; also in swellings from cold and itch, and as an application to sores in the ears.

Dose.—2 mashas. Price, 4 annas a seer.

1144. Helicteres scabra. Vern.—Paphli.

(1932) Lahore.

No specimen was found in the Exhibition collection. Used in special diseases.

1145. Pentapetes Phœnicea. Vern.—Dopahrya; bandhuk (Hindi).

(1707) Lahore.

(2143) Lahore (bandhuk).

Considered by natives astringent. Flowers yield a mucilaginous refrigerent juice, used in special diseases, and in disorders of rheum and bile.

1146. Eriodendron anfructuosum. Vern.—Safaid sembhāl ka phul.

(979) Delhi.

The hardened flowers, with the woody four-lobed calyx, the dried thin red petals, and numerous stamens.

1147. Sterculia, sp——. Vern.—Pryango.

(2060) Lahore.

Leaves considered aperient, and a decoction of the fruit mucilaginous and astringent, and is useful in rheumatism.

MALPIGHIACEAE.

1148. Hiptage madablota. Vern.—Mad-malti.

(2097) Lahore.

Leaves.

TILIACEÆ.

1149. Corchorus olitorius, depressus, acutangula, and other species. Vern.—

Bahúphalli; bophalli; banphal; babúna? karond?

(665) Gurgaon.

(1791) Lahore.

(1121) Hissar (karond).

(2189) Gujrat (babúnah).

(2258) Dera Gházi Khán.

(2190) Gujrat (bahúphalli).

(1251) Jalandhar (Ispand).

Considered by the natives a cold remedy. Used in special diseases, and also eaten as a vegetable. Leaves emollient. Infusion used as a fever drink. The bark is fibrous, and is used to make rope.

Dose.—6 mashas. Price, 4 annas a seer.

1150. Grewia asiatica. Vern.—Fálsa.

(2157) Lahore (phalsa).

There are two kinds—one sweet, called “shakari,” the other acid, “sharbatí.” It is said to be astringent and to allay thirst, and strengthen the stomach. Its sherbet is useful in fever and indigestion.

GUTTIFERÆ.

1151. Garcinia. *Spec. incert.* Vern.—Usárah rewand.

(1088) Delhi.

Considered by the natives a warm purgative, and used in indigestion, constipation, and also as a paint. It contains a yellow resinous acid, cambogic acid, and some gum. Extensively used as a valuable hydragogue cathartic in dropsy and obstinate constipation; also in brain diseases and tape worm.

Dose.—Grains 1 to 5. Price, Rs. 2 a seer.

1152. Mesua ferra. Vern.—Nágkesar.

(1084) Delhi.

(1718) Lahore.

Dried buds. Considered a temperate remedy. Used in coughs, especially when attended with much expectoration.

Dose.—2 mashas. Price, Rs. 1 a seer.



AURANTIACEÆ.

1153. *Feronia elephantum*. Vern.—

Kath bel.

(1024A) Delhi.

(2085) Lahore (kaith pathá).

Very aromatic. Used as a stomachic stimulant in diseases of children. Both leaves and flowers are said to smell like anise. It yields a gum resembling gum Arabic, which acts as a demulcent.

1154. *Ægle marmelos*. Wood apple. Vern.

—Bel; belgiri.

(675) Gurgaon.

(992) Delhi.

(1196) Simla.

(1264) Jalandhar.

(1375) Amritsar.

(1737) Lahore.

(2411) Kashmir (kath bil).

Simla.

The bark of the root and stem and the leaves are used as tonics in fever. The cut fruit, unripe, but dried, is a useful remedy in diarrhoea and dysentery. It contains tannic acid, a balsam gum, sugar, and a vegetable acid. It is said to act both as an astringent in diarrhoea, and its pulp as a laxative in constipation. It is considered by natives to be hot and moist, and to be useful in dysentery and diarrhoea.

Dose.—6 mashas. Price, 4 annas a seer.

1155. *Citrus aurantium*. Orange Peel.

Vern.—Post turanj; sangtara.

(1736) Lahore.

(1026) Delhi (variety) post sangtara. This is considered the best kind.

(1433) Amritsar.

An aromatic tonic, containing tannic acid in the peel, and citric acid in the juice. Orange peel is used by the natives as a tonic in indigestion and palpitation. By Europeans it is employed as a tonic in fever and dyspepsia: the juice also in scurvy.

Dose.—2 mashas. Price, 2 annas a seer.

1156. *Citrus decumana*. Vern.—Mahā

nimbu.

(2059) Lahore.

Fruit large, nutritive, and refrigerant. It contains sugar and citric acid, with much essential oil in the peel. The leaves of this and the orange are said to be useful in epilepsy, chorea and convulsive cough.

1157. *Citrus limonum*. Vern.—Nimbú,

jambira.

(1028) Delhi.

SEEDS.—Karnah.

(1738) Lahore.

(1553) Amritsar.

(2096) Lahore (broish), (Hindí).

LEAVES.—Yuthika (Hindí), barg amrit phal.

(2147) Lahore.

The rind has a thin yellow surface, dotted with transparent vesicles, containing aromatic oil; it contains volatile oil, bitter extractive gallic acid, and hesperine. Used as a febrifuge. The peel is aromatic, bitter, and stimulant; the juice contains much citric acid, and acts as a refrigerant and antiscorbutic, and is largely used in scurvy and acute rheumatism; also for fevers, and occasionally in dysentery. It is said to be of service as an antidote to acromarcotic poisons. Considered by natives an antidote to animal poisons.

Dose.—Of the juice, 1 to 2 ounces.

CEDRELIACEÆ.

1158. *Cedrela toona*. Vern.—Tun.

(1029) Delhi (unripe flowers).

(1071) Lahore.

Bark very astringent; used in diarrhoea and dysentery. Seeds sometimes used in fevers as a tonic; also the flowers are employed as a yellow dye, and the seeds to dye red.

GERANIACEÆ.

1159. *Geranium nodosum*. Vern.—

Bhánd.

(2395) Kashmir.

Said to be astringent and useful in diseases of the kidneys.

VITACEÆ.

1160. *Vitis vinifera*. Grapes, raisins. Vern.

—Kishmish; munakka; dák.

(1733) Lahore (kishmish).

(1085A) Delhi.

(1732) Lahore (munakka).

(1495) Amritsar (zirishk shirín).

(1735) Lahore (dakh, seeds).

The pale raisins are said to be dried in the shade, the darker ones in the sun. Considered by natives cool and aperient. Used in coughs with great expectoration, and in catarrh and jaundice. Occasionally employed as a refrigerant in fever. They contain grape sugar and bitartrate of potash.

Dose.—20 fruits. Price, 4 annas a seer.

The grape seeds are employed as an astringent in diarrhoea.

Dose.—2 mashas.

GRAPE VINEGAR. Vern.—Angúz kí sirkhá.

(2476) Kashmir.

The expressed juice kept partly exposed in the air till it ferments. It generally contains from 1 to 3 per cent. of anhydrous acetic acid. Used as an acid drink in indigestion and cholic; and sometimes in cholera; also mixed with salt as an emetic.

Dose.—5 tolahs; or as an emetic, 2 chitaks.



ZYGOPHYLLACEÆ.

1161. Tribulus lanuginosus and terrestris. Vern.—Kāntaphal; khar-i-khushk (Persian); gokrukhard; bhakra; pakra; phaugra.

- (661) Gurgaon.
(1006) Delhi.
(1145) Ambālah.
(1221) Jālandhar.
(1378) Gurdaspūr.
(2212) Jhīlam.
(2225) Shahpūr.
(1376) Amritsar.
(1761) Lahore.
(2177) Rawalpindi.
(2241) Dera Ghāzi Khān. (Gákrá) (*sic* in original list).

(2030) Lahore (phangra).

(2471-2474) Kashmir.

This indigenous plant is considered cold by natives, and used in special diseases. Considered a mucilaginous diuretic. Used in diseases of kidneys, suppression of urine, and calculus; also in cough and diseases of the heart. The herb is said to be astringent and vermifuge, and the seeds cordial.

Dose.—6 mashas.

1162. Peganum harmala. Vern.—Hūmul; Isband; Isband Lahori?

- (1760-1171) Ludhiana.
(1394) Amritsar.
Kashmir.
(2231) Muzaffargarh.
(641) Gurgaon (Isband).
(1251) Jālandhar (ditto).
(2203) Gujrat. (ditto).
(1038A) Delhi (ditto).
Pattiala.

(1559) Gurdaspūr (called harhar: *this is probably a mistake*).

An indigenous and abundant plant. Principally used as a fumigatory agent to avert evil influences, especially when any person is present suffering from wounds, ulcers or abscesses. Also used in special diseases and in weakness of sight and retention of urine. The plant is considered proper only for sweepers, and not to be touched by Sikhs or Hindūs; but the seeds are burned on a fire if any person enters a room who may have any discharge which could render him unclean.

Dose.—2 mashas. Price, 1 anna a seer.

1163. Fagonia cretica. Vern.—Bādawurd; damāhān (or perhaps more properly dam-āhār; both these names, the one in Hindi the other in Persian, mean "carried by the wind.")

(1792) Lahore (damāhān).

(1399) Amritsar.

(1184) Ludhiana.

(942) Dera Ghāzi Khān.

(1796) Lahore.

Used principally for purifying the blood. An indigenous plant, said to be hot and dry. Useful as an application to tumours; also in chronic fever, dropsy, and delirium, and in any disorder which arises from poisoning.

Dose.—6 mashas. Price, 1 anna a seer.

RUTACEÆ.

1164. Ruta augustifolia. Rue. Vern.—Sudāb; katmal.

(1758) Lahore.

The leaves contain a quantity of an acrid volatile oil and bitter extractive matter. Used by natives in a peculiar rheumatic pain, called "rhi," caused by exposure to draught. It also acts as an emmenagogue, and in pregnancy causes abortion.

Dose.—2 mashas.

Employed by Europeans as stimulant, narcotic, and antispasmodic, particularly in hystēria, cholera, and in uterine affections; and to destroy intestinal worms. Externally it acts as a rubefacient.

Dose.—10 to 30 grains.

MELIACEÆ.

1165. Melia azadirachta. Vern.—Mahānīm; bukhain; drekh; the fruit is called darkonah.

- (1003) Delhi.
(1743) Lahore (drekh).
(1103) Delhi (bukhain).
(1742) Lahore.
(1745) Lahore.

Said to be cool, dry, and bitter. Useful for gravel, piles, and lumbago; also to cure leprosy and diseases of the skin and boils. The seeds also are used to destroy vermin. It is said that the wood is not attacked by insects.

1166. Azadirachta indica. Vern.—Nīm.

- (977) Delhi.
(1035) Delhi (seeds, tukhm nīm).
(1255) Jalandhar.
(1372-1423) Amritsar.
(1744) Lahore.
(2423) Kashmir.

The leaves are used externally as an application to leech bites and blisters, &c.; also by the natives they are taken internally for the purpose of purifying the blood, and curing skin diseases, especially leprosy and fever. The infusion of the leaves is used to wash ulcers. The bark is a valuable astringent tonic; useful in fever as a substitute for cinchona. It is considered by the natives cool and bitter, useful in eruptions and leprosy; also as an application to ulcers and boils:



also a decoction is useful as a wash for the hair, which it is said to darken, and to cure skin diseases, especially scabies.

Dose.—6 mashes. Price, 2 annas a seer.

AMYRIDACEÆ.

1167. Amyris commiphora.* *Vern.*—Gūgal; mukal.

(1073) Delhi.

(1741) Lahore.

The power of this remedy is considered to be increased by the number of blows, with a heavy pestle, that it receives. If one and a half lakhs of blows be given, it is considered a most valuable remedy especially for piles. It is also used as a fumigatory agent.

Dose.—1 masha. Price, from 6 annas to 1 rupee a seer, in proportion to the number of blows which it has received.

1168. Boswellia thurifera. *Vern.*—Kundar.

(1180) Delhi (lábán?)

Pattiala.

Used for incense; also as a stimulant astringent, and diaphoretic in affections of the chest. Considered by natives hot and dry; useful as a tonic to the stomach and brain.

1169. Balsamodendron gileadense. *Vern.*—Tukhm-i-balsán.

(1763) Lahore.

The balsam is considered a panacea.

CORIARIACEÆ.

1170. Coriaria Nepalensis. *Vern.*—Majári.

(1005) Delhi.

Leaves used for dyeing and tanning, and sometimes to adulterate senna, but is a dangerous poison in large doses. The fruit said to produce symptoms like tetanus.

AQUILARIACEÆ.

1171. Euonymus tingens? *Vern.*—Torud gopa.

(1040) Delhi.

Said to be really prepared from the dung of cows, which have been fed on "kesá," the flowers of the *Butea frondosa*. Used in ophthalmia, and to make the "tika" on the forehead.

CELASTRACEÆ.

1172. Celastrus paniculatus. *Vern.*—Malkangani.

(667) Gurgaon.

(976) Delhi.

(1347) Hushyarpúr.

(1550) Amritsar.

(1592) Gurdaspúr.

(1837) Lahore.

(2351) Kashmir.

(2508) Lahore (leaves, kutaj ka patta).

(2138) Lahore (katahar).

A warm and dry remedy; principally used for horses, and for rheumatism, paralysis and special diseases. Acts as a powerful diaphoretic and tonic. Used to form the *Oleum nigrum*, a stimulant diaphoretic used in Beriberi. This oil is made by putting the seeds of *Celastrus nutans* with benzoin, cloves, nutmegs and mace into a perforated earthen pot, and then obtaining by a kind of *destillatio per descensum*, into another pot below, a black empyreumatic oil.

Dose.—1 masha. Price, 2 annas a seer.

MORINGACEÆ.

1173. Hyperanthera pterygosperma. *Vern.*—Sohánjina; sohanjna.

(1283) Jalandhar.

(1695) Lahore (bark).

Considered by natives hot. Used as a cold infusion in diarrhoea, and to purify the blood; also in affections of the eyes and diarrhoea; also eruptions and boils. The leaves, flowers, and pods are eaten. The roots resemble those of horse-radish, and are used in paralysis, epilepsy, and hysteria; also in fever. The wood is said to be employed to dye a blue color in Jamaica. The fruit is used by hakims in affections of the liver and spleen, tetanus, debility of nerves, paralysis, pustules, and Indian leprosy.

PORTULACACEÆ.

1174. Portulaca oleracea. *Vern.*—Kulfa; lóniya; kundar?

(634) Gurgaon.

(1140) Ludhiana.

(1398) Amritsar.

(1591) Gurdaspúr.

(1235) Jalandhar.

(1764) Lahore.

(2196) Gujrát.

(2471) Kashmir.

Pattiala.

(2285) Kashmir (entered as "dhanni" in the Catalogue).

(2104) Lahore.

(1969) Lahore (the herb, lónak ság).

Herb used for eating; acts as a refrigerent and alternative in scurvy and liver disease. Seeds said to be vermifuge. Considered by natives cool and

* For a particular account of these resins and balsams, see under the Class Gums and Resins.

dry; also aperient. Useful in disorders of mucus and difficulty of breathing and fevers. By hakims, in inflammation of the stomach and ulcerations of the intestines (HONIGBERGER); also as an external application for erysipelas, and a diuretic in dysentery (AINSLIE). Applied to the temples it allays headache and heat; and internally it stops spitting of blood.

SIMARUBACEÆ.

1175. *Nima quassides*.

(1715) Lahore (faringi).

(2417) Kashmir (baringi).

Said to be hot and dry, and very bitter. Used in fever, indigestion, and difficulty of breathing. Used as a substitute for quassia as a useful tonic in fever.

FICOIDEÆ.

1176. *Glinus litoides*. Vern.—Zakhm-hayât.

(1970) Lahore.

The well-known creeper *Lettsomia* is also called zakhm-ul-hayât.

CALYCIFLORÆ.

RHAMNACEÆ.

1177. *Zizyphus jujuba*. Vern.—Ber; 'unáb.

FRUIT.—Kokanber, kuchra; seed or stone, kinár ke bij.

(1112) Delhi.

(1468) Amritsar.

(1835) Lahore.

(2183) Rawalpindi.

(2238) Kashmir.

(1020A) Delhi (kinár ká bij, or hal ká bij).

(1835) Lahore (kokanber, the wild fruit).

Red wrinkled dry drupes, the size of a nut.

BARK OF THE TREE.—Post-i-ber; ber ká chil.

(1057-1062) Delhi.

(1368) Amritsar.

(2419) Kashmir.

DRIED LEAVES.—Barg-i-unáb.

(2420) Kashmir.

The fruit called jujube is said to be nourishing, mawkish, mucilaginous, pectoral, and styptic.

The berries are considered by natives to purify the blood, increasing its quantity and converting black blood to red; and to assist digestion. The best comes from Kandahár.

Dose.—9 fruits. Price, 8 annas a seer.

The bark is said to be a remedy for diarrhoea: it contains much tannic acid, and a peculiar acid, called zygophic.

Dose.—6 máshas. Price, 1 anna a seer.

The small wild fruit, kokanber, is used in special diseases. The fruit if eaten after a meal is said to improve digestion and produce corpulency.

The root is said to be used as a decoction in fever; and also powdered to be applied to ulcers and old wounds; also in delirium. The leaves are used to polish gems, and to form a plaster in strangury and other diseases.

The seeds are used as astringents in diarrhoea.

1178. *Zizyphus nummularia*. Vern.—Ber; mallán; jhar-berí.

(1248) Jalandhar (fruit).

(1836) Lahore.

A small red drupe the size of a pea: use similar to the "unáb." Considered by natives cool and astringent: useful in bilious affections.

AQUILLARIACEÆ.

1179. *Aquillaria agallocha*. Aloe wood or Eagle wood. Vern.—'U'd; 'ád fársi; agar.

(1020) Delhi.

(1994) Lahore.

A yellowish white, rather hard wood, with a pleasant smell.

It is said to owe its fragrance to the rotting of the wood, and the best specimens are therefore buried in earth for some time. They sink in water. It contains an aromatic resin, and is used as a stimulant and cordial in gout and rheumatism, and paralysis; also as a stimulant astringent in diarrhoea and vomiting. Its name, aloe wood, has nothing to do with aloes, but is a corruption of the Arabic term, Al-'ád. Formerly much used in Europe in gout, rheumatism, diarrhoea, vomiting and palsy. It is stated that in Siam the wood is obtained from hollow trees, of which it forms the heart-wood, the sap wood is much lighter and weaker in odour. Some consider that this wood is obtained from the *Alcaylon agallochum*, a leguminous plant growing in Cochin China: it is called Lign aloes.

TEREBINTHACEÆ.

1180. *Pistacia vera*. Pistachio nut.

FRUIT.—Pista; fistak (Arab).

(1752) Lahore.

GALLS.—Gul-i-pista; pista ka phúl.

BARK.—Post birán-i-pista; chilka-i-pista (shells of the nut).

(1051) Delhi.

(1753) Lahore.

(1751) Lahore.

(2387) Kashmir.

The fruit is considered a warm and moist remedy, the kernel contains much oil and acts as a demulcent

and restorative. It is principally used in special diseases.

Dose.—6 máshas. Price, 1 rupee a seer.

The bark is employed as a tonic in indigestion.

The galls act as astringents and are used in diarrhoea.

Price, 1 rupee a seer.

1181. *Pistacia lentiscus*. Mastic. *Vern.*—Mustakí rúmi.

(1083) Delhi.

(1976) Lahore.

A yellow gum resin in small roundish semitransparent tears : used in native medicine for indigestion and diarrhoea, also as a local application for toothache : principally used in England as an astringent in excessive discharges, and to stop carious teeth ; it has also diuretic properties, but is much inferior to turpentine.

It is used by hakims in diseases of the stomach or liver ; also as a masticatory. It comes from Kábul but the best is said to come from Turkey and the Levant, hence called "rúmi."

Dose.—Grains 20 to 40.

1182. *Pistacia terebinthinus*? *Vern.*—Hab-ul-khizra.

(1680) Lahore.

Small brown dried fruits. Said to come from Bukhára, and to be used as an astringent in special diseases, and for palpitation of the heart.

This tree is said to produce cypress or Chian turpentine, and to supply a kind of follicular gall (*vide supra*).

Price, Rs. 2-8 a seer.

1183. *Buchanania latifolia*? *Vern.*—Nakl-khwája.

(1757) Lahore.

Used for glandular swellings of the neck.

Dose.—7 máshas. Price, 8 annas a seer.

1184. *Semecarpus anacardium*. *Vern.*—Bhela ; bhiládar or bhiláwár.

(1114) Delhi.

(1204) Simla.

(1754) Lahore.

(1377) Amritsar.

Considered by the natives a very warm, dry and acrid remedy, principally used for horses, or for men suffering from paralysis. It is also considered that if a child commences with a daily dose of 3 máshas, and gradually increases this to 1 tola weight, he will always be free from coughs and colds, and his hair will never turn white even in old age.

It is also supposed by natives to be useful in dropsy, fever, piles, diarrhoea and leprosy, and if it agrees with the patient, it is very efficacious, but otherwise, very

prejudicial : also used in epilepsy, catalepsy and shortness of memory ; and its juice is used in ring-worm and rheumatic pains. With lime water it is used to mark linen cloths.

The expressed oil is used also in paralysis and anæsthesia.

Price of seeds, 2 annas a seer.

It is a very acrid and poisonous substance, but if roasted the acidity is dissipated and the receptacles are then sometimes eaten as fruit. Probably would be useful in chronic rheumatism. The fruit is said to be eaten when green, and the juice of the dried nut to be used as an escharotic, or given internally in syphilis.

1185. *Pistacia integerrima* or *Rhus acuminata*.—*Vern.*—Kakar singhi.

(1803) Jalandhar.

(1354) Hushyarpúr.

(1756) Lahore.

(1032A) Delhi.

(2326) Kashmir.

(5090) Simla.

Pattiala.

A large hollow horn-like curved gall, with a tawny brown rough exterior.

It is considered hot, dry and astringent, and is used by natives in coughs and asthma, fever, piles and dysentery. It is also said to allay vomiting, thirst, and difficulty of breathing.

Dose.—3 máshas. Price, 6 annas a seer.

1186. *Balsamodendron myrrha*. *Vern.*—Bol.

It contains gum and resin, and acts as a stimulant expectorant. It is principally used in bronchitis, asthma and diseases of women ; also as an external application to ulcers and sore throats, aphthæ and spongy gums : it acts as a stimulant and expectorant, also tonic and antispasmodic. By hakims it is employed in chronic coughs, induration of the liver, intestinal worms and amenorrhœa. It is said to cause abortion.

Dose.—10 to 30 grains.

1187. *Mangifera indica*. Mango. *Vern.*—A'm.

KERNEL.—Am ki bijli, am ki gutli.

(1053) Delhi.

(1185) Dera Ghází Khán.

(1232) Jalandhar.

(1746) Lahore.

PEEL, DRIED.—Am chor ; am khushk.

(1402) Jalandhar.

(1747) Lahore.

Stone oblong, yellow, rough, fibrous, celled, with

two woody valves. The peel is used as a stimulant tonic in indigestion; it is also astringent.

The fruit is much eaten, and is used for an aperient in constipation, and a tonic: as the fruit is somewhat of the shape of a kidney, it is said to be useful for stone and diseases of the bladder. The kernels are said to be useful in expelling intestinal worms; also to arrest bleeding from piles and menorrhagia, and in diarrhoea as an astringent, and as a tonic in fever. The fruit of the mango contains much acid and turpentine, it therefore acts as a diaphoretic and refrigerant, and may prove useful in diseases of the urinary organs.

Dose.—6 māshas. Price, 4 annas a seer.

1188. *Rhus coriaria*. Sumach nat. *Vern.*—Sumāk; tantri.

(1301) Jalandhar.

(1754) Lahore.

(18A) Pattiala.

Used by natives in cholera and indigestion. The leaves are extensively used in England for tanning purposes.

1189. *Rhus parviflora* P *Vern.*—Samāk.
(2304) Kashmtr.

1190. *Rhus* sp.—*Vern.*—Tukhm dhalyāñ.
(2187) Rawalpindi.

LEGUMINOSÆ.

1191. *Jonesia asoka*. *Vern.*—Asog.
(2149) Lahore.

Not commonly used in the Punjab.

1192. *Trigonella foenumgræcum*. Fenugreek. *Vern.*—Methi; shamli.

(642) Gurgaon.

(1038) Dera Ghāzi Khān.

(1983) Delhi.

(1182) Ludhiana.

(1229) Jalandhar.

(1147) Ambālah.

(1417) Amritsar.

(1816) Lahore.

(2210) Gūjrat.

(2216) Jhilm.

(2438) Kashmīr.

(2493) Jhind (tukhm bahal).

(1819) Lahore.

Seeds yellow, small, ovate, wrinkled, the radicle forming a prominent ridge divided by a furrow from the rest of the seed. It is considered by natives hot and dry, it removes costiveness, and is a vermifuge. The seeds are employed as tonics and demulcents in dysentery, cough, and special diseases. They are also used as coffee after roasting, and to form a yellow dye; and are said to be emmenagogue. The leaves are eaten

as a vegetable. In English medicine the seeds are only employed as a demulcent and in poultices.

Dose.—6 māshas. Price, 1 anna.

1193. *Psoralea corylifolia*. *Vern.*—Bābchi.
(607) Gurgaon.

(1124) Delhi.

(1508) Amritsar.

(1987) Lahore.

Pattiala.

Seeds said to act as tonics and alteratives in skin diseases. Considered by natives to be hot and dry; useful in leprosy, and affections of the bile and skin diseases.

1194. *Indigofera tinctoria*. Indigo.
Vern.—Nīl; wasma; basma.

(1065) Delhi.

(2003) Lahore.

SEEDS—Nīl kā bij; tukhm-i-wasma.

(2004) Lahore.

LEAVES.—Barg-i-wasma.

(4) Gūjrat.

(1527) Amritsar.

The seeds are small cylindrical, reddish, and with flat ends. The leaves, "wasma," are made into a dry greenish powder. The powdered seeds are used as a local application for ophthalmia, boils and dropsy. The leaves are used as dye, especially for hair. Indigo is said to be very poisonous. It is made in the Punjab in irregularly rounded lumps of a deep blue color, with a coppery lustre when rubbed. It is applied to severe ulcers, especially in horses. The flowers and leaves are also used in diseases of the liver and bowels. By Europeans the dye is occasionally used internally in epilepsy, and it colors the urine green.*

1195. *Indigofera* sp.—*Vern.*—Dant dawānī.

(2111) Lahore.

Useful in fever. The plant is brought from the hills. It is probably *I. arborea*, or *I. heteranthera*.

1196. *Clitoria ternata*. *Vern.*—Shobānjan (H.); aprājī; shāmī kā bij; vishnū kanti; nīla gharia; nilkanth; band pat; kālizar, kawā tūntī; nīl isband.

(2067) Lahore.

(2123) Lahore (seeds).

(2078) Lahore (flowers).

(2034) Delhi (seeds).

Said to be cooling and to act as an antidote to poisons. The roots are used as emetics and in rheumatism; the seeds in large doses are purgative and anthelmintic, and used for weakness of sight, sore

* Indigo also is used in epilepsy by wrapping the patient in a sheet dipped in recent solution of indigo, so as to promote sweating; it is also employed as an astringent in diarrhoea.

throat, and mucous disorders. Also in tumours and the affections of the skin, and in dropsy.

Dose.—6 máshas. Price, 6 annas a seer.

1197. Glycyrrhiza glabra. Liquorice.

Vern.—Mulathi ; asl-us-sús.

(689) Gurgaon.

(1039) Delhi.

(1287) Jalandhar.

(1581) Gurdaspur.

(1473) Amritsar.

(1814) Lahore.

(2382) Kashmir.

(2490) Nabha.

(1815) Lahore (extract, rab-us-sús).

The root is long cylindrical, brown without, yellow and soft within, but fibrous, sweet to the taste. The root is used for coughs or stammering in native medicine ; by Europeans it is extensively used as a demulcent and vehicle for other remedies.

Dose.—6 máshas. Price, 4 annas a seer.

The extract is made by evaporating a strong decoction of the root.

Dose.—1 másha. Price, 2 rupees a seer.

A fictitious extract is often made with gum, sugar, and various roots, boiled down together.

It acts as a demulcent, containing much peculiar sugar, and is used in catarrh and coughs ; also in many diseases of the urinary organs, also to flavor other remedies.

1198. Tephrosia purpurea. *Vern.*—Sarphoka ; jojar ? sarpatka ? sarpanka.

(658) Gurgaon.

(1407) Amritsar.

(1717) Lahore.

(2302) Kashmir.

(982) Dehli (root, po-kil).

Used for dyspepia, dysentery, and to purify the blood. Also employed as a tonic and febrifuge. It is considered by natives astringent and bitter, useful in fever diseases of liver and spleen, also in eruptions and boils, and in difficulty of breathing and cough.

Dose.—6 máshas. Price, 2 annas a seer.

1199. Tephrosia sp.—P *Vern.*—Mahín.
(2014) Lahore.

1200. Astragalus spinosus. *Vern.*—Atnil.

(2388) Kashmir.

A hard tabulated root-stock, with numerous long thin spinous branches.

1201. Astragalus hamatus. *Vern.*—Táj bádsháhi, aklel-ul-malik.

(1060) Dehli.

(1441) Amritsar.

(1887) Lahore.

Small yellowish curved legumes, with a deep furrow along the convex border. Named from its great efficacy in coughs and rheumatism, when given as an infusion.

Dose.—6 máshas. Price, 8 annas a seer.

1202. Alhagi maurorum. *Vern.*—Gokan ; khár shutar ; jawása.

(1221) Jalandhar (the plant, gokan).

MANNA.—Turanjabin turangbin.

(1061) Dehli.

(1984) Lahore.

The manna is said to exude from this plant in Persia. It is used by natives as a mild purgative in fever, dissolved in rose water.

The herb is said to be cool and bitter, to cure disorders of the bile and vertigo, also to expel wind and strengthen the system. The manna is used in coughs, vomiting, cholic, itching, uterine diseases, &c., and all pulmonary affections.

Dose.—7 tolahs. Price, 1½ rupees a seer.

1203. Eryum lens. Lentil. *Vern.*—Masúr. Jalandhar, &c., &c.

Pattiala.

Seeds small, circular and convex. Said to be difficult of digestion, but used as food : it is said to produce thirst, heat of skin and eruptions if freely used ; but it is said to be used in the treatment of ulcers, small pox, by applying a poultice of it.

1204. Abrus precatorius. *Vern.*—Rati ; ghúnchi.

SEEDS.—Chunaf safaid ; chirmiti ; hab-ul-súrk.

(1324) Jalandhar.

(1353) Hushyarpur.

(1802) Lahore (white).

(1803) Lahore (red).

(655) Gurgaon.

(995) Dehli.

(2288) Kashmir.

(1804) Lahore (root).

White or red, hard, roundish, shining seeds, with a black hilum, having a white spot on shell. Root resembles closely that of liquorice : considered hot and dry. Principally used by natives as an ornament ; but is also administered in cholic and special diseases. The white seeds are considered to act as a poison producing vomiting and pains, purging, and convulsion ; but are not usually fatal to man. The smallest fatal dose is 1 tolah. Price of the white 12 annas a seer ; of the red 4 annas. All parts of the plant are demulcent. The seeds are used in Egypt as food, but are indigestible. The root is commonly substituted for liquorice, and is very serviceable in coughs of children. The expressed juice of the fresh leaves is said to be useful in aphtha.



Of this creeper there are several varieties, with seeds scarlet, black and white. Those of a bright scarlet color, with a jet black spot at the top, are used by the jewellers and druggists as weights, each weighing almost uniformly one grain;* also for beads and rosaries, whence the specific name. From their extreme hardness and pretty appearance, the Hindús prize them for necklaces and other ornaments. They are said to be innocuous if swallowed whole, but dangerous in a powdered state. On the latter point, however, there must be some mistake, as they form an article of food in Egypt, though considered hard and indigestible. They are occasionally employed in external applications in ophthalmia. They are reduced to a fine powder by the goldsmiths, who use them in this state to increase adhesion in the more delicate parts of manufactured ornaments.

In Hindústán, they are known as the Rati weights. The root is employed as a substitute for liquorice. The leaves have a similar taste, and mixed with honey are applied externally in swellings of the body, and pulverised and chewed with sugar, are given to mitigate coughs. RHEEDE states that the seeds mixed with the roots and cocoanut milk are given in hæmorrhoids. In Java, the roots are considered demulcent, and the mucilage is there combined with some bitter.

1205. *Dolichos sinensis*. Vern.—Lobiyañ.
(1812) Lahore.

Considered hot and dry, diuretic, and difficult of digestion. Used in special diseases, and to strengthen the stomach.

Dose.—6 máshas. Price, 1 anna a seer.

1206. *Dolichos* sp.— Vern.—Gulatlú.
(2009) Lahore.

1207. *Mucuna prurita*. Vern.—Kúñch; kanaucha; konch kari; gúñch gají; kawanch.

SEEDS.

(654) Gurgaon.
(1041) Delhi.
(1153) Ambálah.
(1348) Hushyarpúr.
(1570) Gurdaspúr.
(1810) Lahore.
(2335) Kashmir.

Seeds oval, brownish mottled, reniform, with a white linear hilum; in one case they were labelled castor oil seed. The seeds principally used in special diseases, given with milk. The hairs of the pods are not used as anthelmintics in India, as they are in England, for round worm. They have been applied externally for paralysis, and produce much

itching. The seed is said to absorb the poison of scorpions and to remain on a bite till all is removed. The leaves are said to be vermifuge.

Dose.—6 máshas. Price, 5 annas a seer.

1208. *Alysicarpus nummularia*.
Vern.—Nágbala.

(2102) Lahore.

1209. *Butea frondosa*.

SEEDS.—Palás pápri; dák pápri; dák-ka-bij.

(672) Gurgaon.
(1033) Delhi.
(1485) Amritsar.
(1787) Lahore.
(946) Dera Gházi Khán.

FLOWERS.—Kesá.

(1400) Amritsar.
(1600) Gurdaspúr.
(1741-1766) Lahore.
(2328) Kashmir.
(2527) Kangra.

DRIED JUICE.—Indian kino. Palás gond; kamar-kas; dhák ki gond.

(1007) Delhi.
(1182) Dera Gházi Khán.
(1246) Jalándhar.
(2331) Kashmir.
Kangra.

Flowers papilionaceous, yellowish red, covered with down, flattened, and containing the petals and stamens.

Seeds large, flat, oval, compressed, smooth; brown externally, yellow within.

Juice forms a ruby-colored translucent brittle gum, in small angular pieces with an astringent taste. When old the gum becomes of a darker color.

Flowers are principally used as a yellow dye for cloth; also as a fomentation in dysuria. They are not generally used internally.

Price, 1 anna a seer.

The seeds are considered warm purgatives, and are used in fevers, and for new born infants; and also as anthelmintics.

Dose.—6 máshas. Price, 4 annas a seer.

The juice is a powerful astringent, used for tanning and as a hair dye; also in diarrhoea, pyrosis, and after parturition.

It is used as an astringent in diarrhoea and dyspepsia; also in phthisis, and hæmorrhagic affections; it is likewise employed as an application to ulcers and relaxed sore throats. It forms a good substitute for kino. It is said that the bark of the white-flowered dák tree, gives to persons who eat it supernatural knowledge.

Dose.—6 máshas. Price, 4 annas a seer.

*BIRDWOOD gives $\frac{15}{10}$ grains, apothecary's weight.

1210. Pterocarpus santalinus. Red sandal wood. *Vern.*—Rakta chandan (H.) ; chandan lál. (1008) Delhi.

A red resinous wood, principally used for its red coloring matter, called Santalin, and as a dye. Sometimes applied to the skin after bathing. Considered by natives a hot remedy ; useful in bilious affections and skin diseases ; also in fever, boils, and to strengthen the sight. It also acts as a diaphoretic, like gentian. It is applied to the forehead in headache ; and also as a cosmetic.

1211. Pterocarpus draco, or calamus draco.—Dragon's blood. *Vern.*—Dam-ál-akh-wain ; khún siáwashán ; hira da-khún ; barg-i-bart ? (1017) Delhi.
 (1979) Lahore.

A red hard resin, in large, somewhat cylindrical, lumps. It contains benzoic acid and tannic. A dry and cold remedy ; used in dysentery and special diseases. A stimulant gum resin, chiefly used for its coloring matter : but is also very astringent.

Dose.—2 máshas. Price, 5 rupees a seer.

1212. Lupinus albus. *Vern.*—Zurmish ; tármuz.

(1052) Delhi.

Said to be brought from Egypt, and used as a carminative. Said to be useful in leprosy and internal heat.

Dose—1 másha. Price, 5 rupees a seer.

1213. Phaseolus aconitifolius. *Vern.*—Moth.

(994) Delhi.

Used as a diet in fever. Considered by natives cool and dry, removes laxity of bowels and flatulency : it is said to produce worms. Its roots are considered narcotic.

1214. Phaseolus mungo. *Vern.*—Máng. (1070) Delhi.

Used as a diet in fever. Considered by natives cool, light and astringent, but difficult of digestion ; used to strengthen the eyes.

1215. Phaseolus Roxburghii. *Vern.*—Mash ; úrad.

Peshawur.

Also used in fever, said to be the most esteemed kind of pulse. It is considered hot and tonic ; useful in piles, paralysis, and affections of the liver ; also in cough and rheumatism. Considered the most indigestible of the pulses.

1216. Cicer arietinum. *Vern.*—Chola ; channa.

(1068) Delhi.

(1798) Lahore (variety).

(1078) Delhi (Kábuli chola).

(1063) Delhi (besan, gram flour).

Supposed to be cool and dry ; also to increase the secretion of the bile : used as a stimulant article of diet in special diseases ; also when roasted like coffee, considered aphrodisiac ; also used in cases of flatulency, and in retention of urine and catamenia. It serves as a substitute for coffee. The fresh plant has an acid reaction, and if clothes are placed in a field of it in the dewy morning, and then wrung out they give an acid infusion.

1217. Sesbania Ægyptiaca. *Vern.*—Jaiñt ; jaintar ; jyantika (S.)

(1801-2139) Lahore.

(2126) Lahore (leaves, raisan or rásnan).

The seeds are applied externally mixed with flour for itching of the skin ; they are also said to be stimulant emmenagogues.

1218. Sesbania aculeata. *Vern.*—Brihat-chakramed (H.)

(2165) Lahore.

1219. Dalbergia sissoo. *Vern.*—Shisham or sisú.

(1798) Lahore.

A very common tree. It is considered by natives to be hot. Useful in leprosy, boils, eruptions, and to allay vomiting ; also in special diseases.

1220. Ceratonia siliqua. St. John's bread, or locust bean. *Vern.*—Kharnúb.

(1786) Lahore.

A thick pulpy flat brown curved pod, contains hard red seeds resembling those of the tamarind, imbedded in red fibrous pulp. Said to come from Kábul. Is used by the natives in coughs attended with much expectoration. The pods are used for food, both for men and horses, along the coasts of the Mediterranean ; and are said to improve the voice of singers.

Dose.—1 másha. Price, 10 rupees a seer.

1221. Pisum sativum. Pea. *Vern.*—Matar.

A well known nearly spherical seed, with flattened sides. Introduced by the English. Used as stimulant food in special diseases. Considered by natives hot, aperient, and diuretic ; useful in swellings, and to increase the secretion of milk. It is said that persons who sleep in fields of this plant become paralysed.

Dose.—6 máshas. Price, 2 annas a seer.

1222. Cajanus flavus. *Vern.*—Arhar.

(1022) Delhi.

Said to be hot and dry. A food which is said to produce costiveness, and to be useful in cold diseases. The leaves are used in diseases of the month. It is considered digestible and good for invalids.

1223. Crotalaria juncea. *Vern.*—San.

(1066) Delhi.

(1806) Lahore.

(2142) Lahore (leaves, &c., san pushp, H.)



Seeds flat, irregular, in shape oval or triangular, deep concave, surface smooth, or with one or two ridges; color, pale yellow to deep brown. The seeds are used to purify the blood in special diseases; but the fibre is not used for surgical purposes.

Dose.—6 máshas. Price, 4 annas a seer.

1224. *Crotalaria medicinale* ? Vern.—Gulábi.

(2031) Lahore (from pergana Sarakpúr).

1225. *Melilotus* sp.— Vern.—Maltí.

(2137) Lahore.

1226. *Entada pursetha*. Vern.—Kastorí kaman.

(1963) Lahore.

Said to be used in pains of the loins and debility. A large circular disk-shaped seed; said to be used as a weight in Southern India.

Dose.—6 máshas. Price, 1 rupee a seer.

1227. *Pongamia glabra*. Vern.—Sukh-chain; karanj bará.

(2109-2132) Lahore.

The seeds yield an oil called karanj oil, which solidifies at 55°.

1228. *Desmodium* sp.—

SEEDS.—Detardána.

(2042) Lahore.

LEAVES.—Shiblingi, girikarní.

(2115-2160) Lahore.

CÆSALPINIÆ.

1229. *Cassia elongata*. Senna leaves. Vern.—Sanna makhi.

(998) Delhi.

(1518) Amritsar.

(1805) Lahore.

(2242) Dera Gházi Khán.

(2251) Do. (called ghiriwal).

(2220) Jhílam.

Shahpúr.

Pattiala.

Leaflets narrow, acuminate, unequal based veins, forming an intramarginal line. It contains a yellowish red solid, called cathartine, and some volatile oil. Used by natives as a purgative in many diseases. Used by Europeans as a purgative in habitual constipation, dyspepsia, derangements of the liver, and fever. It is stated in a native book that if it be used as the only food for one month, it prolongs youth and causes the hair to remain black, and gives universal strength: if eaten for 40 days, it produces a sweet smell.

Dose.—6 máshas. Price, 1 rupee a seer.

1230. *Cassia tora*. Vern.—Pawár; pañwár; chakunda; pawás.

(1789) Lahore.

(1387) Amritsar.

(2270) Dera Gházi Khán.

(678) Gurgaon.

(2427) Kashmir.

(1027) Delhi (leaves, chakúnda).

A warm remedy used in gout, sciatica, and pains in the joints. Seeds used to purify the blood and in skin disease; also as a blue dye. Leaves are used as a gentle aperient in fevers, and for children while teething, also as an application for ulcers, and ring-worm. AINSLIE.

The leaves are said to be used to adulterate senna (*Cassia obovata*), but are distinguished by their wedge-shape and ciliated margin.

Dose.—1 tolah. Price, 2 annas a seer.

1231. *Cassia auriculata*. Vern.—Tanghedar? (S.) tarwar (H.); tálopota (S.) (1025) Delhi.

Used as a refrigerant, and to purify the blood; also as an application in ophthalmia, in which it acts as a local stimulant. The bark is said to be an astringent.

1232. *Cassia alsus*. Vern.—Cháksú; chásnak.

(599) Gugaira.

(1050) Delhi.

(1164) Ambálah.

(1282) Jalandhar.

(1346) Hushyarpúr.

(1582) Gurdaspúr.

(1799) Lahore.

(2464) Kashmir.

Seeds small, flat, oblong, with a projection at one end, black externally. They are used in the ophthalmia of children, as an application to the eyes; an extract is also prepared by making a decoction, and then straining it, and this is called "sat chaksú," and is used to purify the blood. The seeds are also used in mucous disorders. It is supposed to act as a local stimulant in affections of the eye.

1233. *Cassia sophora*. Vern.—Brihatchitra (H.)

(2164) Lahore.

The juice of the leaves and the fresh root is considered useful in ring-worm. It is also said to be cathartic.

1234. *Cathartocarpus fistula*. Purging cassia pods. Vern.—Ambaltás; khiyár shambar.

* This is given in the Delhi list, but in books it appears as the Telugu name; I never heard the word in the Punjab.

- (691) Gurgaon.
(990) Delhi.
(1160) Ambálá.
(1194) Simla.
(224) Jálándhar.
(1849-1850) Hushyarpúr.
(1386) Amritsar.
(1565) Gurdaspúr.
(1733) Lahore.
(2185) Rawalpindi.
(2245) Dera Ghází Khán.

BARK. *Vern.*—Saki; girdnallí (Dera Ghází Khán).
(1995) Lahore.
(2472) Kashmir.
(2245) Dera Ghází Khán.
(686) Gurgaon.

Legume cylindrical, 12 to 16 inches long, smooth, dark or black externally, containing numerous transverse woody dissepiments, covered with a dark thick sweet pulp in which lie the seeds. The pulp is used as a purgative, both by natives and Europeans. One seer of the fruit gives half a seer of pulp. The bark is astringent, and used to purify the blood. The flowers are said to be laxative, and to be used for flavoring meat.

Dose.—9 tolahs, 1½ to 2 ounces.

1235. Cæsalpinia sappan. Sappan wood.
Vern.—Bakam; pathangá (S. and H.); yakm; kanjúr?

- (975) Delhi.
(1784) Lahore.

Used by natives to purify the blood, and as a powerful emmenagogue; also as a red dye. Europeans consider that its action is similar to logwood. Used as an astringent in diarrhoea, dysentery, &c.

Dose.—6 máshas. Price, 4 annas a seer.

1236. Guilandina bonduc. *Vern.*—Katkaranjwa; karanj; kanjúá; mithla?; bankat, or katkaleji.

- (991) Delhi.
(1182) Ludhiana.
(1458) Amritsar.
(1560) Gurdaspúr.
(2007) Lahore.
(2222) Shahpúr.
(2275) Kashmir (kanjúá).
Pattiala.

A hard round seed, about the size of a gall, brown externally, white within, very bitter. Considered by natives hot and useful in piles, worms, and leprosy; and used to purify the blood, and as a tonic in fever and spleen disease; also as an astringent in special diseases.

Dose.—6 máshas. Price, 3 annas a seer.

Externally it is said to be useful in hydrocele. It is a valuable bitter tonic and febrifuge; often given in conjunction with assafœtida and black pepper, in intermittent fevers and dyspepsia. It contains a peculiar resin, also sugar, starch, gum, and oil. The root bark is said to be more efficacious in fever than chinchona itself.

Dose.—Grains 10 to 20.

1237. Tamarindus indica.

FRUIT.—Imlí.

- (1087) Delhi.
(1278) Jálándhar.
(1784-2101) Lahore.
(2380) Kashmir.
Pattiala.

SEEDS.—Imlí ká bij.

- (1785) Lahore.

LEAVES.—Chinchá.

- (2101) Lahore.
(2044) Lahore (confection, chitramúl).

Legume flattened, often curved irregularly compressed; filled with dark acid pulp, and a few smooth hard flattened thick seeds, with a dark red exterior. The pulp is used as a purgative in many diseases, especially jaundice, fever, and melancholy; also with water as a refrigerent drink. The seeds are used as anthelmintics and in special diseases, and the kernels deprived of their skin, as food, after roasting and soaking in water. The leaves and the bark are stated to be astringent and useful in diarrhoea. By Europeans it is considered a gentle laxative and aperient, principally used as an adjunct to senna.

Dose.—2 tolahs. Price, 4 annas a seer.

1238. Bauhinia variegata, var. purpurea. *Vern.*—Kachnál.

- (1425) Amritsar.
(1809-1818) Lahore.

The buds are tawny colored bodies, composed of several layers of floral envelopes and stamens. The bark is used as a tonic in fever. The dried buds are used as food, and also as a remedy for piles and dysentery. They are considered by natives cool and astringent, and are useful in diarrhoea and worms.

Dose.—1 chitak. Price, 1 anna a seer.

1239. Bauhinia acuminata? *Vern.*—Shwet kachnár; kachnál safaid.

- (2052) Lahore.

1240. Bauhinia racemosa. *Vern.*—Murta or márt (H.); mahlá.

- (2140) Lahore.

The leaves of several species are used Bengal as demulcents and mucilaginous remedies in dysentery. The seeds are eaten, and are said to be tonic and aphrodisiac.

**1241. *Acacia Arabica*.** Vern.—Kikar or babul.

JUICE.—Akakiá.

(999) Delhi.

(1794) Lahore.

LEAVES.—Kikar ke patte.

(1795) Lahore.

FLOWERS.—Kikar ke phul.

(1225) Jalandhar.

PODS.—Kikar ka bij, phal babul.

(1225) Simla.

(1433) Amritsar.

(1792) Lahore.

(2259) Dera Ghazi Khan.

BARK.—Post-kikar.

(1793) Lahore.

(2A) Pattiala.

GUM.—Kikar gond ; gond-i-babul ; chir.

(1026) Delhi.

(1256) Jalandhar.

(1395) Amritsar.

(1796) Lahore.

(2279) Pattiala.

(2317) Kashmir.

The juice forms dark flat cakes with a sweet and astringent taste. The bark is long, thick, and fibrous brown externally, reddish within. The flowers are in small round yellow heads, composed of numerous tubular florets. The pods are flattened, contracted between the seeds on both sutures, and expanded opposite to them. The juice is prepared by evaporating a decoction of the bark mixed with milk. It is used for coughs. It acts as a demulcent and astringent.

Dose.—1 másha.

The leaves are used in mucons discharges. The pods are used in coughs, and in distilling spirit.

Dose.—1 másha. Price, 1 anna a seer.

The bark is used by natives in snake bites, and as an application to cancer and ulcers. The bark is used as an astringent in diarrhoea, and for tanning. It is also used in fermenting sugar for distilling.

Dose.—3 máshas. Price, 1 anna a seer.

The gum exudes principally in March and April ; there are two kinds—the red and white—the former is the most efficacious. It is used in coughs, rheumatism, mucons discharges, and special diseases.

It acts as a demulcent, and is said to be useful as food in diabetes. It has been employed as a local application in bleeding and to burns.

Dose.—4 máshas, or 30 to 60 grains. Price, from 4 to 6 annas a seer.

1242. *Acacia farnesiana* (Gum of). Vern.—Gond babul.

(1056) Delhi.

Used as a sort of gum Arabic. The gum is in dark conchoidal masses, translucent or transparent at the edges. Some pieces are much whiter. The pods are said to contain a balsamic liquid.

1243. *Acacia modesta*. Vern.—Phulahi ; gum (Bhimbri gond).

(1790) Lahore (leaves).

(2333) Kashmir (gum).

Sometimes used instead of gum Arabic.

1244. *Acacia speciosa*. Vern.—Siris ; sirih.

(1434) Amritsar.

(1818) Lahore.

Seeds are used by natives in treatment of piles, and as an astringent in diarrhoea. The flowers are considered by natives cool : to cure boils, eruptions, and swelling, and act as antidotes for poisons ; also in headache and jaundice. The leaves are useful in opthalmia. The powdered bark is useful for ulcers, and especially in snake wounds. The oil extracted from the seed is said to cure white leprosy. The seeds are said to be useful in urinary diseases, especially gonorrhoea.

Dose.—6 máshas. Price, 1 anna a seer.

1245. *Acacia catechu*. Vern.—Kath.

(761-1381) Amritsar.

(1010) Delhi.

(1817) Jalandhar.

(2021) Lahore.

In irregular square cakes of a light reddish color within and brownish externally : very astringent. It contains mimotannic acid, a variety of tannin, and red catechuic acid. Made by boiling the cut wood of the *Acacia catechu*, "khair" for some time with water, then straining and evaporating the decoction to a fitting consistency. The catechu sold in the Punjab is always the pale variety, in square cakes ; this is stated in the British Pharmacopœia to be the produce of the *Uncaria gambir*, which plant does not grow in this part of India, while the *Acacia catechu* is very common. It is a very useful astringent and styptic, much employed in diarrhoea, dysentery, and mucons discharges. It is said to be useful in phthisis, also in opthalmia. It is also used as an application to inflamed gums and ulcers, and to relaxed sore throats ; and by natives in fever, leprosy, and eruptions.

Dose.—1½ másha. Price, 8 annas a seer.

1246. *Mimosa pudica*. Vern.—Lajwantí.

(1820) Lahore.

A cold remedy, used to purify the blood, and in gravel. The leaves are useful in piles and fistula.

Dose.—6 máshas.

1247. *Mimosa rubicunda*. Vern.—Dev khádir.

(2100) Lahore.

1248. *Prosopis spicigera*. Vern.—Sankri (the pod.)

Pod long, irregularly cylindrical, sweet to the taste, often esculent; the tree is excellent for fuel, and is called "jhand."

ROSACEÆ.

1249. *Amygdalus communis*, A. dulcis. Vern.—Bádám shírfín.

(1057) Delhi.

(1554) Amritsar.

(1823) Lahore.

1250. *Amygdalus amara*. Vern.—Talkh bádám; hab-ul-lanz talkh; karwa bádám.

(988) Delhi.

(1822) Lahore.

Almond seeds are brown, lanceolate, ovate, with a white sweet kernel. They contain 54 per cent. of fixed oil; also emulsine, a kind of albumen, 29 per cent; sugar 9 per cent. The sweet almonds are considered dry and warm remedies, and are used in headache and debility; also in coughs. Oil is made from them.

Dose.—6 máshas. Price, 4 annas a seer.

The bitter almonds are used in deafness and as a deobstruent; also against the effects of intoxication, in ague, calculus, and toothache. A branch of the tree is said to keep flies from the room in which it is placed.

Price, 1 rupee a seer.

Bitter almonds have often proved poisonous, as they contain a peculiar substance, called Amygdaline, which, under the influence of a solution of the albumen of the almond, produces prussic acid. They are said to be useful as a local application in skin disease, especially in prickly heat; also in heart-burn: and the sweet variety are used as food in diabetes. The bitter kind has also been employed in fever, as an anthelmintic in tape worm, and to prevent intoxication. Very often the kernels of the plum, *Prunus Domestica* (*alucha*) are substituted for the bitter almonds.

1251. *Prunus armeniaca*. Apricot. Vern.—Zard alú; khubání; alú Kashmírí; kishta.

FRUITS.

(1123) Delhi.

(1825-2016) Lahore.

(2291-2332-2453) Kashmír.

(2186) Rawalpindi.

STONES.—Tukhm-i-zard alú; bádám talkh pahári; sári.

(1823) Lahore.

(2236) Kashmír

Grows in the hills. The fruit is considered a warm remedy, and is used for coughs, and as an article of food. Likewise by hakims in skin diseases, flatulency and putrid fevers, to quench thirst, to arrest diarrhoea, to purify the stomach, and expel unhealthy bile.

Dose.—3 máshas. Price, 5 annas a seer.

1252. *Prunus domestica*. Plum. Vern.—Alúcha.

(2370) Kashmír.

The dried drupes. Used as a laxative in coughs and asthma, and an addition to other purgatives: they are acid and refrigerent.

1253. *Prunus domestica*, var. *Bo-khariensis*. Vern.—Alu bukhára.

(1105) Delhi.

(1304) Jálándhar.

(1821) Lahore.

A cold remedy. The fruit is used as a refrigerent laxative in fever and indigestion, both as a cold infusion, and as an electuary. It is principally brought from Peshawur. By Europeans it is principally used as a laxative in combination with senna.

Dose.—9 fruits. Price, 4 annas a seer.

1254. *Prunus padus* (*Cerasus*). Vern.—Jáman.

(2557) Kashmír.

The kernel yields a poisonous volatile oil, similar to oil of almonds.

1255. *Prinsepia utilis*. Vern.—Bekrál.

Simla.

Yields a useful oil.

1256. *Cerasus communis*. Vern.—Gilás; girása.

(1826) Lahore (from Kábul).

An edible fruit, used as a cold remedy in insanity. The kernel is said to relieve the pains caused by calculus in the bladder, and to dissolve the stone.

ROSEÆ.

1257. *Rosa centifolia*. Vern.—Guláb; gul-i-surkh.

PETALS.

(1161) Ambálah.

(1143-1186) Ludhiana.

(1230) Jálándhar.

(1452-1549) Amritsar.

(1828-1832) Lahore.

(2172) Rawalpindi.

(2219) Jhílam.

(2364) Kashmír.

(2491) Nabha.

Pattiala.

STAMENS.—Guláb zira.

(1833) Lahore.

STEM.—Kubjak (Hindí medicine).

(2133) Lahore.

The petals are red, broadly ovate, and wrinkled, with a sweet smell, owing to the presence of volatile oil; they also contain some tannic acid. The petals are used as laxatives for children. The stamens are considered to arrest purging. In European medicine, they are considered to be slightly astringent, but are principally used to mix with other remedies.

CONSERVE OF ROSES.—Gul khand.

(1822) Lahore.

It is said to contain citric and malic acid; also sugar, and a little volatile oil. This is prepared by carefully separating the red petals of the rose from all other parts: these are then beaten with sugar into a pulp and dried in the sun. Used as a purgative in cholera.

Dose.—2 tolahs. Price, 8 annas a seer.

1258. *Rosa glandulifera*. *Vern.*—Gul seoti (or sewati).

(1516) Amritsar.

(1830) Lahore.

A cold remedy: used for palpitation of the heart.

Dose.—6 máshas. Price, 1 rupee a seer.

1259. *Rosa sinensis*. *Vern.*—Sádá guláb. (1832) Lahore.

1260. *Rosa* sp.—*incerta*. *Vern.*—Nasrin; kubjak.

(2357) Kashmir.

(2135) Lahore.

(2421) Kashmir (barg-i-nasrin, leaves).

POMACEÆ.

1261. *Pyrus communis*. *Vern.*—Kishta bahira? naspáti.

(1375) Kashmir.

Fruit nutritive, contains much sugar.

1262. *Cydonia vulgaris*. Quince. *Vern.*—Bedána or bihdána; bihi tursh; safarjal (Arabic).

(1045) Delhi.

(1497) Amritsar.

(1824) Lahore.

(2393-2424) Kashmir.

Pattiala.

Grows at Lahore; but the best kinds are obtained from Peshawur and Kashmir. The seeds act as demulcents; and by natives are used in diarrhoea, dysentery, sore throat, and fever. The seeds are ovate, pointed, convex on one side, and flattened on the other. They abound in very soluble mucilage, and are used in aphthous affections, diseases of the mouth, and ophthalmia; also to cracks on the skin, and in dysentery.

The dried fruit is used as a refrigerent, and recommended in special affections.

Dose.—6 máshas. Price, 1½ rupees a seer.

CUCURBITACEÆ.

1263. *Cucurbita pepo*. *Vern.*—Kadú (seeds); magz kadú; kúnda?

(662) Gurgaon.

(1101) Delhi.

(1261) Jalandhar.

(1546) Amritsar.

(1691) Lahore.

(2454) Kashmir.

Seeds are cooling. Leaves used for an application to burns. The fruit is cool, useful to create an appetite and assist digestion; also employed in gravel and disorders of the urinary bladder. A sherbet is made from it by filling the hollow centre with sugar, and exposing it to the sun till it turns acid.

1264. *Cucurbita lagenaria*. *Vern.*—Tomri.

(1688) Lahore.

Seeds cooling; leaves purgative. The bitter pulp is stated by DR. ROYLE to be poisonous. It is considered by natives to be cool: useful in coughs, and as an antidote to poisons.

1265. *Cucurbita citrullus*. Water-melon. *Vern.*—Tarbáz.

(683) Gurgaon.

(1247) Jalandhar.

(1685) Lahore.

(2447) Kashmir.

Pattiala.

(2259) Dera Ghází Khán.

Fruit refrigerent, very watery and edible; used in fever: contains much water and sugar.

1266. *Cucumis melo*. Musk-melon. *Vern.*—Kharbúza.

(1163) Ambálah.

(681) Gurgaon.

(1187) Ludhiana.

(1239) Jalandhar.

(1428) Amritsar.

(1689) Lahore.

(2272) Dera Ghází Khán.

(2447) Kashmir.

(1037A) Delhi (rind of fruit, kharbúza ka chil).

Fruit refrigerent, difficult of digestion: seeds used for cases of calculus, and as diuretics. Considered by natives hot and dry.

1267. *Cucumis sativus*. Cucumber. *Vern.*—Khíra; khiyár (Pers.)

(680) Gurgaon.

(1187) Ludhiana.

(1223) Jalandhar.

- (1430) Amritsar.
(1602) Gurdaspur.
(1690) Lahore.
Pattiala.
(2448) Kashmir.
(1049) Delhi.

Fruit refrigerant. Considered by natives cool and dry. It is diuretic and aperient, and said to be useful in disorder of bile, calculus, and suppression of urine; also to be very useful for remittent fever. The seeds contain much oil. The juice is said to kill cockroaches and woodlice, and the peel is equally efficacious.

1268. Cucumis pubescens. Vern.—Kakri.

- (680) Gurgaon.
(1421) Amritsar.
(1686) Lahore.

Considered cool and astringent: it creates appetite and removes bilious disorders.

1269. Citrullus colocynthus. Vern.—Indrain; hanzil; kortumbah; tummah.

- (1097-1102) Delhi.
(1191) Ludhiana.
(1437) Amritsar.
(1687) Lahore.
(2171) Rawalpindi.
(2221) Jhilm.
(2258) Dera Ghazi Khan.
Shahpur.

Root.—Hanzil ka jar.

- (966) Delhi.
(1191) Ludhiana (kortumbah ka jar).

The rind is hard, yellow, the fruit is about the size of an orange; the pulp is light yellow and spongy, containing the seeds. The true colocynth of European medicine is a powerful purgative, much used in constipation, dyspepsia, dropsy, and affections of the head, such as apoplexy.

It contains a peculiar neutral bitter principle, colocynthin, and acts as a powerful hydragogue, cathartic, and emmenagogue. It is said also to stop gonorrhoea. It is considered by natives hot and moist and to be a purgative and anthelmintic. Useful in jaundice, dropsy, and fever, and diseases of the liver and spleen.

Dose.—Grains 5 to 10.

1270. Bryonia P Vern.—Shibling (Hindi).
(2114) Lahore.

A purgative and anthelmintic; externally, it acts as a rubefacient; internally it purges and is said to stop the secretion of milk.

1271. Momordica charantia. Vern.—Karila.
(1122) Delhi.

- (1254) Jalandhar.
(1422) Amritsar.
(1692) Lahore.

Very bitter: acts as an anthelmintic. Sometimes used in brewing. Considered by natives cool and laxative: useful in piles, jaundice, and as a vermifuge; also to strengthen the stomach and in special affections; also it is useful after parturition.

1272. Momordica muricata. Vern.—Kakora.

- (1693) Lahore.

Similar to karila: useful in ague, and as an antidote for poisons.

1273. Momordica echinata. Vern.—Bindal; khagarwal.

- (657) Gurgaon.
(245) Dera Ghazi Khan.
(1869) Lahore (khagarwal).

It is hot and dry: used in piles and epilepsy.

1274. Luffa tenera. Vern.—Karwa turai.
(1028) Delhi.

Every part extremely bitter: fruit cathartic and emetic; juice applied to the temples for headache.

1275. Luffa acutangula. Vern.—Kali tori.
(1122) Jalandhar.

The seeds are said to produce purging and vomiting in doses of 15 grains.

ONAGRACEÆ.

1276. Trapa bispinosa. Vern.—Singhara.
(1018) Delhi.

- (1000A) Amritsar.
(1913) Lahore.

The nuts are farinaceous, used as food, and in special diseases. It is considered by natives cool and sweet, that it cures bilious affections and diarrhoea: it is greatly used as a food in the rainy season. The nuts are used to form poultices.

LYTHRACEÆ.

1277. Grisea tomentosa. Vern.—Dhao; gul dhawi; gul bahar; dhawa ka phul.

- (1431) Amritsar.
(2028) Lahore.
(2318) Kashmir.

The dried flowers are stimulant, especially in pregnancy; also used in dyeing. Considered by natives cool; used in piles, bilious and mucous disorders.

1278. Lawsonia inermis. Vern.—Mendhi; hanná.

- (989) Delhi.
(7031) Amritsar.
(1183) Ludhiana.

- (1834) Lahore.
 (2236) Dera Ghāzī Khān.
 (2416) Kashmir.

Used to dye the hands of a red color by rubbing the powdered leaf between them; also as a medicine to purify the blood. It contains a peculiar sort of tannic acid: it is sometimes applied as an astringent to ulcers of the mouth; also in cases of lepra and skin disease.
AINSLIE.

MYRTACEÆ.

1279. *Myrtus communis*. Myrtle. *Vern.*
 —Sutrsowa; ās (Arab.); wilāṭī mendhī; barg morād.

BERRIES.—Hab-ul-ās.

- (1117) Delhi.
 (1524) Amritsar.
 (1990) Lahore.
 (2243) Dera Ghāzī Khān.

Leaves used in tanning and to distil an essential oil: they act as astringents and aromatics, and were formerly employed as spices. The bark and the leaves are said to be useful in tanning, and the berries in dyeing.

The leaves are used by hakīms in cerebral affections, especially epilepsy; also in flatulency, diseases of stomach and liver. The fruit in diarrhoea, hæmorrhage, and ulceration of the womb.

1280. *Caryophyllus aromaticus*. Cloves. *Vern.*—Laung; karanfal.

- (1293) Jalandhar.
 (1059) Delhi.

A dark brown substance like a nail, consisting above of a ball of petals and stamens, below a four-pointed calyx, and below this a tapering stick-like ovary. It contains much volatile oil and tannic acid. Considered by natives a warm, dry remedy, given internally in fever and debility, and applied externally in anaesthesia.

Dose.—1 to 3 māshas. Price, 8 annas a seer.

Hakīms consider it a tonic to the stomach and liver. Used in European practice as a stimulant carminative, especially in cholera. The oil is applied in toothache; also used in dyspepsia and as an adjunct to other remedies.

Dose.—5 to 20 grains.

1281. *Punica granatum*. Pomegranate.

BARK OF STEM.—Post anār.

- (1224) Hushyarpūr.
 (2387) Kashmir.

LEAVES.—Dārimpatra (Hindi).

- (2156) Lahore.

BUDS.—Anār kallī.

- (1022) Delhi.

FLOWERS.—Gul anār, dārim pushp (Hindi).

- (1750) Lahore.
 (1453) Amritsar.

RIND OF FRUIT.—Naspāl, chāl anār.

- (980) Delhi.
 (1189) Ludhiana.
 (1351) Hushyarpūr.
 (1592) Gurdaspūr.
 (1749) Lahore.
 (2387) Kashmir.

SEEDS.—Anār dāna, dārimesar? hab-ul khilkhil.

- (677) Gurgaon.
 (1046) Delhi.
 (1224) Jalandhar.
 (1384) Amritsar.
 (1748) Lahore.
 (2180) Rawalpindi.
 (2372) Kashmir.

The fruit is globular, brown, and curved by the calyx, containing numerous yellowish seeds, embedded in red pulp. The rind is hard, brown externally, yellow and rough within, curved in every direction. The root bark is in thin quills, brown externally and yellowish within; both the bark and the rind contain tannic acid and punicine. The bark of the root, called "rumān," is a powerful anthelmintic and astringent, and is especially useful for tape-worm and for thread-worms. The rind of the fruit acts as a tonic astringent and anthelmintic; and is used for tanning. It is also powdered and boiled with milk as an astringent in diarrhoea. The buds act similarly to the fruit rind. The fruit is refrigerent and astringent, and is used in fevers, and debility of the stomach. The seeds are used as refrigerent and astringent remedies. The flowers are used as refrigerent, and astringent drugs also. All parts of the plant are rich in tannic acid, and act as astringents and anthelmintics. It is principally used in dysentery and chronic diarrhoea; also as a remedy for tape-worms; also as a local application for relaxed sore throat, and cancer of the uterus.

1282. *Psidium pyrifera*. Guava. *Vern.*
 —Amrūd; anjir zard.

- (1275) Lahore.
 (2375) Kashmir.

Fruit edible. Used in medicine as an astringent in diarrhoea, and is supposed to strengthen the stomach.

COMBRETACEÆ.

1283. *Terminalia chebula*. *Chebulic myrobalan.* *Vern.*—Har; harhar; halela zard.

- (1158) Ambālah.
 (1276) Jalandhar.
 (1339) Hushyarpūr.
 (1491) Amritsar.



(1588) Gurdaspúr.

(1973) Lahore.

(2365) Kashmir.

(2494) Nabha.

Pattiala.

Used as an astringent in ophthalmia, and to purify the blood; also a purgative in many diseases. The price and the supposed efficacy increases with the size of the fruit, one weighing 6 tolahs would cost Rs. 20. It is powerfully astringent, said to be more so than galls. It is used also for tanning, dyeing, and making ink. It acts internally as a useful aperient; externally as an astringent application to ulcers and skin diseases.

Dose.—6 máshas.

1284. Terminalia citrina P or **T. chebula** P *Vern.*—Harir; halelah syah; halela jangí; halelah khúrd; har jangí.

(934) Delhi.

(1339) Hushyarpúr.

(1589) Gurdaspúr.

(1491) Amritsar.

(1974) Lahore.

Pattiala.

Said to be the young state of the *Chebule myrobalan*, usually employed as a purgative; the smallest is the most sought after.

1285. Terminalia arjuna. *Vern.*—Arjan.

(1336) Jálándhar.

(2158) Lahore.

Said to be hot and astringent: useful in bilious affections, and as an antidote to poisons. The fruit is used as a tonic and deobstruent. The bark is astringent and febrifuge. The juice of the leaves is useful in earache. AINSLIE.

Dose.—2 to 4 máshas. Price, 7 annas a seer.

1286. Terminalia bellerica. *Belleric myrobalan.* *Vern.*—Bahira; Persian, balela.

(670) Gurgaon.

(1024) Dehli.

(1288) Jálándhar.

(1341) Hushyarpúr.

(1445) Amritsar.

(1911) Lahore.

(2394) Kashmir.

(2495) Nabha.

Pattiala.

Sirmúr.

Considered a hot dry and astringent remedy; useful in dropsy, piles, diarrhoea, and leprosy; also fever. Used for coughs and as a food. Is, in small doses, an astringent tonic; in larger ones, a narcotic poison: also used for dyeing and as a purgative.

TRIPLA TIRPHALA; OR TRIPHALA.

(2041) Lahore.

A mixture of the three common *Myrobalans*—the chebulic, *P. chebula*; the belleric, *T. bellerica*; and the emblic, *Phyllanthus emblica*.

1287. Combretum nanum. *Vern.*—Dant jathi (Hindi).

(2089) Lahore.

UMBELLIFEREÆ.

1288. Apium involucratum. *Vern.*—Ajmúd; karafs.

FRUITS.—Ajwain, ajmúd.

(1482) Amritsar.

(1920) Lahore.

(2399) Kashmir.

ROOT.—Bekh-karafs.

(997) Delhi.

(2409) Kashmir.

LEAVES.—Phát jatá (Kashmir).

(2425) Kashmir.

Roots diuretic and laxative: used for jaundice and gravel. Supposed to be bitter and heating, and to remove cholic, increase the appetite, remove fetid breath, flatulence, stoppage of urine or menses. Both the root and the fruits act as diuretics and stimulants, and are used in cases of calculus and gravel; also in rheumatism and coughs; also to relieve hiccough.

The wild plant is considered to be poisonous. It is an aromatic stimulant, useful in cholic, diarrhoea, and catarrh; also in fever. It probably contains Apiol, an oily liquid used as a substitute for quinine.

Dose.—3 máshas.

1289. Bupleurum marginatum. *Vern.*—Sarh (ghás).

(2294) Kashmir.

Used as a diuretic and laxative.

1290. Ptychotis ajwain. *Vern.*—Ajwain.

(632) Gurgaon.

(1180) Ludhiana.

(1116) Delhi.

(1159) Ambálah.

(1269) Jálándhar.

(1200) Simla.

(1590) Gurdaspúr.

(1338) Hushyarpúr.

(1389) Amritsar.

(1919) Lahore.

(2191) Gujrat.

(2218) Jhilam.

(2176) Rawalpindi.

(2244) Dera Ghází Khán.

(2356) Kashmir.

(2484) Jhínd.

(2486) Nabha.

Bitter, pungent and heating; it assists digestion, improves the appetite, is used in catarrh and rheumatism. Also used for cholic, both in men and horses; and for fever, rheumatism and dyspepsia, and in stoppage of urine. It is a useful stimulant carminative, which deserves to be more used in cholic. It yields a useful essential oil.

Dose.—3 máshas. Price, 3 annas a seer.

1291. *Ptychotis sylvestris* P Vern.—Wal ajwain.

(1964) Lahore.

Fruit carminative like ajwain.

1292. *Carum gracile*. Vern.—Kálázira; zira siyah.

(972) Delhi.

(1285) Jálándhar.

(1922) Lahore.

(1469) Amritsar.

(1000A) Delhi.

Kashmír.

Fruit black, slender and nearly linear, with five ridges and oil channels between them. They contain much volatile oil. A carminative and stimulant remedy. Used for indigestion, rheumatism and enlargement of the spleen; also in neuralgia; and as a vermifuge, and to obviate the bites of serpents. By Europeans they are principally used in cholic and dyspepsia; also in flatulency.

Frequent mistakes have arisen from a confusion of the vernacular names of plants called "zira," a number were sown by DR. BROWN, who reported to the A. H. Society as follows:—

"Among the seeds which germinated, were several more or less confused in the catalogue, under the names of kálázira; kaleejeree; and kálazeera; these were all sown and produced plants. The first generally called kalajera, but also kalonja, was a small black triangular seed, which, when sowed, produce a plant evidently belonging to the natural order Ranunculaceae, and resembling the *Nigella sativa* (Linn.)"

"The second, kaleejeree, when sown produced a Composite flower, which answered to the description of the *Serratula antihelmintica*. And the last, kalazeera, produced an evidently umbelliferous plant, but this unfortunately did not flower owing to the heat of the season: this however was in all probability the *Carum nigrum*, to which the above name is generally given in books."

Dose.—7 máshas. Price, 12 annas a seer.

1293. *Cuminum cyminum*. Cummin. Vern.—Zira safaid.

(972-1107) Delhi.

(1174) Ludhiana.

(1411) Amritsar.

(1921) Lahore.

(2487) Nabha.

(2264) Dera Ghází Khán.

Fruit concave, convex, rather larger than coriander, with nine ridges, and four vitæ or oil channels. A warm and dry remedy, used in indigestion, cholic, diarrhoea and special diseases; also in spleen disease and vomiting. Used by the hakims in flatulency, suppression of milk, urine, and catamenia.

Dose.—6 máshas. Price, 4 annas a seer.

1294. *Pimpinella involucrata*. Vern.—Anísún.

(1442) Amritsar.

(1925) Lahore.

(2295-2380) Kashmír.

Considered by natives hot and dry, and used for cholic and indigestion. A stimulant carminative and deobstruent remedy; principally used for flatulency and dyspepsia: said to be useful in phthisis. It is also said to be diuretic and emmenagogue; also to augment the secretion of milk, and to relieve headache.

Dose.—6 máshas. Price, from 8 annas to 2 rupees a seer.

1295. *Daucus carota*. Carrot. Vern.—Gájar; Pers., zardak.

(1169) Ludhiana.

(1240) Jálándhar.

(1924) Lahore.

(2435) Kashmír.

The root contains volatile oil, albumen, pectine, and a peculiar red principle, called carotine. Used as a diuretic in calculus and special diseases, also in abdominal pain in women and debility; it creates appetite and cures eruptions.

Fruit carminative and diuretic. Root used for food and as an application to ulcers. Seeds formerly used in dyspepsia and cholic. It is stated that if a horse is fed on carrots for a month, it will remain free from disease for a year.

Dose.—4 tolahs. Price, 1 pice a seer.

1296. *Anethum sowa*. Dill. Vern.—Soya; shibt (Arab).

FRUITS.

(637) Gurgaon.

(985) Delhi.

(1156) Ambálah.

(1359) Hushyarpúr.

(1212) Jálándhar.

(1405) Amritsar.

(1923) Lahore.

(1181) Ludhiana.

(2207) Gujrát.

(2331) Kashmír.

(2493) Nabha.



(1963) Lahore (the plant).

(2299) Kashmir.

The fruits are oval and flattened, with five ridges and four oil channels, and a membranous margin; they are slightly convex on one side. It is considered by natives as a warm remedy; used for cholic, especially in horses; also for indigestion and abdominal pains in women, and to increase the secretion of milk. Fruit aromatic and carminative; used for flatulence, cholic, and hiccough, especially of infants.

Dose.—6 māsas. Price, 2 annas a seer.

1297. *Foeniculum vulgare*. Vern.—Sonf; bādyān.

(634) Gurgaon.

(1011A-1115) Delhi.

(1215) Jalandhar.

(1358) Hushyarpur.

(1382) Amritsar.

(1557) Gurdaspur.

(1917) Lahore.

(1163) Ludhiana.

(1154) Ambālah.

(2174) Rawalpindi.

(2214) Jhilm.

(2204) Gūjrat.

(2265) Dera Ghāzi Khān.

(2485-2388) Kashmir.

(2483) Pattiala.

(2481) Jhind.

Roots.—Bekh bādyān.

(1488) Amritsar.

(1918) Lahore.

(2422) Kashmir.

The fruits are oblong, convex on one side, flat on the other; or convex on both, from the union of two by their flat surfaces. The root is said to be purgative, and the leaves diuretic. AINSLIE.

They contain volatile oil. The fruit is a stimulant aromatic, carminative, much used in cholic, flatulency, dyspepsia, but is inferior to ajwain. It is said greatly to increase the flow of milk, especially when diminished by indigestion; also to increase the urine and menses, and to relieve flatulency.

1298. *Coriandrum sativum*. Vern.—Dhaniyān; kashniz (Pers.)

(649) Gurgaon.

(1027-1070) Delhi.

(1183) Ludhiana.

(1199) Simla.

(1243) Jalandhar.

(1397) Amritsar.

(1569) Gurdaspur.

(2178) Lahore.

(2192) Rawalpindi.

(2215) Gūjrat.

(2490) Jhilm.

(2329) Jhind.

(2090) Kashmir.

Simla.

Pattiala.

The fruit is globular, marked with five ribs. Seeds used in headache, cough, debility; also as a food and a perfume. Considered cool and dry.

Dose.—6 māsas. Price, 1½ annas a seer.

The green plant is also eaten, called "khotmīr." A useful aromatic, stimulant and carminative, used in cholic and diarrhoea; it contains much volatile oil.

Dose.—Grains 10 to 30.

1299. *Prangos pabularia*. Petrasoleum. Vern.—Fitrāsalyān.

(1928) Lahore, from Thibet.

Used for debility, indigestion, and rheumatism.

Dose.—3 māsas. Price, 2½ rupees a seer.

The leaves are used as fodder for sheep, they are rather heating, but are said to fatten cattle readily, and to prevent the liver fluke. This plant is believed to be the *Sylphium* mentioned by ARRIAN. The native name, "fitrāsalyān," is probably a corruption of "parsley." It is described by LINDLEY as being a perennial herbaceous plant, stem taper, leaves very compound with linear segments, umbels numerous, flowers yellow, calyx, a 5-toothed rim, petals ovate, entire involute, disk depressed, fruits tapering, compressed, broad, mericarps compressed at the back with 5 smooth ridges, thick at the base, ending in membranous wings; vittae numerous.

ROYLE states that LIEUT. BURNES crossing in the direction of ALEXANDER'S route, found this plant, "the *prangos*," greedily cropped by sheep, and even eaten by his fellow travellers, and he supposes it to be the *Sylphium* described by ARRIAN as growing only with pines on Paropamesus. HEEREN applies the greater portion of the remarks that remain of Clesias respecting the Indians to the high land of Tartary, where grew the *Sylphium*, grazed on by innumerable flocks of sheep and goats.

DR. JAMESON, in his Catalogue of plants says, that it is called "prangos," from its Thibetian name, and that this plant is much used in Thibet to feed cattle, and is said to destroy the liver fluke in sheep. It grows wild at Mussoorie, but does not thrive in the plains.

DR. LINDLEY also writes that the leaves are dried, and used as winter fodder for cattle. Its effects are heating, producing fatness quickly. MOORCROFT.

This plant is also mentioned by HOOKER in his Flora Indica, as being abundant in the Dras valley, on the north of Kashmir.

The following letter is extracted from one of the

early numbers of the A. H. Society of India's Journal. The volume is rare, and the information will be acceptable no doubt to some.

"Wishing to employ as usefully as possible the time I am compelled to wait for the final answer of the Chinese authorities of Elela, to my representation, I lately undertook a journey to Imbal or Droz, for the purpose of examining into the reported qualities of a plant produced in that neighbourhood, and of which the accounts I had received seemed to border on exaggeration.

"This plant, called "prangos," is employed in the form of hay as a winter fodder for sheep and goats, and frequently for neat cattle; but its seed when eaten by horses is said to produce inflammation of the eyes and temporary blindness.

"During a stay at Imbal of nearly a month, in which I was occupied principally in acquiring an acquaintance with various details respecting the plant, I drew up a letter on this subject to the Secretary of the Board of Agriculture of Britain, which I propose to request the favor of having forwarded under cover to the Chairman of the Honorable the Court of Directors. And the whole will be transmitted to your address with the envelopes unsealed, should you think proper to examine their contents.

"The properties of "prangos" as a food appear to be heating, producing fatness in a space of time singularly short, and also destructive to the *Fasciola hepatica*, or liver fluke, which in Britain after a wet autumn, destroys some thousands of sheep by the rot, a disease, that to the best of my knowledge, has in its advanced stages hitherto proved incurable.

"The last mentioned property of itself, if it be retained by the plant in Britain,—and there appears no reason for suspecting that it will be lost—would render it especially valuable to our country.

"But this, taken along with its highly nutritious qualities, its vast yield, its easy culture, its great duration, its capability of flourishing on lands of the most inferior quality and wholly unadapted to tillage, impart to it a general character of probable utility unrivalled in the history of agricultural productions.

"When once in possession of the ground, for which the preparation is easy, it requires no subsequent ploughing, weeding, manuring, nor other operation, save that of cutting and of converting the foliage into hay.

"Of its duration I have two facts, viz., one of its seeds having been carried westward along with those of yellow lucerne, above forty years ago, sown on the Eastern frontier of Kashmir, where they vegetated, and of which the plants of the first growth still remain in a flourishing condition. In the second instance the seeds were transported eastward, and

sown upon rocks near Molbee, where their plants flourished for about forty years, but in consequence of a long period of drought, during which there fell scarcely either rain or snow, the "prangos" perished along with the crops of that district in general.

"From various facts it is conceived not unreasonable to presume that by the cultivation of this plant, moors and wastes hitherto uncultivated, and a cause of disgrace to British Agriculture, may be made to produce large quantities of winter fodder, and that the yield of highlands and of downs enjoying a considerable depth of soil may be trebled.

"I have made every precautionary arrangement in my power, by presents, &c., for gathering, drying, packing and transporting a large quantity of the seed, and have left MR. GUTHRIE, the Apothecary, to superintend their operations; one cask will be transmitted through Kashmir, and two others through Busahir, to your address.

"As the 'prangos' has hitherto been of spontaneous growth alone, practices better adapted to the nature of the plant or of the country may be adopted at a future time, but from a view of its habitudes in its wild state, I venture to suggest that the seeds be dibbled singly into holes an inch deep and a foot apart, a short time before the rainy season.

"During three years the plants will be little productive, but in that interim they will not be in the way of any other surface crop."

1300. *Sium* sp.—? Vern.—Shakákal.

(1496) Amritsar.

(1927) Lahore.

(2298) Kashmir.

Used in special diseases only. DR. STEWART has proved that some specimens of shakákal are the root of a species of *Convallaria*.

Dose.—6 máshas. Price, 2 rupees a seer.

1301. *Narthex assafoetida*. Vern.—Hing; angáza; kashim or masham (?).

Root.

(1040) Delhi.

(1807) Jalandhar.

(1926) Lahore.

In masses of whitish tears, it becomes pink and then red on exposure; the smell is strongly alliaceous. It contains volatile oil, resin and gum. Used as a condiment with food; also as a medicine for indigestion, cholera and rheumatism. Considered to be very warm and pungent; also in special diseases. Said to be emmenagogue, and to produce abortion.

Dose.—1 másha, or grains 5 to 20. Price, 1 rupee a seer.

The plant is a native of Kashmir, Persia and Afghanistan.

The portion of the root exhibited came from the most southern habitat of the plant at present known, this being the Chenab valley, near Pangl.

The leaves are considered sudorific and carminative. The drug is extensively used as an antispasmodic stimulant in asthma, hysteria, and epilepsy. Assafoetida is the most powerful of the foetid gum resins, it acts as a stimulant nervine tonic; and is also an expectorant and anthelmintic; it is largely used in hysteria and nervous affections; also in cholic, dyspepsia and whooping cough, in asthma, chronic bronchitis and palpitation of the heart; it is said to destroy round worm and the guinea worm, in doses of from grains 10 to 30. Used by hakims to disperse indurations, and to carry off urine and to promote menstruation.

1302. Opoponax chirorum. Vern.—Jawāshir. (See under Gums.)

(1184) Ludhiana.

(1926) Lahore.

Antispasmodic and stimulant like assafoetida. It is used by hakims in uterine affections, flatulence, cholic, convulsions, discharges and indurations.

1303. Angelica sp———. Vern.—Chora. Simla (root).

A cordial and stimulant remedy; it was formerly much employed in the treatment of flatulency and dyspepsia; also in special diseases. It is also used in obstinate constipation, flatulency, and bilious complaints; and in dyspepsia after fever.

1304. Dorema ammoniacum.* Vern.—Ushak, or simagh-bil-shirin (Pers.)

(1001) Delhi.

Used in coughs. It is usually in small globular masses, pale yellow externally, white within, and smooth. It contains volatile oil, resin, and gum. A foetid gum resin, similar in its action to assafoetida: it acts as a stimulant and expectorant, especially useful in chronic, catarrh, and asthma. Also externally as a stimulant discentient to indolent tumours. The hakims use it in epilepsy, stoppage of urine, and menstruation; as also in tumours. It is said to produce abortion.

Dose.—1 to 2 māsas, or 5 to 10 grains.

RUBIACEÆ.

1305. Rubia munjista. Vern.—Manjith; majith.

(1916) Lahore (imported).

A cold and dry remedy; used for purifying the blood; used as a dye. It is said to be useful in poison, swelling, eruptions, boils, leprosy, and dysentery. Also employed in deficient menstruation and dysmen-

orrhœa as a tonic and emmenagogue, and as a deobstruent after parturition.

Price, 4 annas a seer.

1306. Randia dumetorum. Vern.—Mainphal; rāra.

(671) Gurgaon.

(1505) Amritsar.

(1978) Lahore.

(2292) Kashmir.

Fruit about the size of a nutmeg, containing strong smelling seeds. A warm and dry remedy; used in cholic, and as an application to swellings. The fruit is said to destroy fish, and also to act as a powerful emetic and intoxicating agent; but this is doubtful.

Dose.—1 māsha. Price, 2 annas a seer.

1307. Gardenia sp———. Vern.—Hab-il-ās. (1914) Lahore.

(2237) Dera Ghāzi Khān.

The berries of this plant are sometimes confounded with the fruit of the juniper, properly called "hauber," which they resemble in appearance, but are longer and narrower, and show above the 5 sepals of the superior calyx, instead of the 3 or 4 bracts prescribed by the true juniper berries. It is said to be cathartic and anthelmintic.

DIPSACACEÆ.

1308. Morina Wallichiana? Vern.—Bekh ahmar.

(2398) Kashmir.

VALERIANACEÆ.

1309. Nardostachys jatamansi. Vern.—Bālbhīr; jatāmāsi; samb-ul tib.

(697) Gurgaon.

(1063) Delhi.

(1272) Jalandhar.

(1342) Hushyarpur.

(1897) Lahore.

(2396-2462) Kashmir.

A warm remedy, acting as a stimulant perfume. The spikenard probably of the ancients. Used to scent and clean the hair; also in medicine as a stimulant and antispasmodic. Employed in jaundice, affection of the throat, and as an antidote for poisons; and it appears to be very valuable in hysteria and epilepsy, dyspepsia, cholic, and delirium tremens.

1310. Valeriana Wallichiana. Vern.—Dālā; wālā; † bālā; char; bālā mushk; char godar; also probably tagir or takar.

† I doubt whether those names are both correct: one is more likely to be a mistake arising from the similarity of the Persian letters "w" and "d."

* *Ferula orientalis* of some writers.



(1842) Hushyarpur.

(2012-2046) Lahore.

Kashmir.

An aromatic stimulant and antispasmodic : useful in hysteria, epilepsy, hypochondriasis ; and, occasionally, intermittent fever.

Dose.—15 to 30 grains.

Asarun is said to be also a name for "takar," and there is no doubt that the specimens called "asarun" were really the same as "wala."

(1002) Delhi (tagar).

(1997) Lahore (asarun).

(2401) Kashmir.

It is considered by natives hot and moist, and to be useful in epilepsy, delirium, affections of the eyes, and to act as an antidote for poisons.

Dose.—2 māsas. Price, 6 annas a seer.

COMPOSITEÆ.

1311. *Lactuca sativa*. *Vern.*—Kahū; khas ká bij (??)

(639) Gurgaon.

(1023) Delhi.

(1152) Ambalah.

(1165) Ludhiana.

(1292) Jalandhar.

(1451) Amritsar.

(1907) Lahore.

(2442) Kashmir.

Pattiala.

Dose.—6 māsas. Price, 5 annas a seer.

Very cold remedy. It is used by natives as a demulcent only. By Europeans it is employed occasionally as an anodyne, similar to opium, but much weaker; also acts as a purgative and antispasmodic, and is said to be anti-aphrodisiac. Its juice contains a crystalline substance, lactucérine. In European practice it is used as an anodyne in phthisis, rheumatism, and gout—the inspissated juice is an anodyne and diaphoretic and diuretic in dropsy, rheumatism and hooping cough.

Dose.—Grains 8 to 30.

1312. *Cichorium intybus*.—Chicory or succory. *Vern.*—Kasni.

FRUITS.

(640) Gurgaon.

(1055) Delhi.

(1157) Ambalah.

(1167) Dera Ghazi Khan.

(1260) Jalandhar.

(1337) Hushyarpur.

(1414) Amritsar.

(1596) Gurdaspur.

(1905) Lahore.

(2175) Rawalpindi.

(2195) Gújrat.

(2218) Jhām.

(2233) Muzaffargarh.

(2257) Dera Ghazi Khan.

(2446) Kashmir.

(2497) Jhind.

Root.—Bekh kásui.

(1490) Amritsar.

(1270) Jalandhar.

(1706) Lahore.

(2404) Kashmir.

The fruit is a cold remedy ; used for fever and headache, also for jaundice. It is said to act as a purgative and cholagogue.

Dose.—6 māsas. Price, 3 annas a seer.

The root is used as a tonic and demulcent in fever and dyspepsia, and is largely used to adulterate coffee in England.

Dose.—6 māsas. Price, 2 annas a seer.

1313. *Sonchus oleraceus*. *Vern.*—Bhangra ; kálá bhángra ; dughdika ; sahadevi bari (H.) ; jangli tamaku (?).

(1955-2065-2164-1991) Lahore.

Similar to *Lactuca* in its properties.

1314. *Senecio* P *Vern.*—Sadbagh, or sadbarg.

(2305) Kashmir.

Used in coughs and asthma.

1315. *Centaurea behmen*. *Vern.*—Bahman surkh or lál ; bāhman safaid.

(1901) Lahore.

A root which comes from Kábul ; useful in special diseases. A bitter tonic and purgative ; used in special diseases and as a substitute for "rhubarb." Used by hakims as aromatic and aphrodisiac. The red kind, "bāhman lál," is said by some to be the root of the *Salvia hamatoides*.

Dose.—6 māsas. Price, 4 annas a seer.

1316. *Carthamus tinctoria*. Safflower. *Vern.*—Kusumbha ; kúsam ; má'sufir.

SEEDS. Hab-ul-kurtum (Arab.) ; poliyan ; hab-ul-zulm.

(1262) Jalandhar.

Amritsar.

(1899) Lahore.

Delhi.

(1175) Ludhiana.

(2273) Dera Ghazi Khan.

(2469) Kashmir.

The fixed oil is useful in rheumatic affections and in paralysis. The seeds are laxative, and the dried flowers are said to cure jaundice. The petals contain a peculiar acid carthamic acid, which, when mixed with powdered talc forms rouge ; and with carbonate of soda,

card rouge, which is colorless till applied to the skin. The petals are used as a rose-colored dye and to adulterate saffron. The seeds are used in diseases of the bladder and gravel, on account of the doctrine of signatures; also said to be aperient and emetic; They yield a clear and useful oil.

Dose.—6 māshas. Price, 4 annas a seer.

1317.—*Carthamus oxyacantha*. Vern.—Karar; poliyān.
(1908) Lahore.

1318. *Carduus nutans*. Vern.—Gul-i-bā-dāwurd.
(2319) Kashmir.
Used to purify the blood.

1319. *Aucklandia costus*. Vern.—Kut; kust-talkh.
(1082) Delhi.
(1329) Jālandhar.
(1503) Ambāllah.
(767) Amritsar.

A bitter aromatic tonic used in fever; formerly used in Europe, but not at present, called "putchuk" root; the roots have a pleasant smell, and are used as perfumes.

I here take occasion to extract from the proceedings of the Agri.-Hort. Society, a report from Dr. JOHNSTONE of Gújrat, respecting "kut," &c. :—

"Pachak root is brought from Lahore, where it is called 'kut.' It is of unknown origin. It is chiefly exported to China, where it is used as an incense." Bengal Dispensatory, page 692.

"*Iris Florentina* yields orrice root. It finds its way to India, where it is called 'bekh-banafsha'—violet root—costus of the ancients,—'kut' and 'pachak' of the natives, is often called orrice root in North West India." ROYLE'S Manual, page 618.

"'Bekh-banafsha' and 'pachak' root are imported from Kashmir." HONIGBERGER'S Thirty-five years in the East, page 292.

"The *Costus arabicus* of the ancients has almost sunk into oblivion, possibly owing to the uncertainty of its origin and ignorance of its virtues. When in Kashmir, last year, I endeavored to trace it, and after toiling up many a rugged mountain pathway, was rewarded: but the root-stock alone existed buried in snow which clothed its habitat so late as June. Leaving the valley, I directed two intelligent servants, one on the Indus, the other on the Punjab side of Kashmir, to wait until it had bloomed and was seeding. Owing to the unusual severity of the season, a good collection of plants was not obtained until the end of September. Eight of those were carefully removed, imbedded in their natural soil, and safely landed at Gújrat on 28th ultimo, when I replanted them.

"The costus is the 'kut' of the Kashmiris, the 'pachak' of Hindústán."

From the above quotations it will be observed that the "kut" is recorded as of unknown origin in the Bengal Dispensatory. In Mr. DAVIS' report on the Trade and Resources of North West India in the last Appendix, the "kut" is recorded as *Aucklandia veracosta*.

DR. ROYLE leads one to infer that "kut" and "pachak" are identical with orrice root. DR. HONIGBERGER notifies "bekh banafsha" and "pachak" root as separate exports from the Kashmir valley. I find that "kut" in DR. JAMESON'S report on the Botanical Gardens of the North West Provinces, 1865, figures as the *Aucklandia veracosta*, with a reference to Endl. Gen. plant: p. 468, which I have no opportunity of consulting. DR. ROYLE in the introduction to his large work, questions on MOORECROFT'S authority, if the *Aucklandia* is the veritable "kut."

The *Iris Florentina*, which yields orrice root, is entirely distinct from the Kashmir variety, which luxuriates over every grave, and blooms on many a housetop in the far-famed valley, a custom by the way resembling that of the ancient Greeks, who venerated the *Iris* as the messenger between God and Man. The white, blue, and yellow flowers cover the brow of the dancing girls as they did the Hebrew choristers in ancient Egypt.

I cannot endorse the statement that "Bekh-banafsha" is the orrice root, much less that "kut" and "pachak" are often called orrice root. It may be so in Calcutta, it is not so in Kashmir, or the Punjab, and any where it is a misnomer. "Bekh-banafsha" is the root of the *Viola repens*, generally prescribed by the Kashmir hakims as an emetic. The rhizome of the fleur-de-lis is retailed by the pansáris as *Kutta ka bij*, the (Warch) root of *Acorus calamus*, as a spurious "kut." MIR MUHAMAD HUSSEIN, in his *Materia Medica*, p. 494, mentions *kut*, *talkh* and *shirin*, the former the young, the latter the old, root. It is just the opposite.

The "kut" is not found in the Kashmir valley, but on the Southern slopes of the surrounding mountains, at a minimum elevation of about 7,000 feet above the sea, and where snow lies during the winter.

As the snow melts in the end of March, the root stock appears, its caudal leaves develop in the beginning of June, and it comes to full fruition in September. It belongs to the *Cynaracephala*, a suborder of the *Asteraceae* (*Compositae*), is a perennial, leaves and stems dying yearly to root stock, the exstipulate caudal leaves rise in threes, the two lateral spathing the centre, the centre sheathing the stem as it shoots above ground.

The stem, two or three of which may arise from

root stock, stands in adult growth 40 inches, is fluted, lined internally with pith, and sheathed with exstipulate tristichous leaves.

The root stock varies in size from 9 to 15 inches in length, and from 3 to 21 inches in thickness, the caudal leaves spring straight from root-stock, and are supported on petioles 18 inches long, the leaves are simple abcordate 8 by 5 inches in adult growth strongly veined, and resemble that of the "kashī phal," or "Benares kadā."

The official part of the "kut" is the root stock. It is used by the Kashmir hakims.

1. Dried and powdered as the principal ingredient in an astringent stimulant ointment applied to severe ulcerations.

2. Dried and powdered as a hair-wash.

3. As a stimulant in cholera, an infusion is made of

Cardomoms, 1 drachm	} one ounce every half hour.
Fresh "kut," 3 "	
Water, 4 ounces	

It is doubtless a powerful aromatic stimulant, and would be serviceable in any spasmodic disease.

4. It is universally employed by the shawl merchants, as a mechanical (?) protector of Kashmir fabrics from the attacks of moth and other vermin.

5. The dried root is an agreeable fumigatory, and yields excellent pastilles which burn fairly.

6. It is exported, in enormous quantities, to China, where it is used as an incense. Lines of camels may often be met passing down to Máltán, the "kut" perfuming the air for a considerable distance; in every Hong it is found; no mandarin will give an audience until the "pachak" incense smokes before him; in every joss-house it smoulders before the Tri-Budh Deity, in every floating junk in the Chinese rivers, the only home of countless hordes, Budh's image is found, and the smoke of the "pachak" religiously wends its way heavenward; with the bulk of the Chinese, this ceremony is regarded as sufficient to propitiate the Gods, while their merchants by substituting a spurious pungent article, endeavor even to mephitise their blurred and frozzy deity.

7. It is a crown monopoly, each village in the vicinity of the "kut" fields is assessed a fixed amount yearly, which must be delivered in the capital; the MAHARAJAH's agents buy up the surplus at one maund per *chilki* rupee, and retail it at double rate.

1320. Gnaphalium sp——. *Vern.*—Bál raksha (H.)

(2057) Lahore.

Flowers said to be astringent and diaphoretic.

1321. Doronicum scorpioides? *Vern.*

—Daránaj-'akrabí.

(1481) Amritsar.

(1902) Lahore.

Used in special diseases. The roots are aromatic tonics, and are said to be used to prevent giddiness on ascending heights.

Dose.—3 máshas. Price, 6 rupees a seer.

1322. Vernonia cinerea. *Vern.*—Kák jangi; sahádevi barí (H.)

(2082-2164) Lahore.

Said to be a powerful anthelmintic. All the parts of the plant are very bitter: used as a diaphoretic in fever. AINSLIE.

1323. Microlonchus divaricata. *Vern.*—Birandandí; rathinandí; barhamdí?

(656) Gurgaon.

(1854-1977) Lahore.

Considered by natives hot and dry. Used in special diseases. Used to purify the blood.

Dose.—6 máshas. Price, 4 rupees a seer.

1324. Carpesium. *Vern.*—Hukm andáz. (2468) Kashmir.

1325. Matricaria chamomilla. *Vern.*—Bábúnah.

(1075) Delhi.

(1186-1190) Ludhiana.

(1293) Jalandhar.

(1548-1429-1572) Amritsar.

(1911) Lahore.

(2189) Gújrat.

(2271) Dera Gházi Khan.

(2324-2415) Kashmir.

Jhílám.

Pattiala.

It contains a volatile oil and bitter principle. Used by hakims in affections of the brain, inflammation, swellings, and pains. Used both externally and internally in fever, as a tonic and febrifuge. Might be used as a substitute for (*Anthemis*) chamomile flowers, in dyspepsia, flatulency and intermittents as an aromatic tonic and carminative. It was formerly used for chinchona.

Dose.—3 máshas. Price, 1 rupee a seer.

1326. Spilanthus oleracea? *Vern.*—'Akarkará; pokarmál.

(1054) Delhi.

(2005-2006) Lahore.

(1526) Amritsar.

Considered by natives a powerful stimulant and sialogogue: useful in headache, paralysis of the tongue, affections of the gums and throat, and for tooth-ache; also in fever, coughs, and special diseases. It is used as a substitute for the Pellitory of Spain, *Pyrethrum* root, which increases the secretion of saliva, by its local irritant action, and is principally used by Europeans in toothache and paralysis of the muscles of the mouth.

Dose.—6 máshas. Price, 1½ rupee a seer.

1327. *Artemisia indica*. Wormwood.
Vern.—Afsantīn; mastārū (H.)

(1478) Amritsar.
 (1910) Lahore.
 (2338-2378) Kashmir.

It contains volatile oil and bitter extractive matter. Used as a tonic in fever and debility; also to flavor spirits and essences.

Dose.—8 māshas.

Also used as an antispasmodic in hysteria. A valuable bitter tonic. Might be used as a substitute for chinchona, although inferior in intermittent fevers; also employed in dyspepsia and as an anthelmintic, and in liver diseases.

Dose.—Grains 20 to 40.

1328. *Artemisia scoparius*. *Vern.*—
 Churi saroch.

(2613) Lahore.

The flower spike when dry has a pleasant smell. Used for purifying the blood, and in indigestion.

Price, 2 annas a seer.

1329. *Artemisia elegans*. *Vern.*—Dandī
 or danti.

(2071) Lahore.

All the different species of *Artemisia* are aromatic bitter tonics, and most of them have anthelmintic properties; they contain an essential oil, a bitter principle called absinthine, and a peculiar acid.

They are principally used in intermittent fever, for intestinal worms, and in dyspepsia; also in epilepsy and chorea.

Dose.—1 to 2 drachms of the powder.

1330. *Sphoceranthus mollis*. *Vern.*—
 Māndī; mundi bātī; guruk mundi; zakhm haiyāt.

(652) Gurgaon.
 (1134) Hissar.
 (1404) Amritsar.
 (1588) Gurdaspūr.
 (1944) Lahore.
 (2284) Kashmir.
 (1410) Amritsar (herb, zakhm hyāt).

Considered a warm remedy: used in special diseases. Flowers used in skin diseases, and for purifying the blood. The roots are considered anthelmintic.

Dose.—6 māshas. Price, 12 annas a seer.

1331. *Myriogyne minuta*. *Vern.*—Nak-
 chiknī.

(694) Gurgaon.
 (1229) Jalandhar.
 (1438) Amritsar.
 (1803-1861) Lahore.
 (2358) Kashmir.

Considered by natives hot and dry: useful in paralysis, pains in joints, and special diseases; also as a

vermifuge. It promotes sneezing, hence its vernacular name.

1332. *Serratula anthelmintica*. Blue
 flea bane. *Vern.*—Kālī zīrī (or kālā zīra); bukoki??
 kakshama (S.); malwa bakchī (H.)

(647) Gurgaon.
 (1058) Delhi.
 (1149) Ambālah.
 (1501) Amritsar.
 (1568) Gurdaspūr.
 (1361) Hushyarpūr.
 (1192) Simla.
 (1182) Ludhiana.
 (2082) Lahore.
 (2217) Jhilam.
 (2312) Kashmir.
 Pattiala.

(See Carum).

A cold remedy. Used by natives for fever and skin diseases, and against worms. Acts as a bitter tonic and anthelmintic; and is recommended by MR. MIXAS in the treatment of skin disease, especially in porrigo and lepra. Considered a very valuable remedy for prolonging life, and restoring youth; also to prevent the hair turning gray: it is vermifuge, cures boils and eruptions of the skin; and also special diseases. It is said that fleas disappear if this plant is roasted in the room, or its powder strewed on the floor.

Dose.—6 māshas. Price, 2 annas a seer.

1333. *Chrysanthemum indicum*. *Vern.*—
 Gul dādi or dādi. (David's flower).

(1909) Lahore.

Considered by natives hot and dry: useful in affection of the brain and calculus, also to remove depression of spirits.

1334. *Xanthium strumarium*. *Vern.*—
 Gokru? khagarwal?

(1869-2076) Lahore.

Root acts as a bitter tonic, and is said to be useful in cancer and strimous diseases.

1335. *Bertholetia lanceolata*. *Vern.*—
 Rai sanā.
 (1015A) Delhi.

1336. *Tagetes erecta*. *Vern.*—Sadbargī.
 (1832) Lahore.
 (2334) Kashmir.

Used in diseases of the eye, and to purify the blood; the flowers are sometimes used to dye yellow.

1337. *Eclipta erecta*. *Vern.*—Bhangra;
 dodak; nigand; bamārī (?)

(1956-1962) Lahore.
 (1461) Amritsar.
 Simla.



Juice used to dye hair black; also in elephantiasis. It is considered by natives hot and dry. It is said to cure leprosy if dug up on the first day of the week, and dried in the shade; and also if eaten for six months, that it turns the hair black, especially if applied externally.

COROLLIFLORÆ.

ERICACEÆ.

1338. *Rhododendron campanulatum*.

Vern.—Kashmiri patr; talis patr; nikú (Kashmiri).
(1780-1694) Lahore.
(2360) Kashmir.

The leaves are said to be narcotic, and to intoxicate animals that eat them; and they are used as an errhine in headaches and severe colds. It is said to be useful in chronic rheumatism, syphilis, and sciatica.

Dose.—1 rati. Price, 4 annas a seer.

1339. *Pencea sarcocolla*. *Vern.*—Anjarát.

EBENACEÆ.

1340. *Diospyros cordifolia*. *Vern.*—

Banténdu.

(1333) Jalandhar.

A valuable astringent and styptic for fresh wounds; also occasionally in intermittent fever. The fruits furnish a kind of glue, used to cover the bottom of boats. The seeds yield oil.

STYRACACEÆ.

1341. *Symplocos cratægoides*. *Vern.*

—Lodar, patháni sarhá (?)

(1523) Amritsar.

(1839) Lahore.

Leaves said to be astringent.

1342. *Styrax benzoin*. *Vern.*—Lábán.

(1039A) Delhi.

In masses composed of white lumps—joined together by a brownish red substance. It has an agreeable odour and taste. It contains a resin mixed with a considerable quantity of benzoic acid, which may be prepared from this drug, either by boiling it with a solution of carbonate of soda, and precipitating it by hydrochloric acid, or simply by subliming it in a vessel divided by blotting paper placed transversely across the middle. A very useful stimulant, expectorant, and diuretic. It is principally used in chronic bronchitis and laryngitis; also in jaundice and disease of the bladder. The vapour of it when burning is said to be useful as a local application in hemorrhoids; also as a cleansing agent for the hair.

Dose.—Grains 10 to 30.

OLEACEÆ.

1343. *Olea ferruginea*. *Vern.*—Kahu or káu; zaitún.

(1849) Lahore.

Leaves and bark bitter and astringent; used as an antiperiodic in fever and debility. Fruit contains a little oil.

1344. *Fraxinus floribundus*. (Manna).

Vern.—Sherkhist; shaklá.

(1031) Delhi.

(1982) Lahore.

(2260) Dera Gházi Khán.

The purest kind of Indian manna. It occurs in small reddish white pieces. It is used as a demulcent and laxative in fevers, pulmonary affections, cholera and vomiting.

JASMINEACEÆ.

1345. *Jasminum grandiflorum*.

FLOWERS.—Chambeli, chamba, jati.

(1552) Amritsar.

(1874) Lahore.

(2357) Kashmir.

Considered by natives a bitter and cool remedy; employed as a perfume; also as an application to wounds, ulcers, boils and eruptions of the skin; also in headache, and to cure disordered eyesight. The leaves are said to cure toothache and pain in the eyes, and the juice of the root to relieve suppression of urine. It acts as an aromatic stimulant, and might be used as a substitute for *Sambucus*, elder flowers.

1346. *Jasminum revolutum*. *Vern.*—

Malto; pitmalti (Hindi).

(2137-2103) Lahore.

It contains an essential oil of an aromatic flavor, and is used as a perfume. The root is said to be useful in ringworm.

1347. *Jasminum zambac*. *Vern.*—Motýá.

(994) Delhi.

(1552) Amritsar.

(1873) Lahore.

Considered by natives cool and sweet; used as a remedy in cases of insanity; in weakness of sight, and affections of the mouth. The flowers are considered sacred by Hindús; and are employed as a perfume, as they contain an aromatic essential oil.

1348. *Nyctanthes arbortristis*. *Vern.*

—Harsinghár; sítal; dúdhiká (H.); hadhjórá.

(1005) Delhi.

(1875-2135) Lahore.

Pattiala.

Used as a dye and perfume. Considered by natives

cool and light, and used in ringworm, and to reunite broken bones, hence one of its native names, "had-jora." It is also employed in disorders of the wind, mucus, and bile; and in special affections. It is very aromatic, and contains essential oil. It also would form a substitute for *Sambucus*.

EHRETIACEÆ.

1349. *Heliotropium brevifolium*.

Vern.—Chifti mirák (Deraját); chittiphúl.

(2238) Dera Gházi Khán.

(2014) Lahore.

The herb is said to be laxative, and diuretic: the seeds are emmenagogue. The juice of the leaves is considered warm and bitter. It is used by natives as an application to gumboils and in ophthalmia, especially of the tarsus; also to clear wounds and ulcers. It is said to relieve the pain caused by the sting of a scorpion.

LOGANIACEÆ.

1350. *Strychnos nuxvomica*. *Vern.*—

Káchila; hub-ul-jaráb; kágphala? (said to be called azráki in Persian, and falús máhi and khának-ul-kalb in Arabic).

(1043) Delhi.

(1290) Jálándhar.

(1844) Lahore.

The seeds are disk-shaped, circular, hard and thorny, of a gray color, covered by a silky down, composed of thickset simple hairs, containing a large bilobed albumen, and a small embryo with distinctly veined cotyledons. It contains two powerfully poisonous alkaloids, strychnine and brucine, and an acid. It acts as a powerful excitor of the spinal chord, and as a tonic. By Europeans it is principally used in paralysis and neuralgia; also in muscular tremors and incontinence of urine. It is occasionally used in dyspepsia, diarrhoea and dysentery, and with purgatives in constipation; likewise in fever instead of quinine, and to check vomiting. By natives it is considered hot, that it strengthens the system, and turns white hair to black. It is used externally to rub paralysed parts. Internally it is employed in paralysis, vomiting, cholera and dropsies.

Dose.—1 to 3 grains.

1351. *Strychnos faba* S. Ignatii. *Vern.*

—Papíta.

(1000) Delhi.

(1843) Lahore.

Seeds of a reddish brown color, about the size of almonds. It contains strychnine and a little brucine.

It has only lately been used in India, but is employed as a tonic in cholera, ague, and as a vermifuge; also in vomiting, pain in the stomach, and diarrhoea, but it is said to be most useful as an antidote to the bites of serpents and to narcotic poisons, even when the patient is insensible. It is also worn as an amulet to prevent scurvy. In European medicine it is used instead of *Nuxvomica* but in a smaller dose, as it contains three times the proportion of strychnine. It is especially useful in dyspepsia and cholera.

1352. *Strychnos potatorum*. *Vern.*—

Nirmali.

(1842) Lahore.

Used to purify water by rubbing the cut seed on a rough earthen vessel, so that the expressed juice mixes with the water, on allowing the water to stand most of the impurities in suspension subside. In this process the gelatinous matter of the seed at first mixes with the water, but afterwards combines with the lime salts, and both become insoluble, and are precipitated, carrying with them the matters held in suspension. It is said that almonds used in a similar way will also clear water. It is considered by natives a cool and dry remedy, useful in dysentery, snake bites, and to strengthen the eyesight; also in special diseases. It is said not to be at all poisonous, but that the young fruit acts as an emetic.

APOCYNACEÆ.

1353. *Nerium odorum*. Oleander. *Vern.*

—Kaner; gandara; karber; shwet kaner (H.), (white variety); rakt kaner or karbir (red kind).

(1841) Lahore (leaves and roots).

(1832) Jálándhar (gandara).

(2119) Lahore (white).

(2081) Lahore (red).

(2129) Lahore (leaves).

The roots contain a yellow poisonous resin, tannic acid, wax and sugar, but no alkaloid or volatile poison. The bark and flowers contain the same poisonous resin which is most abundant in the liber or inner bark; it is very soluble in carbonate of soda, and though not volatile is carried over mechanically when the plant is distilled with water.

It is considered by the natives hot and poisonous; it is used in leprosy, eruptions of the skin and boils; also to remove worms.

1354. *Cerbera manghas*. *Vern.*—Pili

karbir; kaner zard.

(2136) Lahore.

The leaves and the bark act as purgatives, and resemble senna; and the milky sap is also purgative. The seeds are said to be powerfully narcotic and poi-



noxious, producing delirium, and resembling datura. (AINSLIE).*

1355. Wrightea antidysenterica. Connessi bark. Vern.—Indarjan shirín; andusarín (of Yunáni writers); lisán-ul-ásafir (Ar.); tiwaj (?)

(650) Gurgaon.

(1213) Simla.

(1840) Lahore.

(2381) Kashmir.

Pattiala.

Said by natives to be hot bitter and astringent; used in fever, dysentery, and debility; also in piles, and as an anthelmintic for tape-worm.

Dose.—3 máshas. Price, 8 annas a seer.

1356. Holarrhena antidysenterica. Tellichery bark. Vern.—Indarjan talkh.

(1321) Jalandhar.

A broader seed than the former. Said to resemble the "indarjan shirín" in its action. It acts as a bitter vermifuge and antispasmodic, and is used in dysentery, cholera, and tape-worm; also externally to rub over rheumatic joints.

1357. Carissa diffusa. Vern.—Mardak.

(2917) Lahore.

1358. Rhazia stricta. Vern.—Sanwár.

(2362) Dera Gházi Khán.

I found this growing all over the hill sides at Attock, where it was called "ganira."

1359. Ophioxylon. Vern.—Chándrikí-ká-jar.

(2017-2019) Lahore.

The root is said to be a bitter tonic and febrifuge and also purgative. It is especially used by natives in cases of poisoned wounds from serpents and scorpions; also in fever, and to promote delivery in tedious labors.

ASCLEPIADACEÆ.

1360. Calotropis procera. Vern.—Akh (Pji); ák (Hind.); akund, ark? (H.); madár; kabár ki jar (the root); taghár (the manna).

(1113-1014A) Delhi.

(1265) Jalandhar.

(1189) Ludhiana.

(1157-1858) Lahore.

(1859) Lahore (flowers, gul madár).

(1951) Lahore (kabar ki jar, or bekh kibr (root)).

The root bark is said to be diaphoretic and expectorant; also a purgative and emetic. It is used in European medicine to replace ipecacuanha, both as an emetic and for the cure of dysentery—twice the dose

being given. It is also employed advantageously as a substitute for sarsaparilla in syphilis. By natives it is used in the treatment of leprosy, skin diseases and coughs; also in diseases of the liver and secondary syphilis. The fresh juice is employed as a rubefacient in rheumatism and chest disease, and the leaves are used for the cure of guinea worm.

1361. Manna from Calotropis. Vern.—Shakar taghár.

(1092) Delhi.

(1983) Lahore.

(2514) Amritsar.

Said to be the nest of an insect.

1362. Hemidesmus indicus. Indian sarsaparilla. Vern.—Anant mál.

(1860) Lahore.

It contains a volatile crystalline acid principle, called hemidesmic acid. It is extensively used in European practice as an alterative tonic and diuretic, especially as a substitute for sarsaparilla, which some consider it to exceed in efficacy. It is principally used in syphilis and skin disease, and in affections of the liver. It is not often employed by natives.

1363. Asclepias curassavica. Vern.—Káktundi.

(2090) Lahore.

Root acts as an emetic, but is less powerful than ipecacuanha; also as a purgative, and subsequently astringent. It is used in cases of piles and gonorrhœa; and is said to be so useful in the treatment of dysentery in Jamaica, as to be called "blood flower," there. (AINSLIE).

1364. Pentatropis sp——. Vern.—Ark pushp (Hindi).

(2056) Lahore.

GENTIANACEÆ.

1365. Ophelia chireta. Chiretta. (Agathotes chiretta). Vern.—Chiraita; hab-ul-mál; dawai-i-pechish.

(1135) Sirsa.

(1281) Jalandhar.

(1393) Amritsar.

(1004) Delhi.

(1360) Hushyarpúr.

(1522) Amritsar (called kiraita).

(1847) Lahore.

(2366-2847) Kashmir.

It contains a yellow bitter principle and a resin. It acts as a simple bitter tonic, not aromatic nor astringent; it is the best substitute for gentian and quassia. It is principally used by Europeans in fever, debility and dyspepsia. By natives it is con-

I believe *Alhamanda cathartica* is also called "zard kaner," and is occasionally used in native medicine.

sidered cool and dry, and is used in fever and skin diseases; also to purify the blood and in cough.

Various other plants are often mixed with it, and some of these contain tannic acid, and therefore precipitate salts of iron black.

The root is the bitterest part of the plant, and the bitter principle is easily imparted to water or alcohol. According to MR. BATTLE'S analysis of its chemical properties, "It contains a free acid, a bitter resinous extractive with much gum, and chlorates, with sulphates of potass and lime. No alcaloid has been detected in it; what is therefore sold as a sulphate of chiraytine is well known to be only the disulphate of quinia." It is best recommended in preparation as an infusion or watery extract, or a tincture, but not in decoction; even infusion made with warm water is denounced as producing violent headache. To form a cold infusion, a pint of water should not stand more than twenty minutes on half an ounce of the bruised plant. "Chirayta possesses the general properties of bitter tonics, but has at the same time some peculiar to itself, which fit it well for certain forms and complications of disease. Unlike most other tonics, it does not constipate the bowels, but tends to produce a regular action of the alimentary canal, even in those subject to habitual constipation. During its use the bile becomes more abundant and healthy in character. The tendency to excess of acidity in the stomach, with disengagement of flatus, is much restrained by its use. These qualities fit it in a most peculiar degree for the kind of indigestion which occurs in gouty persons. It may, when necessary, be associated with alkaline preparations or with acids; the latter are generally preferable. The same remark applies to its employment in the treatment of scrofula. As a remedy against the languor and debility which affect many persons in summer and autumn, nothing is equal to the cold infusion of this plant. It may be taken twice or even more frequently daily, for a considerable time; then discontinued, and afterwards resumed. Children take it more readily than most other bitters. It is found to be a very efficacious remedy in India against intermittents, particularly when associated with *Guilandina bonduo* or Caranga nuts. The debility which is apt to end in dropsy is often speedily removed by infusion of chirayta, to which is added the tincture formed of it with orange-peel and cardamoms. Its efficacy in worm-cases has procured for it the name of worm-seed plant. The extract is given with great benefit in some forms of diarrhoea and dysentery, particularly if combined with ipecacuanha, the emetic tendency of which it very markedly controls."

Dose.—6 māshas. Price, 8 annas a seer.

1366. *Picrorhiza kurrooa*. *Vern.*—Karwā; kaur; pathānbed; kāli kutki.

(1138) Sirsa.

(1208) Simla (DR. CLEGHORN).

(1506) Amritsar.

(2038) Lahore.

(2316-2426) Kashmir.

(1127) Delhi.

Considered a dry warm remedy, removing fever, gravel, and special diseases.

The term "kāli kutki" is stated in many books to denote black hellebore (*Helleborus niger*), an acrid purgative and poison; but others say that it does not really act as a purgative, and all the specimens sent to the Exhibition were evidently precisely the same as the specimens of "karwā."

Dose.—6 māshas.

1367. *Gentiana* sp.—*Vern.*—Jintyanā.

ROOT.—Pakanbed or pathānbed; dawai-i-ātshak.

FLOWERS.—Gul-i-ghāfish.

(1846-1848) Lahore.

(2283) Kashmir.

Used in fevers and rheumatism; also for diarrhoea and dysentery, and to purify the blood. It acts as a substitute for gentian, which is a pure better tonic; used in fevers, debility and dyspepsia.

Dose.—6 māshas. Price, 8 annas a seer.

SOLANACEÆ.

1368. *Solanum indicum*. *Vern.*—Kand-yāri.

(1855) Lahore.

(1459) Amritsar.

(1006A) Delhi (bhat khatai).—See *S. xanthocarpum*.

The powder is applied to the head in headache.

1369. *Solanum tuberosum*. *Potatoe.* *Vern.*—Alū.

(1973) Delhi.

(2372) Kashmir.

A useful esculent, contains a large amount of starch, and when dried it is used as a substitute for salep.

1370. *Withania coagulans*. *Vern.*—Panir.

(2229) Muzaffargarh.

Said to be useful to coagulate milk.

Price, 14 seers per 1 rupee.

1371. *Solanum nigrum*. *Vern.*—Mako; 'anb-us-sā'lap, i. e., fox's grapes (Arabic); pilak; kākhnāchi.

(1238) Jālandhar.

(1424) Amritsar.

(1181) Ludhiana.

(1352) Hushyarpur.

(1985) Lahore.

(1019A) Delhi.

(2255) Dera Ghāzi Khan (karbēri).

(2480) Jhind.

(1556) Gurdaspur.

(660) Gurgaon.

(2063) Lahore (kákmači).

(2306) Kashmir ('anb-us-sá'lab).

Considered by natives cool and moist : used in fever, diarrhoea, and ulcers ; also in disorders of the eye-sight, and in hydrophobia, both externally and internally. It contains a small amount of solanine in the juice of the stem and berries, but it may be eaten as food, as in France.

Dose.—6 máshas. Price, 8 annas a seer.

1372. *Solanum melongena.* Vern.—Baingañ ; bádánján (Pers.) ; buntaki (?).

(1226) Jalandhar.

(2403) Kashmir (bádánján bostáni).

(2433) Kashmir (tukm-i-bádánján ráni).

It is hot and dry : it is said to prevent sleep and produce unpleasant dreams, owing to vitiated bile. It is much used as a vegetable. Leaves are said to be narcotic : the berries have been called *Mala insana*, or mad apples.

1373. *Solanum xanthocarpum.* Vern.—Unt katára ; bhat khatai.

(1853) Lahore.

(1855) Lahore (called kandyári).

Considered to be an expectorant, and to be useful, in coughs, asthma, and consumption. AINSLIE.

1374. *Solanum gracilipes.* Vern.—Hálún ; gágra.

(2047) Lahore.

(2241) Dera Gházi Khán (gágra).

(1090) Delhi (hálún).

1375. *Solanum* sp.—*incerta.* Vern.—Rúbahárik.

(1850) Lahore.

It contains a peculiar alkaloid solanine, and acts as a diaphoretic, diuretic and alterative ; especially in skin diseases, as lepra.

1376. *Withania somnifera.* Vern.—Ásgand nágori ; isgand ; ashwa gandha (Sanskrit).

(1013) Delhi.

(669) Gurgaon.

(1521) Amritsar.

The leaves are bitter and narcotic, and are used in fever. The leaves as used as an application to carbuncles.

(1989) Lahore (asgand).

(2067) Lahore (vaman viréchan or daman, &c. (?)) (Hindi medicine).

Root used as a diuretic and deobstruent, and also a narcotic. A long white root. When in perfection it is said to smell like a horse, whence the name (ashwa gandha). It is hot and dry, useful in special diseases

and in swellings ; it is said also to improve the complexion.

1377. *Capsicum fastigiatum.* Red pepper, common capsicum, Guinea or Chilli pepper. Vern.—Lál mirch.

(1048) Delhi.

(1318) Jalandhar.

(1396) Amritsar.

Pattiala.

A small conical orange-colored pod, shining externally ; internally containing spongy pulp, and white flat reniform seeds in two cells. It contains a volatile neutral principle, called capsicine, and acts as an acid stimulant, and externally a rubefacient. It is used in putrid sore-throat, scarlatina ; also in ordinary sore-throat, hoarseness and dyspepsia, and yellow fever ; and in diarrhoea occasionally ; also in piles.

1378. *Datura alba.* Vern.—Dhatúra safaid. (2166) Lahore (various preparations of datura).

(1222) Jalandhar.

(1946-1032A) Delhi.

(2444) Kashmir.

(947) Dera Gházi Khán.

Seldom used in medicine, but occasionally employed as a poison. Considered by natives hot and useful in fever, poison and worms ; also in itch, poisoning and nausea. Considered by Europeans a narcotic and antispasmodic ; useful in asthma and gastrodynia.

Dose.—One tola weight would prove fatal. Price, 1 rupee a seer.

1379. *Datura fastuosa.* Vern.—Dhatúra. (946) Dera Gházi Khán.

(1172) Ludhiana.

(1449) Amritsar.

(2444) Kashmir.

Used for coughs and asthma, also in special diseases ; also applied extensively for stiff neck and rheumatism. It is considered more powerful than the white variety, and is often used as a poison. It contains an alkaloid called, daturine ; and is used as a narcotic anodyne and antispasmodic, especially in cases of asthma, bronchitis and emphysema ; also in insanity, in diseases of the eye and neuralgia and in rheumatism. Used to smoke in asthma, in doses of grains 10 to 20.

Dose.—1 rati. Price, 1 rupee a seer.

1380. *Hyoscyamus nigra.* Vern.—Khurásáni ajwain ; tukhm-i-kasús.

(1112) Delhi.

(1019) Delhi (chauni jawain).

(1558) Gurdaspur.

(1851) Lahore.

(1483) Amritsar.

A warm remedy. Used like dhatúra for cough and asthma, also to relieve pain in many diseases.

The whole plant contains a peculiar alkaloid hyos-



cyamia resembling atropia. It acts as a narcotic and antispasmodic, and is used as a substitute for opium. In coughs, phthisis, disease of the heart, in delirium, in blindness and brain disease; also in neuralgia and rheumatism.

Dose.—Half a rati. Price, 5 annas a seer.

1381. *Nicotiana tabacum*. *Vern.*—Tamáku.

(1218) Jalandhar.

(2360) Kashmir.

Said to be imported from England in the time of AKBAR. Supposed to be hot and dry, to weaken the brain, and depress the spirits, but to be useful in dispersing cholic and pyrosis. It contains a liquid poisonous alkaloid nicotine and a volatile oil. It acts as a powerful sedative; and is also diuretic, purgative and emetic. It has been used in cholic, strangulated hernia, and in dislocations; also in tetany, poisoning by strychnine, and spasmodic asthma. It is occasionally used externally in skin diseases.

1382. *Nicandra indica*. Winter cherry.—*Vern.*—Káknaj.

(1012A) Delhi.

(1856) Lahore.

Said to be diuretic and purgative; useful in ulcerations of the bladder.

PETALIACEÆ.

1383. *Sesamum orientale*. *Vern.*—Til; kunjad.

(1018-1086) Delhi (black).

(1893) Lahore (mixed).

(2427) Kashmir.

(1894) Lahore (Oil cake. The residuum after exposing the oil, called "khal.")

The seeds are used as food. It is considered by natives a warm dry remedy; used both externally and internally in rheumatism and boils. The black seeds are said to be the most powerful; next the white; and afterwards the red. They yield abundance of oil, called oil of benne, which is used both in food and medicine.

Dose.—2 tolahs. Price, 1 anna a seer.

1384. *Pedaliium murex*. *Vern.*—Gokru bara; gokru dakhani.

(1221) Jalandhar.

(1578) Gurdaspur (gokru kalán).

(661) Gurgaon.

(2212) Jhilm.

(2225) Shahpur.

(1083A) Delhi.

A useful demulcent and diuretic, especially in urinary diseases; it rapidly renders water mucilaginous.

It is considered cool and tonic, and is used in special diseases, and urinary affections.

Dose.—6 máshas. Price, 8 annas a seer.

1385. *Martynia diandra*. *Vern.*—Hathajori (H.)

(2083) Lahore.

VERBENACEÆ.

1386. *Vitex trifolia*. *Vern.*—Sharobálú; ringa.

(1891) Lahore (seeds and leaves).

(2252) Dera Ghází Khán.

(1106) Delhi.

(1455) Amritsar.

Used in special diseases, and after parturition; also to produce appetite and increase the bile. Considered by the natives bitter and astringent; it improves the appetite, and is useful in boils, eruptions and leprosy. It is said to be useful as an external application for enlarged spleen; also in sprains, contusions, rheumatism, and contraction of limbs; also internally in fever and rheumatism. AINSLIE.

Dose.—8 máshas. Price, 6 annas a seer.

1387. *Vitex negundo*. *Vern.*—Nirgándi; nindi.

(2104) Lahore.

Leaves are useful in acute rheumatism, and intermittent fever and special diseases; also said to relieve headache and catarrh; also after confinement. The fruit is acid; its action is similar to that of the *Vitex trifolia*, but less powerful.

1388. *Verbena* sp——. *Vern.*—Chiraita.

(2320) Kashmir.

Said to be febrifuge; used as a rubefacient in rheumatism and diseases of the joints. The root is said to cure strumous diseases. It was considered to cure snake bites; and to be useful in many diseases. AINSLIE.

1389. *Clerodendron siphonanthus*. *Vern.*—Arnah; dawai-i-mubarak.

(1890) Lahore.

(2286) Kashmir.

Slightly bitter and astringent; yields resin. Employed in syphilitic rheumatism.

1390. *Clerodendron infortunatum*. *Vern.*—Barangi.

(2417) Lahore.

1391. *Gmelina asiatica*. *Vern.*—Badhára.

(1892) Lahore.

Used for rheumatism, pains in the loins, or special diseases.

Dose.—2 máshas. Price, 8 annas a seer.



- 1392. *Gmelina arborea*.** Vern.—Chok.
(1504) Amritsar.
(1768) Lahore.
(2121) (Lahore kākodumri, H).

A warm remedy: used for coughs and asthma; also in rheumatism and as an anthelmintic. The root is said to be demulcent and mucilaginous; useful in pains in the joints and nervous diseases.

The *Gmelina parviflora* is said to be diuretic and demulcent, warming, and to render water mucilaginous; useful in gonorrhœa.

Dose.—2 māshas.

- 1393. *Lippia nodiflora*.** Vern.—Gorukmundi.
(2124) Lahore.

SAPOTACEÆ.

- 1394. *Mimusops kanki*.** Vern.—Khirni.
(2142) Lahore.
(1270) Jālandhar (khirni ka bijj).
(1838) Lahore.

The pulp of the fruit is edible; the flowers are aromatic; and the seeds yield oil. Considered by natives hot and moist. Applied to the eyes in ophthalmia; also used internally for leprosy and worms; also in thirst and delirium, and disorders of all secretions.

Dose.—2 māshas.

- 1395. *Bassia latifolia*.** Vern.—Mahora ? māhwa; mowa.
(2355) Kashmir.

It is hot and dry: useful in disorders of mucus and wind, and to cauterize wounds. The kernel of the fruit yields a white semi-solid oil, and a spirit is distilled from its flower, the petals of which contain much sugar.

LABIATÆ.

- 1396. *Hyssopus officinalis*.** Vern.—Zūfah yābis.
(1885) Lahore.
(1467) Amritsar.

Used for coughs and asthma in infusion; also in toothache, uterine or vesical affections, and indurations of the liver or spleen. Leaves said to be stimulant, stomachic, emmenagogue and carminative; useful in hysteria and cholice; also as a poultice to bruises, especially of the eyes.

Dose.—10 māshas. Price, 10 annas a seer.

- 1397. *Nepeta ciliaris*.** Vern.—Zūfa.
(1034) Delhi.
An aromatic stimulant.

- 1398. *Prunella* sp——.** Vern.—Ustūkhū-dūs.

- (1873) Lahore.
(2335-2369) Kashmir.

Used as a warm remedy for coughs and asthma; also in brain diseases, such as epilepsy; and also in toothache, cutaneous affections, dyspepsia and bilious disorders. A stimulant aromatic, used as a substitute for spike lavender, or for true lavender.

Dose.—6 māshas. Price, 4 annas a seer.

- 1399. *Ajuga reptans*.** Vern.—Jān-i-ādam.
(2459) Kashmir.
Bitter, astringent, nearly inodorous; sometimes substituted for chinchona in the treatment of fevers.

- 1400. *Ajuga* sp——.** Vern.—Makand bābri.
(1144) Ambālah.

Said to be two kinds "nar," or masculine, with red flowers; and "māda," or feminine, with white flowers—its virtues are supposed to be manifold. It is especially useful in ague. In reality it is an aromatic tonic.

- 1401. *Mentha viridis*.** Vern.—Pādina.
(1098) Delhi.
(1241) Jālandhar.
(1374) Amritsar.
(1220A)
(1183) Ludhiana.
(1881-1882) Lahore (pādina kūhi, wild or hill mint).
(2407) Kashmir.
(2249) Dera Ghāzī Khān.
Pattiala.

It is considered hot and dry; prevents vomiting, and is used for indigestion and cholice. The cultivated plant is considered more powerful than the wild one. It contains much volatile oil. It is used in cholice and nausea, as an aromatic stimulant and carminative; also used with purgatives to prevent griping.

Dose.—6 māshas. Price, 4 rupees a seer.

- 1402. *Mentha incana*.** Vern.—Mashk tarāmusha.
(2350) Kashmir.

Used for rheumatic pains.

Dose.—6 māshas. Price, 4 annas a seer.

- 1403. *Salvia Moorcroftiana*.** Vern.—Farāsīn; tukhm-i-kanaucha.
(2451) Kashmir.
(2310) Kashmir.

- 1404. *Salvia* sp——.** Vern.—Kanaucha.
(1493) Amritsar.
(1811) Lahore.
(2451) Kashmir.

- 1405. *Ocimum sanctum*.** Vern.—Tulsi.
(1279) Jālandhar.
(1883) Lahore (bantulsi).
(1885) Lahore.

Used in fever and catarrh. It is a hot pungent remedy. Used for purifying the blood and indigestion; also in affections of the liver and leprosy. Considered by Hindús sacred to Vishnú. The leaves have a pleasant aromatic smell and taste, and are used as stomachics, and in the catarrhs of children (AINSLIE). The seeds are mucilaginous and are used in gonorrhœa.

Dose.—6 máshas.

1406. *Ocimum* sp.—*incerta*. *Vern.*—Faringh mushk.

(1888) Lahore (seed).

Used to purify the blood and in indigestion. Said also to be emmenagogue and to relieve labor pains. Aromatic and diaphoretic.

Dose.—3 máshas. Price, 2½ annas a seer.

1407. *Ocimum basilicum*. *Vern.*—Niyázbo.

(950) Dera Gházi Khán (bábrí).

(1252) Jálándhar.

(1884) Lahore.

(1183) Dera Gházi Khán (káli tulsi or niyázbo).

Not much used by natives. The seeds steeped in water swell and form a pleasant jelly: useful as a diaphoretic and demulcent in catarrh, dysentery and diarrhœa; said also to be useful in fever. The juice of the leaves is used in catarrh.

1408. *Ocimum pilosum*. *Vern.*—Raihán.

(648) Gurgaon.

(1185) Ludhiana.

(1460) Amritsar.

(1886) Lahore.

(2205) Gájrát.

(2436-2418) Kashmir.

Seeds aromatic and carminative: used in cholic, diarrhœa and hæmorrhage, especially in bowel complaints of children during dentition. Also to relieve pains after parturition.

Dose.—6 máshas. Price, 4 annas a seer.

1409. *Origanum vulgare*. *Vern.*—Marzanjosh.

(2354) Kashmir.

It contains a volatile oil, and is used as an aromatic stimulant and tonic in cholic, diarrhœa and hysteria; also as an application for chronic rheumatism and toothache; also against baldness, and in sprains and bruises. It is occasionally used as a dye, and is said to be emmenagogue.

1410. *Lallemantia royleanum*. *Vern.*—Tukhm bálangú.

(644) Gurgaon.

(1302) Jálándhar.

(1459) Amritsar.

Pattiala.

(2169) Rawalpindi.

(1879) Lahore.

A cold remedy: used principally for palpitation of the heart. Similar in action to ordinary mint.

Dose.—7 máshas. Price, 4 annas a seer.

1411. *Melissa*? or *nepeta*. Mountain balm. *Vern.*—Bililotan; baibarang katái; gandal; ban raihán.

(1880) Lahore.

(1584) Gurdaspúr.

(949) Dera Gházi Khán (gandal).

(1390) Amritsar (ban raihán).

(2337) Kashmir.

Said to have a peculiar attraction for cats. It is used in dyspepsia, flatulency and hysteria; also in fever and dysentery, and stomachic affections. A stimulant and aromatic tonic, used in affections of liver and heart; also in weakness of sight, and obstructions of mucous membrane.

1412. *Nepeta ruderalis*. *Vern.*—Bádranjboya.

(2386) Kashmir.

1413. *Onosma echioides*, and other species. *Vern.*—Ratanjot.

(1502) Amritsar.

(1598) Gurdaspúr.

(1876) Lahore.

(690) Gurgaon.

(2240) Dera Gházi Khán (yaralung, so in original list).

Applied externally with ghí to burns and piles (also given externally to purify the blood), and to cure weakness of sight.

Used principally for its coloring matter as a substitute for alkanet (*Achusa tinctoria*). Plentiful in Kangra. Used to color liquids, particularly Rowland's Maccassar oil.

Dose.—6 máshas. Price, 4 annas a seer.

1414. *Trichodesma indica*. *Vern.*—Ratnandi; ratisurkh (Kashmir); nílakrái.

(1403) Amritsar.

(2288) Kashmir.

(2362) Kashmir (nílakrái).

Used for purifying the blood; also as a diuretic and a cure for snake bites.

Dose.—6 máshas. Price, 8 annas a seer.

1415. *Onosma macrocephala*. *Vern.*—Gáo zabán; lisán-ul-ásár (Arabic).

(1067A-1067B) Delhi (flowers).

(1470) Amritsar.

(1575) Gurdaspúr.

(1903-1904) Lahore (flowers, gul gáo zabán).

(2314) Kashmir.

Its rough leaves resemble a cow's tongue, hence the



name. It is used for palpitation and faintness. Said to be useful in rheumatism and leprosy. AINSLIE.

Gáo zabán is often attributed to a species of *Cacalia* (*C. Kleinii*), a composite plant; but the flowers which accompanied two of the other specimens clearly belonged to a plant of the natural order *Boraginaceae*.

Dose.—6 máshas. Price, 8 annas a seer. Price of flowers, Rs. 2-8 a seer.

SCROPHULARIACEÆ.

1416. *Herpestes monniera*. Vern.—
Jal ním; shwet chamni (H).

(1896) Lahore.

Used for purifying the blood. The expressed juice mixed with petroleum is said to be useful in rheumatic pains. A diuretic. AINSLIE.

CONVOLVULACEÆ.

1417. *Convolvulus arvensis*. Vern.—
Harinpádi (in Hindí medicine).

(2152) Lahore.

Juice said to be purgative.

1418. *Convolvulus pentaphylla*. Vern.—
Shakarkandí.

(1015) Delhi.

(1867) Lahore.

Largely used for eating, and called sweet potatoe. Considered by natives hot, useful to strengthen the brain, and in special diseases.

1419. *Convolvulus scammonia*. Vern.—
Mahmúdah (?) sakmúníá.

Convolvulus argenteus*.** Generally given in books for "samundar sokh." See ***Salvia Plebeia.

(1108) Delhi.

(1866) Lahore.

The pure scammony comes from Bombay; but a compound is made with senna leaves, gúr, &c. Used in obstinate constipation and coughs.

Dose.—2 máshas. Price, 7 rupees a seer.

Scammony is a gum resin, contains a peculiar resin, soluble in alcohol and ether. It acts as a diuretic, purgative, and is principally used in dropsy, in affection of the brain and to remove intestinal worms; also in dropsy and constipation.

Dose.—4 to 10 grains.

1420. *Ipomœa turpethum*. Vern.—Tur-
bad; tirwi; nasút.

(1081) Delhi.

(1464) Amritsar.

(1864) Lahore.

It contains a purgative resin, resembling that of ja-

lap. Used as a purgative in indigestion, but is very uncertain.

Dose.—9 máshas. Price, 2½ rupees a seer.

Used by hakíms in paralysis, gout and leprosy; also diseases of mucous membrane. The inner part of the root is preferred. It resembles jalap in its action, but must be used in a large dose.

1421. *Pharbitis nil*, or *Ipomœa cœrulea*. Vern.—Ishpecha; káládána; hab-ul-níl.

(1448) Amritsar.

(1868) Lahore.

(2198) Gújrat.

(666) Gurgaon.

(1178) Ludhiana.

(1328) Jálándhar.

(1865) Lahore.

(1009A) Delhi.

(2410) Kashmir.

A valuable purgative: used as an efficient substitute for jalap in European and Native practice, especially in constipation, dropsy and intestinal worms; also in diseases of the brain.

Dose.—3 drachms. Price, 4 annas a seer.

1422. *Evolvulus alsinoides*. Vern.—
Shank pushp (in Hindí medicine).

(2076) Lahore.

1423. *Cuscuta reflexa*. Dodder. Vern.—
Aftimún; ákás bel; nirádhār (Gújrat list).

(1257) Jálándhar.

(1479) Amritsar.

(1561) Gurdaspór (ákásbel).

(1870) Lahore.

(2376) Kashmir.

(1888) Amritsar.

(1184) Ludhiana (ákásbel).

(1781) Lahore.

(2200) Gújrat (nirádhār).

A warm remedy; purifies the blood, and is especially used in bilious diseases. It is said to be purgative, and used externally against the itch. It is used by hakíms in debility of stomach, melancholy, hypochondria, protracted fevers, retention of wind, and induration of the liver. It is said to produce thirst.

Dose.—3 máshas. Price, 10 seers to the rupee.

ACANTHACEÆ.

1424. *Asteracantha longifolia*, *Barleria longifolia*. Vern.—Tálmakhána; phálmakhána; gokantaka (?) gokshara (H.)

(763) Amritsar.

(659) Gurgaon.

(1895) Lahore.

Fattíala.

Used in special diseases. Considered cool and

moist. It strengthens the system, and acts as an astringent as a powder. A valuable mucilaginous diuretic in urinary diseases and dropsies, and cases of gravel. **AINSLIE.**

Dose.—4 māsas. Price, 8 annas a seer.

1425. Adhatoda vasica. *Vern.*—Bānsa vāsā ; bahikat (?) H.

(940) Dera Ghāzī Khān.

(1450) Amritsar.

(1562) Gurdaspūr.

(2414) Kashmīr (bhaikar?)

(2120) Lahore.

(1852) Lahore.

Leaves are purgative : flowers and roots are bitter and aromatic, also antispasmodic, and are used in asthma and fever. The wood is used for making charcoal for gunpowder. **AINSLIE.**

1426. Utangan.

(683) Gurgaon.

The botanical name of this is not known, but the plant clearly belongs to this order of plants. It is often, but erroneously, referred to *Urtica*.

Used for debility.

PLUMBAGINACEÆ.

1427. Plumbago Europea. *Vern.*—Chit-ra ; chitah ; shītraj.

(1335) Jālandhar.

(1395) Amritsar.

(1052) Pattiala.

(1195) Simla.

(2458) Kashmīr.

(1155) Ambālah.

(1730) Lahore.

(2086) Lahore (chitra phal).

(2070) Lahore (buds, chitra pushp or māl).

Very useful as a blister, preferable to cantharides as as not affecting the urinary organs. Used by rubbing to a paste with flour : to be applied for half an hour. A powerful irritant, containing a neutral crystalline principle, plumbagine. It is principally used as a blister. Considered by natives dry and irritant ; employed to cure skin diseases and to aid digestion ; also mixed with oil to relieve rheumatism and paralysis.

PRIMULACEÆ.

1428. Anagallis cœrulea. *Vern.*—Giah surkh gul (Kashmīr ?) ; anāsu kālā bhangra.

(2343) Kashmīr.

(2379) Kashmīr (anāsu).

(1956) Lahore (kāla bhangra).

Said to be poisonous to dogs, producing inflammation of the stomach : used in epilepsy, mania, and hy-

drophobia ; also occasionally in dropsy. Formerly it was used in Europe in epilepsy, mania, hysteria, delirium, enlargement of the liver, spleen and dropsy, emaciation, stone, the plague, bites of serpents and mad animals, and numerous other diseases.

1429. Primula speciosa. *Vern.*—Bish-khapra.

(1871) Lahore.

A narcotic.

CORDIACEÆ.

1430. Cordia myxa. *Vern.*—Sapiatān ; lāsūra.

(1177) Ludhiana.

(1228) Jālandhar.

(1862) Lahore.

(2201) Gójrāt.

(693) Gurgaon.

(2226) Shahpūr.

(2347) Kashmīr.

(2248) Dera Ghāzī Khān (sapiatān).

(683) Gurgaon (ditto larger).

A demulcent fruit : is edible and laxative. The bark is a mild tonic used in fever. The leaves are useful as an application to ulcers, and in headache. Seeds are used for ringworm. The dried fruit is glutinous and expectorant, and useful in disease of the urethra. This is the Sebesten of old writers.

1431. Cordia angustifolia. *Vern.*—Gondi.

(1863) Lahore.

Bark used to make astringent gargles. Fruit eaten.

MONOCHLAMYDEÆ.

PLANTAGINACEÆ.

1432. Plantago isphagula. *Vern.*—Isa-ghól or isabghol.

(635) Gurgaon (isaf gól).

(1111) Delhi.

(1166) Ludhiana.

Jālandhar.

(1380) Amritsar.

(1942) Lahore.

(2170) Rawalpindi.

(2194) Gójrāt.

(2489) Jhīnd.

(2223) Shahpūr.

(2374) Kashmīr.

(2489) Nabha.

(2246) Dera Ghāzī Khān.

It is much used in dysentery, and also piles and

special diseases; considered by some to be a perfect panacea, and that it may be given with safety in any disease.

A native of Persia. Small oval gray seeds, which swell up with water, forming a demulcent mucilage: used in catarrh and diarrhoea, especially to sheathe the mucous membrane, and are then given whole. It acts as a useful demulcent.

Dose.—9 máshas. Price, 2 annas a seer.

1433. *Plantago amplexicaulis*. *Vern.*—Gajpipali.

(2088) Lahore.

Said to be an astringent: useful in intermittent fever, and as an application to the eyes in ophthalmia; also used against the bites of serpents, and in pulmonary complaints. AINSLIE.

1434. *Plantago major*. *Vern.*—Bártang.

(1474) Amritsar.

(1942) Lahore.

(2410) Kashmir.

Used as an astringent in dysentery, hæmoptysis, and internal bleeding; also as an application to the eyes in ophthalmia. BIRDWOOD, refers *P. psyllium*. The Yunáni synonym is "fasliyán," which looks like an adaption of *Psyllium*.

Dose.—6 máshas. Price, 5 annas a seer.

MYRSINACEÆ.

1435. *Myrsine Africana*. *Vern.*—Baibarang; baring (Arab); bimak Kábuli (?)

(1099) Delhi.

• (1315) Jalandhar.

(1512) Amritsar.

(1026A) Pattiala.

(1872) Lahore.

(2385) Kashmir.

A warm remedy, used for dysmenorrhœa. Considered hot and dry by the natives; useful in dropsy, cholera and worms, and to remove costiveness.

It is said to be a powerful vermifuge; but occasionally produces vomiting in doses of 3 or 4 drachms: it is said to be largely used in Abyssinia, and to be greatly superior to the pomegranate root leaf. "Baibarang" (or "waiwarang") is often referred in books to *Embilia ribes*.

Dose.—3 máshas. Price, 2 annas a seer.

NYCTAGINEACEÆ.

1436. *Mirabilis jalapa*. *Vern.*—Gul'ábás; a'bási.

(1168) Ludhiana.

(1767-68) Lahore.

The root is said to be equal to jalap: it is said that the root is a substitute for "chob chiní." Some

consider it purgative; others not so. It is said that the powdered seeds are applied as white paint to the face in Japan. AINSLIE.

Dose.—1 toláh. Price, 8 annas a seer.

SANTALACEÆ.

1437. *Santalum album*. *Vern.*—Chandan; ajilah (?)

(1135) Delhi (chandan).

Considered by natives to be dry and cool, a tonic and antidote to poisons, also to allay thirst and clear the complexion.

POLYGONACEÆ.

1438. *Rheum Moorcroftianum*, and other species. *Vern.*—Rewand; rewand chiní; ribás (*Arabic*.)

(2039) DR. CLEGHORN.

(967) Delhi (rewand chini) rewásh (*Pers.*)

(957) Dera Ghází Khán.

(1206) Simla.

(1320-1520) Amritsar.

(1597) Gurdaspár.

(1004A) Delhi.

(2281) Dera Ghází Khán.

(2287) Kashmir.

(5094) Pattiala.

(2039) Lahore (rewand; ribás).

(173) Kashmir.

(2038) Lahore.

1439. *Rheum palmatum*. *Vern.*—Chukri.

(1326) Jalandhar.

Used extensively by natives as a purgative and for purifying the blood; also applied to the eyes in ophthalmia; also used in indurations of the liver, salivation and palpitation.

Dose.—6 máshas. Price, 4 annas a seer.

The stalks are extensively eaten in Kábul, where it is said that all the fruits are so hot, that without this remedy the people would become insane. The* stalks were also used as a cure for insanity.

Dose.—6 máshas.

Used largely by Europeans as a stomachic and astringent in small doses, and as a purgative in larger ones, especially in dyspepsia, and strumous affections.

Rhubarb contains a peculiar acid, called chrysophanic acid; also tannic acid, resin, and much oxalate of lime. It acts as an astringent tonic and purgative, and is principally used by Europeans in diarrhoea, dyspepsia, and diseases of children.

The following extract is from a letter from the

* See Transactions A. H. S., II., 245, as to rhubarb in Kábul.

Financial Commissioner to the Secretary to Government. Published in Supplement to the "Punjab Gazette," July 1862.

"As regards rhubarb, I may mention that it grows in abundance, and I understand to a large size in Barnor, and the valley through which the Rávi and its tributaries flow before reaching Dalhousie; which vallies, I believe, DR. CLEGHORN is now about to traverse—while a smaller variety deemed by the natives to be superior in quality to the foregoing grows in the crevices of the gneiss rocks, forming the peaks above Dharmasala. This fact I have brought to the notice of DR. CLEGHORN, who will probably have procured specimens before leaving that station."

Here follow extracts from DR. CLEGHORN'S diary:—

"10th May.—Encamped at the village of Kishang, crossed 5 a. m., with CAPTAIN HOUCHE, by a short and steep ghát (summit about 13,000 feet) to the valley of Asrang, north latitude $31^{\circ} 40'$, east longitude $78^{\circ} 20'$, well known to sportsmen as the ibex ground and glacier, recorded in COLONEL MARKHAM'S book, 'Himalayan Sports,' being at the upper end of the valley, which does not appear to have been visited by scientific travellers, THOMSON and HOFFMEISTER having ascended the Werang ghát, a little to the eastward.

"Two feet of snow lay on the pass, which was not considered open, but a general thaw had commenced. After a laborious march of six hours we reached Asrang village, where the profusion of indigenous rhubarb at once attracted my attention. On both banks of the Teeti river, wherever the snow had disappeared, the old roots were throwing out fresh shoots of a delicate pink color. These protruded from crevices of rock (gneiss and mica slate), and indeed from under every solid stone and hedgerow, in such abundance, that this might be called the rhubarb valley. The common dock (*Rumex obtusifolius*) is not so conspicuous in the waste places of a highland glen as is the officinal rhubarb on the bare rocks in the valley of Asrang. It extends 5 or 6 miles down the valley, and ascends the slope to 500 feet above the river's bed; and I was assured by CAPTAIN HOUCHE and the LAMA of Asrang, that it is equally abundant in the adjoining valley of Dingering.

"We enjoyed the leaf stalks served with sugar during our stay of two days, and a load was dispatched to Chini, where the ladies pronounced the rhubarb to be crisp, juicy and well-flavored. Any quantity of the leaves being procurable, their use was only limited by the amount of sugar in store.

"The LAMA attached to the village temple stated that the leaf stalks are not eaten (to any extent), being acid, "khata," and the roots are neither used nor exported. The large cordate (?) leaves are used to shade the eyes in crossing the pass, as a precaution

against snow-blindness, and they are collected for littering yáks and goats.

"The roots vary much in size and shape. Some carefully selected and apparently of six or eight year's growth were compact and heavy, 4 to 6 ounces in weight; the largest procurable were picked out of the crevices of stone dykes, with a little soil and debris around them. When divided, the section presents the marbled appearance characteristic of commercial rhubarb. The bright yellow color, gritty taste, and peculiar aroma, were also satisfactory. In the autumn (September), when the stems die down, or very early in spring before the shoots sprout, the roots will be more compact and fit for carriage.

"I had an opportunity of testing the therapeutic action of the fresh root, and found it to resemble that of Russian rhubarb from Apothecary's Hall, 'which grows wild in Chinese Tartary, and extends to the south near Thibet' (PALLAS, Voyage, t. IV., p. 216), consequently at no great distance from upper Kunáwar. I have consulted the works of Himalayan travellers,—HOOKER, THOMSON, GRIFFITHS, JACQUEMONT, HOFFMEISTER and JAMESON,—and find the occurrence of different species of the genus *Rheum* in various portions of the snowy range recorded by these authors. The excellence of the hill rhubarb as an article of diet is likewise corroborated by the MSS. reports of COLONEL LONGDEN and MAJOR THOMAS, who observed it in Kulá and Pangí, respectively. But in ROYLE'S 'Illustration of the Botany of the Himálayas,' the source of commercial rhubarb is fully discussed. When at Saharunpúr he made many efforts to trace its route, and as the information he collected is curious and valuable, I quote the result of his enquiries.

"The Chinese obtain the rhubarb produced in China Proper from that part of the province of Shensee—now called Kansu—situated between north latitude 35° and 40° . But the best, according to the missionaries, who say it is called Tai hoang, is in the province of Setchuen, from the mountains called Suechan—or of snow—which extend from north latitude 26° to 33° , and from about 100° to 105° of east longitude; that from the latter province, probably forms much of what is called China rhubarb. The missionaries met large quantities of it brought down in the months of October and November. That from Kansu may afford some of what is called Russian rhubarb: but both PALLAS and RHENIAN have ascertained that the greater portion, if not the whole of this, is obtained in April and May, from the clefts of rocks in high and arid mountains surrounding lake Kokonor.

"This would bring the rhubarb country within 95° of east longitude, and 35° of north latitude, that is into the heart of Thibet.



"As no naturalist has visited this part, and neither plants nor seeds have been obtained thence, it is as yet unknown what species yields this rhubarb.

"As it is improbable from the nature of the country that the best rhubarb is confined within very narrow limits, it becomes interesting to ascertain how near it approaches the British territories in India, in order to share in the trade or attempt the cultivation.

"Mr. MOORCROFT discovered rhubarb at Niti, and between Niti and Gotung, that is at elevations of 12,000 feet. If we turn our attention to the northern face of the Himálaya, which has so many features of a Tartarian climate, we find *R. spiciforme*, discovered by MR. INGLIS on the Werang pass, and at several places beyond. DR. GERARD describes the table-land of Tartary as covered with rhubarb, at elevations of 16,000 feet. Mr. MOORCROFT sent some rhubarb from near Ladákh, in north latitude 34° and east longitude $77\frac{1}{2}^{\circ}$, which for compactness of texture, color and properties, was as fine as any I have ever seen. But these are only the western boundaries of the elevated, cold and bleak regions, known under the names of Tartary, Mangolia, and Thibet, of which Kanáwar is essentially a part, participating in the same great physical features, climate and vegetation; this valley already possesses one, if not two species of rhubarb, and has the best growing in its immediate vicinity. There can therefore be no rational doubt about the successful cultivation of true rhubarb in territories within the British influence, as in Kanáwar, or the Bhoteah pergunahs of Kurnaoon, and that with little more labor than placing the roots or seeds in favorable situations. The only difficulty will be to obtain specimens of the true rhubarb.*"

"If my surmise be correct that the indigenous *Rheum*, widely diffused in the rocky valleys of Asrang and Dingering is one of the species furnishing the official rhubarb, or at least possesses valuable properties, cultivation is not required, but only a knowledge of the mode of dressing and preparing the roots, so as to make it merchantable. The following are the Himálayan species:—

1. *R. emodi* (Wall), Pindree glacier, &c.
2. *R. Webbianum* (Royle), Choor mountain.
3. *R. spiciforme* (Royle), Werang pass.
4. *R. Moorcroftianum* (Royle), Niti pass.

"The above four species yield part of the Himálayan rhubarb, according to PEREIRA (Mat. Med., Vol. II., page 485); the two last have denser and more yellow roots than the two first-mentioned, and I believe that the Asrang plant is one of them, but in the absence

of stem, flower and fruit, the essential characters for identification were wanting.

"At present, Himálayan rhubarb makes its way sparingly to the plains of India through Almora and Bhotan (MADDEN. Asiatic Journ., 1848). Dr. WALLICH obtained specimens from the inhabitants of the Himálayas, who had strung them round the necks of their mules. In 1840, when China rhubarb was scarce and dear, 19 chests of Himálayan rhubarb were imported from Calcutta into England, but the samples do not appear to have been 'ordinary,' the color was dark-brown, the taste bitter, the odour feeble. It was exceedingly light and worm eaten. This was the first shipment ever made of Himálayan rhubarb to England. Two chests sold at fourpence per lb., the remainder at one penny per lb.*"

"Dr. ROYLE says that Himálayan rhubarb sells for only one-tenth of the price of the best rhubarb, resembling in quality the Russian, which is found in India. (Bot. Himálayan Mountains, page 316.)

"The quantity of rhubarb imported into Britain during six years, was as follows:—

1843	..	..	..	268,766 lbs.
1844	..	..	..	206,015 "
1845	..	..	..	323,416 "
1846	..	..	..	427,694 "
1847	..	..	..	305,736 "
1848	..	..	..	116,005 "

"No later returns are available, but the above sufficiently indicates the importance of the trade, part of which may be expected to find an outlet through India, instead of passing north-west to Russia, or east-ward to China, before exportation to England.

"I.—From the researches of ROYLE and PEREIRA, it would appear that the varieties known as Russian and China rhubarb, are produced across the chain of Himálayan mountains, beginning at no greater distance (3 or 4 degrees of latitude) from the British territory. It is probable that the species affording them inhabit a widely extended area.

"II.—Although so important and familiar a drug, the source of the best varieties is not certainly ascertained. Specimens of flower, leaf and root, with exact information as to the locality, &c., are desiderata.

"III.—An inferior variety only of Himálayan rhubarb reaches the plains of Hindústan.

"IV.—The extension of hill roads, now in progress must have an important effect in promoting traffic in rhubarb, and other little known products along the frontier. If an annual fair were established at Chini, many northern traders would resort to it, and with

"ROYLE'S Illustrations of the Botany of the Himálayan Mountains." Page 314, *et seq.*

* (PEREIRA Mat., Med. Vol. II., page 482.)

the sanction of Government the quantity of rhubarb required for the medical stores might be purchased there instead of as now in a London warehouse, and and brought thence round the Cape to Calcutta.

"V.—I would suggest that carefully selected roots be gathered in Kanáwar, Kálú, and Pangí (where rhubarb is known to grow) in autumn, for transmission to London, and subsequent valuation. Botanical specimens, with accurate date and locality should accompany the roots that the species may be identified.

1440. *Polygonum* sp———. Vern.—
 Bījband ; kuwár kamin ; humáz.

(1766) Lahore.

(1879) Amritsar.

(2235) Muzaffargurh (kuwár kamin).

(2206) Gújrat (tukhm humáz).

(2390) Kashmir (bekh humáz).

Used in spitting of blood and rheumatism. A substitute for rhubarb in double doses.

Dose.—3 máshas. Price, 4 annas a seer.

1441. *Rumex vesicatoria*. Vern.—Chok
 or choka.

(1767) Lahore.

1442. *Polygonum bistorta*. Vern.—
 Anjabár.

(669) Gugaira.

(1765) Lahore.

(1466) Amritsar.

(1185) Ludhiana.

(2384) Kashmir.

It contains much tannic acid and acts as an astringent : used in dysentery, diarrhoea, and spitting of blood ; also in fevers ; also as an external application for ulcers and sore throat. Root very astringent : useful in sore throat and relaxed gums and ulcers ; also in diarrhoea, hæmorrhage and intermittent fever. The young leaves are edible.

Dose.—7 mashas. Price, 4 annas a seer.

1443. *Calligonum convolvulaceum*.
 Vern.—Phog ; tirni.

(1139) Sirsa.

(2000) Lahore (tirni).

1444. *Polygonum fagopyrum*. Vern.—
 Uglá ; kaspát (and several other names. See under
 "Agricultural Produce.")

Pattiala.

Simla.

Seeds nutritive, contain much oil ; said to be very fattening.

CHENOPODIACEÆ.

1445. *Panderia pilosa*. Vern.—Bái
 kalán. See No. 1458.

(2002) Lahore.

1446. *Suedia fruticosa*. Vern.—Khar-
 khusa (or khaskhaskh in Dera Gházi Khán list).

(937) Dera Gházi Khán (leaves).

1447. *Anabasis multiflora*. Vern.—Búi
 choti.

(1956) Lahore.

1448. *Chenopodium album*. Vern.—
 Báthú, báthua (*Arabic*, kulf).

(1773) Lahore.

Used as food, also as medicine in special diseases ; and to clean copper vessels, preparatory for tinning them. It is considered a laxative in diseases of the spleen, bile and worms.

1449. *Spinacea oleracea*. Vern.—Isfa-
 nák ; pálak. Some pálak is *Beta bengalensis*.

(1772) Lahore (pálak).

Much used as a vegetable : considered to be cool and laxative : useful in difficulty of breathing, inflammation of the liver and jaundice.

BIGNONIACEÆ.

1450. *Bignonia indica* (?) Vern.—
 Syonak (Hindi).

(2048) Lahore.

Said to form a cooling drink in fever, and to be an antidote against poison.

DATISCEÆ.

1451. *Datisca cannabina*. Vern.—
 Akalbír.

(2033) Lahore.

Used as a dye ; also as an application for pain in the back.

AMARANTACEÆ.

1452. *Achyranthes aspera*. Vern.—Put-
 kanda ; chirechiri or phutkanda ; apámargá (S.) ; agará.

(952) Dera Gházi Khán.

(1517) Amritsar.

(1988) Lahore.

(2117) Lahore (apámargá).

Used for purifying the blood. Considered by natives pungent and laxative, useful in dropsy, piles, boils and eruptions of the skin. The stem is also used as a toothbrush. The seeds and leaves are said to act as emetics, and to be useful in hydrophobia and the bites of serpents.

Dose.—6 mashas. Price, 1 anna a seer.



1453. *Amaranthus polygonus*. Vern.—
Chaulai.

(1769) Lahore.

Considered by natives cool and dry, and to act as a diuretic and aperient; it promotes digestion and cures eruptions; it is also useful in special diseases. It is much used as a culinary vegetable.

1454. *Amaranthus cruentus*. Vern.—
Taj-i-khuras; bustan afroz.

(1770) Lahore.

(2606) Kashmir (bustan afroz).

Used for purifying the blood and in piles, and as a diuretic in strangury.

1455. *Amaranthus polygonoides*. Vern.—
Bantandali.

(2092) Lahore.

1456. *Celosia cristata*. Vern.—Taj-i-khuras; kanja.

(1770) Lahore.

(2268) Dera Ghazi Khan (kanja).

1457. *Celosia argentea*. Vern.—Salyara;
chilchil; sil; sarpankha.

(1771) Lahore.

(692) Gurgaon (chilchil).

(1408) Amritsar (sarpankha).

(2270) Dera Ghazi Khan (salyara).

(1021A) Delhi.

Used in special diseases.

Dose.—6 mashes. Price, 3 annas a seer.

1458. *Æruea javanica*. Vern.—Asl-ul-
ghafiran; bai; makrela?

(2001) Lahore (bai kalan).

(1725) Lahore (makrela).

MYRISTICACEÆ.

1459. *Myristica officinalis*. Nutmeg.
Vern.—Jaiphal.

(1104) Delhi.

(1814) Jalandhar.

Is considered by natives a hot light remedy, allays vomiting, and acts as a vermifuge; remedies coughs. By European doctors it is used as a stimulant in cholic and inflammation; also applied externally in sprains. It resembles a small bird's egg. Externally it is brown and marked with furrows; internally it is dull pinkish-white, with dark brown veins.

Dose.—1 masha. Price, 2½ rupees a seer.

MACE.—Jauhtari.

(1096) Delhi.

Used as a stimulant in special diseases; also by hakims in diseases of the eyes, stomach and spleen; and in herpetic eruptions. It produces stupor.

Dose.—2 mashes. Price, 2½ rupees a seer.

Both the kernel nutmeg and the aril mace contain fixed and volatile oils, and an acid called myristic acid, and act as aromatic stimulants. They are principally used in cholic and diarrhoea; also externally in chronic rheumatism, and an application to carious teeth. In very large doses, nutmeg is said to be narcotic.

The mace is used by hakims to remove offensive breath, to correct the tone of the stomach or liver, and in consumption and flatulency.

Dose.—5 to 15 grains.

ELEAGNEÆ.

1460. *Eleagnus orientalis*. Vern.—Kan-
kol mirich.

(698) Gurgaon.

(2020) Lahore.

(2019) Lahore (daku phul).

(2340) Kashmir (gul-i-sanjad).

(1477) Amritsar.

Seeds used to adulterate black pepper; also as a stimulant in coughs. The ripe seeds are eaten as condiments: the oil from the seeds is used in bronchial affections.

Dose.—2 mashes. Price, 2 rupees a seer.

Flowers (gul-i-sanjad) used in coughs and special diseases.

Dose.—2 mashes. Price, 5 rupees a seer.

LAURACEÆ.

1461. *Cinnamomum albiflorum*. The
bark. Vern.—Taj.

(998) Delhi.

(1594) Gurdaspur.

(1073A).

(1271) Jalandhar.

(1778) Lahore.

(2455) Kashmir.

(72A) Pattiala.

(1797) Lahore.

A warm dry remedy, used in coughs; also as an astringent in diarrhoea, and applied to abscesses; also used in cholic and indigestion.

Dose.—2 mashes. Price, 1 rupee a seer.

1462. *Laurus cinnamomum*. Vern.—
Dar chini; kirfa.

(1077) Delhi.

(1963) Lahore (kirfa).

It is close rolled quills, thin, of a light brown color; brittle, fracture splintery; odour pleasant; taste warm. It contains much essential oil, and a peculiar acid, called cinnamic acid, which resembles benzoic acid in its action; it also has a resin and much tannic acid. It acts as an aromatic stomachic and carminative; also

as an astringent; and is largely used in cholera and diarrhoea; also in low fever and vomiting; and the oil applied to teeth, removes tooth-ache, and as an addition to purgatives to prevent griping.

Dose.—10 to 30 grains.

1463. Cinnamomum albiflorum.

Leaves. *Vern.*—Tamála; patra; tejpat; patraj.

(1109) Delhi.

(1271) Jalandhar.

(2440) Kashmir.

(1A) Pattiala.

(1778) Lahore (tamálpatta).

Considered by natives hot and cardiac. Used in cholera and indigestion, and nausea.

The hakims use cinnamom in debility of the stomach, enlargement of the spleen, affections of the nerves or heart, pains in the womb; also retention of urine and catamenia; bites of serpents and poisoning by opium.

Dose.—6 máshas. Price, 3 annas a seer.

1464. Laurus camphora. Camphor.

Vern.—Káfúr; mushk káfúr.

(1044) Delhi.

(1126) Ludhiana.

(1779) Lahore.

A white crystalline solid volatile oil, with a peculiar odour. Considered by natives cool. Principally used in cases of fever, headache and special diseases; also in disease of the eyes, corpulence, and poison; given both in powder and pills.

Dose.—1 rati. Price, 2 rupees a seer.

A concrete volatile oil; extensively used in European practice as a stimulant, and diaphoretic, afterwards as a narcotic; it is used in typhus fever, inflammation of the brain, insanity, epilepsy, asthma and special diseases; also in gout, rheumatism, and to prevent bedsores.

Dose.—Grains 5 to 10.

1465. Tetranchera Roxburghii. *Vern.*—

Meda chob; and the bark, meda sak.

(1587) Gurdaspur.

(1951) Lahore.

Principally used for sprains and bruises in powder mixed with water: employed both externally and internally.

Berries yield oil which is used to make ointment and candles. The wood is aromatic, and the leaves contain a glutinous matter.

Dose.—6 máshas. Price, 4 annas a seer.

EUPHORBACEÆ.

1466. Emblica officinalis. (*Emblia myrobalan*). *Vern.*—Amlá; bijí (?); dátu phal; amla; shámi (Hindi).

(674) Gurgaon.

(971) Delhi.

(1355) Hushyarpur.

(1148) Ambalah.

(1193) Simla.

(1366) Amritsar.

(1277) Jalandhar (aola).

(971) Delhi.

(1678) Lahore.

(1585) Gurdaspur.

(2182) Rawalpindi.

Pattiala.

Simla (leaves).

Kangra (leaves).

(2123) Lahore (shámi).

Considered by natives a cold and dry remedy: used in indigestion, diarrhoea and debility, and in piles; both in confections and cold infusion. Externally it is sometimes used to cleanse the hair.

The fresh fruits are acrid and purgative, and antiscorbutic; the dried simply astringent. It grows cultivated in the Punjab; the best are said to come from the Kohistan.

Dose.—1 tola. Price, 1½ annas a seer.

1467. Croton tiglium. Purging croton.

Vern.—Jáyápal (Sanskrit); danti; jamal gotah; jai-pál phal; hab-ul-mulúk.

(1094) Delhi.

(7289) Jalandhar.

(1674) Lahore.

(1519) Amritsar.

(2467) Kashmir.

(1676) Lahore.

Considered by natives hot and pungent: a violent purgative; useful in dropsy, worms, bilious affections: only safe for strong people. The hill people are said to eat 10 seeds at a time; the green embryo is supposed to be particularly poisonous. The seeds are oval, brown, slightly variegated; they contain a volatile oily acid, crotonic acid, and a fixed oil. Used internally as a purgative, and externally to rub over diseased joints.

By Europeans the oil is used in obstinate constipation, dropsy, apoplexy and mania; and as a powerful drastic. All parts contain powerful irritant cathartic poison: externally it is used to produce pustules, as a substitute for blisters.

Dose.—1 rati, boiled with milk. Price, 12 annas a seer.

The seeds are the size of a sloe, and are considered one of the most drastic purgatives known. Ten or twenty seeds have been known to kill a horse, by producing the most violent diarrhoea. The usual way of making the oil is first to roast the seeds and then compress them. The color is brownish, or brownish-

yellow, soluble in fixed and volatile oils. So powerful is its action that a single drop of the oil applied to the tongue is considered sufficient to ensure the full results, especially in apoplexy, paralysis of the throat, or difficulty of breathing arising from these causes, even should the patient be insensible at the time. But this must be of the pure oil, for it is often adulterated with olive, castor, or purging nut oil. It is chiefly employed in incipient apoplexy, visceral obstruction, and occasionally in dropsy. The seeds mixed with honey and water are often applied to obstinate buboes in native practice.

The expressed oil of the seed is a good remedy, externally applied, in rheumatism and indolent tumours. RHEEDE says, that the leaves rubbed and soaked in water are also purgative, and when dried and powdered are a good application to snake bites. If the leaves are chewed they inflame the mouth and lips and cause them to swell, leaving a burning sensation. The mode of preparing the oil in Ceylon is by pulverising the seeds; the powder is then put into bags, placed between sheets of iron, left to stand for a fortnight, and then filtered. Alcohol is then added to twice the weight of the residue. Much caution is requisite to avoid injury from the fumes which arise during the process. The wood, which is bitter tasted, is gently emetic, and powerfully sudorific.

1468. *Buxus nepalensis*. Vern.—Shamshād; chikri.

(1673) Lahore.

Wood diaphoretic; leaves bitter, purgative and diaphoretic; useful in rheumatism and syphilis: said to be poisonous to camels. From it a foetid oil was formerly prepared.

1469. *Ricinus communis*. Castor Seed. Vern.—Arind; bedan-jir.

(1179) Ludhiana.

(1237) Jalandhar.

(1887-1515) Amritsar.

(1671) Lahore.

There are said to be three kinds—one with red pods, the second with yellow pods, and the third with pods without bristles. Much used as a warm purgative in many diseases, especially cholic, headache, dropsy, constipations and fever; also antispasmodic diseases of the urinary bladder, and in rheumatism. The seeds fermented with milk are said to be useful for itch.

SEEDS.—Dandan dāna.

(1088) Lahore.

The leaves are said to increase the secretion of milk and of the menses. The leaves are used at Hissar for the treatment of Guinea worm; also applied to the breast of women to promote flow of milk.

OIL.—Arind ka tel.

(1363) Hushyarpur.

The oil is used by Europeans as a laxative in constipation, cholic and dyspepsia.

Castor oil obtained by expression is less irritating than that obtained by digestion with alcohol. It contains stearic, palmitic, lauric and crotonic acids, united to glycerine; also a yellow resin, which is the acrid principle. Four seeds have proved poisonous. Castor oil was made at Dinapore by first crushing the seeds, then sifting them and removing by hand any fragments of the husk, then the pulp is ground; and again carefully picked, and afterwards compressed in 1 lt. canvas bags; then warmed in the sun, and again compressed. Lastly, the oil is boiled to coagulate albumen, and then filtered.

1470. *Euphorbia dracunculoides*.

Vern.—Bih rechni.

(1004A) Delhi.

(2003) Lahore.

Used to remove warts.

1471. *Euphorbia antiquorum*. Vern.—Farfiyūn.

(2008) Lahore.

A purgative, used in pain in the loins. An acrid irritant; used externally in rheumatism and in toothache, and internally it acts as a drastic purgative, and is used in diseases of the nervous system and dropsies; also as an errhine in palsy, deafness and amaurosis.

Dose.—1½ mashas. Price, 8 rupees a seer.

1472. *Euphorbia tiraculli*. The juice. Vern.—Shir thohar.

(1263) Jalandhar.

A warm remedy: used in rheumatism, toothache and debility. The milk is said to cure affections of the spleen, and to act as a purgative in cholic; also to be useful in special diseases. Externally it acts as a vesicatory. It is cathartic, emetic and antisymphilitic; its action is very violent. It was formerly used in dropsical cases. It is said to be edible by goats.

Dose.—1 rati.

1473. *Euphorbia Royleana*. Vern.—Shakar pītan.

(1023A) Delhi.

The purgative principle of the *Euphorbiaceae* is principally found in the seeds, but also in the juice; it is an acrid resin. In cases of poisoning, lime juice is useful as an antidote. The difference in different plants depends on the amount of fixed oil with which the resin is combined. The active principle is most abundant in the embryo.

1474. Rottleria tinctoria. Vern.—Kamila; rūlyā.

- (1000) Delhi.
- (1322) Jalandhar.
- (1675-2357) Lahore.
- (2309) Kashmir.
- (1877) Lahore (rūlyā).

Used as a dye. It contains a yellow resin, *Rottlerine*, soluble in carbonate of soda and precipitated by acids. It acts as a purgative, and very sure anthelmintic in doses of from one to two drachms in cases of tape worm. It has been successful in 98 cases out of 100 of tape worm. *Rūlyā*, which is made from it, contains 78 per cent. of coloring matter: it consists of hairs obtained from the outer part of the capsules.

1475. Crozophora tinctoria. Vern.—Sahādevi (Hindi); nil kanti? nil kai.

- (2118) Lahore.
- (1426) Amritsar (nil kanti).
- (2302) Kashmir (nil akrai).

1476. Carissa diffusa. Vern.—Mardak. (Hindi medicine).

- (2117) Lahore.

1477. Putranjiva Roxburghii. Vern.—Jiyaputra.

- (1297) Jalandhar.
- (1672) Lahore.
- (2074) Lahore (putranjivak).

Used as an ornament, not in medicine. The seeds or stones are strung on thread and worn as necklaces. This is considered to be a preservation against evil.

1478. Euphorbia lathyris. Vern.—Sudāb. Delhi.

- (1104A) Delhi.

Seeds purge and cause violent vomiting: used in dropsy; also to produce abortion. There is also a species of *Euphorbia* with narrow leaves: this root is said to be purgative if pulled up slantingly in one direction, and to be emetic if pulled up slanting in an opposite direction. Several other *Euphorbiaceous* plants are used—one called "hirbi," is said to be a very powerful poison. "Dodak" and "zaunchi" are names generically given to many *Euphorbias* with milky juice or sap.

ARISTOLOCHACEÆ.

1479. Aristolochia longa. Vern.—Zarāwand kalān, or darāz, or tawil; isharmel (Hindi).

- (1064) Delhi.
- (1513) Amritsar.
- (1930) Lahore.

The leaves are said to be useful against the bites of of poisonous snakes, especially the cobra. The root is bitter and emmenagogue, and is used in diseases of the womb; affections of the gums or ulcers; also

in indigestion and bowel complaints of children. It is said to act as a tonic and febrifuge. This is the long "zarāwand," called "tawil darāz kalān," or (long, large).

1480. Aristolochia rotunda. Vern.—Zarāwand mundaraj or khurd; bekh za'frān; kangamandi.

- (1514) Amritsar.
- (1929) Lahore.
- (1655) Lahore (kanganmandi).
- (2413) Kashmir (bekh za'frān).

Used in cough and special diseases. The root is hot and aromatic, supposed to be more powerful than the long species. It is used by natives in the treatment of itch, lice, and intestinal worms; also in leprosy and ulcers, and to promote secretion of urine. It is reputed an antidote for poisons. This is the small "zarāwand," called *khurd* or *mundaraj* (small, round).

Dose.—3 māshas. Price, 1 rupee a seer.

PIPERACEÆ.

1481. Piper nigra. Vern.—Golmirich.

- (1075) Delhi.
- (1319) Jalandhar (siya mirich).
- (1771) Lahore (kafi mirich).
- (1081A) Delhi (pipla māl, root? probably root of peepul). See the next species.
- (1775) Lahore.

(695) Gurgaon (marked "chob.")

Used for coughs, indigestion and piles.

Dose.—2 māshas. Price, 8 annas a seer.

The root is said to be bitter and dry, it is a stimulant tonic, is employed for coughs and indigestion; also fever.

Dose.—2 māshas. Price, 4 annas seer.

The fruit is a black wrinkled berry about the size of a pea, containing a grayish-white globular seed. An acrid stimulant, it contains an alkaloid, called piperine, and volatile oil: it is used in cases of fever, cholera and special diseases; also as a local application for piles, relaxed sore throat and some skin diseases: externally it is used as a rubefacient. A popular remedy for ague.

Dose.—5 to 20 grains.

1482. Piper longum or Chavica Roxburghii. Vern.—Pipal; maghz pipal or filfil darāz; dārfilfil or pipla māl (gaz pipal?).

- (1286) Jalandhar.
- (1776) Lahore (dārfilfil).
- (1007A) Delhi (filfil darāz).
- (2047) Lahore.
- (1565) Gurdaspur (maghz pipal).
- (1031) Delhi (pipla māl; maghz).

Used in indigestion, coughs and asthma.

Dose.—2 māshas. Price, 8 annas a seer.

The spikes are black and cylindrical, 2 inches long, covered with projections arranged spirally. An acrid stimulant and carminative. It has been used in intermittent fever, cholera and special diseases; also in beriberi. Considered by natives hot and dry: useful in wind, difficulty of breathing, to remove intestinal worms and to assist digestion; also as an aphrodisiac. (H).

Dose.—5 to 20 grains.

1483. Piper cubeba. Cubebs. Vern.—Kabab chini.

(963) Delhi.

(1284) Jalandhar.

(1774) Lahore.

The fruit resembles that of black pepper, but it has small stalks attached, hence it is called *Piper caudatus*. Used in gonorrhœa. It cures paralysis of the tongue, and cholic, and promotes digestion; it is said to dissolve calculi.

Dose.—3 máshas. Price, Rs. 1-8 a seer.

It contains volatile oil, resin and an alcaloid, called cubebine; and acts as an aromatic stimulant and diuretic. It is principally used by Europeans in the treatment of venereal disease, chronic bronchitis and piles.

Dose.—20 to 120 grains.

URTICACEÆ.

1484. Ficus carica, and F. caricaoides. Vern.—Anjir.

(662) Gurgaon.

(969-1071) Delhi.

(1443) Amritsar.

(1670) Lahore.

(2371) Kashmir (small wild sort).

It consists of disk-shaped flattened pulpy receptacles, brown externally, containing internally numerous small hard seeds embedded in a soft pulpy mass. It contains chiefly sugar and mucilage. The dried fruit contains much sugar, and acts as a demulcent and laxative.

It is principally used as a diet in cases of constipation, and in diseases of the lungs, and urinary bladder; also as an application to boils and abscesses, instead of a poultice.

1485. Ficus religiosa. Vern.—Pípál.

(1668) Lahore.

Used in coughs and asthma. It is considered by natives cool and dry; the young leaves are said to be useful in affections of the skin and boils. The bark is said to be astringent, and is used in special diseases; also it promotes suppuration. The fruit is said to be laxative, and to promote digestion; and

if eaten for 14 days, to remove asthma and produce fruitfulness in women.

Dose.—2 máshas.

1486. Ficus indica. Vern.—Bór; bar; bargat.

(1267) Jalandhar.

(1268) Jalandhar (shír, or milky juice of the tree).

The leaves are applied to bruises. The juice is milky and glutinous, and contains caoutchouc; it is occasionally used in toothache, and also applied to the cracked soles of the feet. The bark is supposed to be a tonic, and is used in diabetes.

1487. Ficus glomerata. Vern.—Gúlar; nirjiv dumba (Hindi).

(2050) Lahore.

Considered cool and moist by natives: used in diarrhœa and piles. Its bark is applied as an astringent to ulcers, and also to remove the poison of wounds made by a tiger or cat. The root is useful in dysentery. The fruits are edible but insipid, and are usually found to be full of insects. The fruit grows in bunches close round the branch or stem, hence the name *Glomerata*.

1488. Morus nigra. Vern.—Shahtút; tút.

(1669) Lahore.

(1242) Jalandhar.

The fruit consists of numerous small berries, each containing a single seed, united by their receptacle. The juice is sweet and of a deep red color. Used in sore throat. It contains sugar and tartaric acid, and acts as a pleasant refrigerent in fever. The fruit is used by hakims in sore throat, dyspepsia and melancholy. The bark is considered a purgative and vermifuge.

Dose.—6 máshas. Price, 1 rupee a seer.

1489. Cannabis sativa. Vern.—Bhang; kanub (*Arab.*)

(635) Gurgaon.

(1249) Jalandhar.

(1667) Lahore.

(1183) Dera Ghází Khán.

(1367) Amritsar.

(2391) Kashmir.

(1599) Gurdaspúr.

(1831) Jalandhar (charras).

(2321) Kashmir.

(40A) Pattiala (garda bhang).

(1039A) (ganjah).

(1132) Ludhiana (bhang).

(2247) Dera Ghází Khán.

Considered by natives hot and astringent: it promotes appetite, but intoxicates in large doses. Used in colds; but principally employed as an intoxicating drug.

There are several preparations. "Bhang" (the

leaves), "ganjah" (the flower tops), and "charras" (the resin exuding).

Price of charras, 6 rupees a seers.

CONIFERÆ, ENDOGENS, AND CRYPTOGRAMS.

CONIFERÆ.

1490. *Pinus longifolia*. Turpentine. Vern.—Ganda biroza.

(974) Delhi.

Common turpentine. A mixture of oil of turpentine and resin. It acts as a stimulant diuretic, and is principally used in diseases of the urinary organs, chronic bronchitis, and hæmorrhages; also in rheumatism and fevers.

TAR.—Zift rūmī.

(2043) Lahore.

A stimulant diuretic; principally used in chronic bronchitis and skin diseases; also in phthisis; and as an application to ulcers. It is used to remedy itching of the skin in camels during the cold season. (H.)

1491. *Pinus gerardiana*. Vern.—Chilghoza.

(970) Delhi.

(1661) Lahore.

In special diseases, and for food in Kanawár, &c.

Price, 5 annas a seer.

1492. *Cupressus sempervirens*. Vern.—Sarv; haubér; májuphal; máfū sabz; saro bij.

(976-986) Delhi.

(1939-1941) Lahore.

(1227) Jalandhar.

(170) Kangra.

Used as an aromatic stimulant in piles, and to purify the blood. Wood and fruit said to be astringent and anthelmintic. An astringent in diarrhoea and leucorrhœa.

Dose.—2 máshas.

1493. *Juniperus communis*. Vern.—Abhal; haubér; ratūn dastī.

(939) Dera Ghází Khán (wild fruit).

(1528) Amritsar.

(1168) Dera Ismail Khán.

(2237) Dera Ghází Khán.

A warm dry remedy; used in dropsy and flatulency. It contains a large quantity of volatile oil, resembling oil of turpentine in its properties: it acts as a stimulant diuretic, and is principally used in dropsy, disease of the bladder and cholic.

Dose.—3 máshas. Price, 4 annas a seer.

1494. *Taxus baccata*. Vern.—Bráhmī.

(1664) Lahore.

(2397) Kashmir.

(1511) Amritsar (zarnab).

Used in epilepsy and indigestion. Leaves and berries poisonous to cattle. The leaves are said to be sedative like *digitalis*, but more manageable, and are used in epilepsy.

Dose.—3 máshas. Price, 4 annas a seer.

1495. *Cupressus sempervirens*. Vern.—Abhal; sarv kúhī.

(986) Lahore (sarv kúhī).

(1938-980) Delhi.

PENECACEÆ.

1496. *Penœa sarcocolla*. Vern.—Anzarút; gosht khora.

(766) Amritsar.

(1981) Lahore.

A stimulant gum resin.

DIOSCOREACEÆ.

1497. *Dioscorea deltoidea*. Vern.—Tarar; krish.

(2053) Lahore.

Roots are farinaceous and esculent.

ENDOGENS.

1498. *Arum campanulatum*. Vern.—Zamín khand; nágphannī-kand.

(1633) Lahore.

(2368) Kashmir.

(2068) Lahore (bansaran).

(2069) Lahore (nágphannī-khand).

A dry and warm remedy, used in coughs and asthma; also as an edible after cooking or pickling.

Dose.—6 mashas. Price, 3 annas a seer.

The roots contain a large quantity of farinaceous matter, mixed with acrid poisonous juice, which may be extracted by washing or heat. When fresh it acts as an acrid stimulant and expectorant; and is used in acute rheumatism.

ORCHIDACEÆ.

1499. *Eulophia* sp. Vern.—Sá'lab misrí.

(1210) Simla.

(1475) Amritsar.

(1649) Lahore.

(2280) Kashmir.

(1651) Lahore (sá'lab káhī).

Used in special diseases on account of its form. Said to be nutritive, restorative and aphrodisiac; but it is principally used on account of the Doctrine of



Signatures. For a further account of Saleb, see page 261.

Dose.—3 máshas. Price, 12 annas a seer.

ACOBACEÆ.

1500. *Acorus calamus*. *Vern.*—Bach ; warch.

- (1275-1327) Jalandhar.
- (2363) Kashmir (warch).
- (1476) Amritsar.
- (1571) Gurdaspúr.
- (1627) Lahore.
- (1476) Pattiala.

Considered hot and bitter : useful in epilepsy and spine disease ; in cold, fever, coughs and rheumatism. It contains an aromatic bitter principle. It is a useful aromatic tonic. Used in fever, dyspepsia and cholice ; and also in chronic bronchitis and asthma ; also as an adjunct to purgatives.

Said to be brought from Kashmir. It is used in hæmorrhages and ulcerations of the intestines ; also in cholice and suppression of urine by hakims. It is also used in England to give an aromatic flavor to gin, and certain kinds of beer, and in the preparation of aromatic vinegar.

Dose.—1 másha, or grains 10 to 20. Price, 2 annas a seer.

1501. *Phoenix dactylifera*. *Vern.*—Tamar ; chuhára ; khajár ; khurma ; kujrán, kuckyán.

KERNEL.—tukhm khurma ; gutli khajár.

(1634)

DRIED DRUPES.—Khurma (Pers).

(1638).

DATES.—Khajár ; kuckyán ; khujiyán.

(1635) Lahore.

GUM.—Gond, or sher-i-darakht-i-khurma ; hukm chil.

SUGAR OF DATES.—Khurma.

(1637) Lahore.

A warm remedy, used in coughs and asthma. Dates are slightly purgative, and the gum is employed in diarrhoea and special diseases. The fruit is considered particularly useful in special diseases.

Dose.—7 tolas. Price, 2 annas a seer.

SMILACEÆ.

1502. *Smilax china*. *Vern.*—Chob chini. (1660) Lahore.

A tonic : used to purify the blood in skin diseases ; much employed by rich natives. It contains much starch, and acts as a demulcent and supposed aphrodisiac, and may be used as a substitute for sarsaparilla in venereal diseases.

Dose.—1 to 4 máshas. Price, 2½ rupees a seer.

MUSACEÆ.

1503. *Musa paradisiaca*. *Vern.*—Khela ; máz.

Lahore.

The leaves are useful to apply to inflamed or ulcerated skin, as in blisters. The fruit is nutritious and demulcent. The root and stem considered by natives tonics, and useful in disorders of the blood, and special diseases.

The fruit is sweet and nutritive, and is considered by some to be the original food of man in Paradise ; hence its specific name.

TYPHACEÆ.

1504. *Typha angustifolia*. *Vern.*—Dab ; lak.

(2342) Kashmir.

The young shoots are edible, and taste like asparagus. The pollen is combustible and resembles *Lycopodium*. The flowers are used in the treatment of burns.

COMMELYNACEÆ.

1505. *Commelina scapiflora*. *Vern.*—Máslí siyah, or dakhani.

(1295) Jalandhar.

(1498) Amritsar.

(1946) Lahore.

It is considered by natives to be hot and dry : useful in headache and giddiness ; also in fever, jaundice and deafness ; also as an antidote to poisons, and to cure the bite of snakes.

ZINZIBERACEÆ.

1506. *Zinziber officinale*. Fresh ginger root. *Vern.*—Adrak.

(1299) Jalandhar.

(1883) Amritsar.

(1647) Lahore.

(2367) Kashmir.

(40A) Sirmúr.

(2367) Kashmir.

DRIED GINGER ROOT.—Zangzabíl ; sonth.

(1816) Jalandhar.

(1643) Lahore.

(1024A) Pattiala.

(1507) Amritsar.

A yellowish white flattened rhizome, branched and knotted, with a short mealy fracture. It contains volatile oil and resinous matter.

A warm moist remedy, used to relieve coughs, asthma, piles, dysentery and diarrhoea, and in special

diseases and cholic as a cold infusion; also in pains in urinary bladder and in heartburn.

Dose.—6 máshas. Price, 3 annas a seer; or "soñth," 6 annas.

An aromatic stimulant, extensively used in European practice as an adjunct to other medicines, especially in cholic and rheumatism, also in relaxed sore throat: internally in dyspepsia, and as an adjunct to purgatives.

Dose.—10 to 20 grains.

AMAL BEDI.—A compound.

(1990) Lahore.

It contains much volatile oil and resin.

1507. Zinziber zerumbet. *Vern.*—Kachúr. The larger kind is called "nar kachúr."

(1484) Amritsar.

(1644) Lahore.

(1579) Gurdaspúr.

(2313) Kashmir.

(1A) Amritsar.

Considered by natives hot, and is used in coughs, asthma, and special diseases; also in leprosy, worms and skin diseases; also as a dye. It has an agreeable smell, and a hot bitter flavor.

Dose.—1 másha. Price, 3 annas a seer.

1508. Curcuma zedoaria. *Vern.*—Nirbisi; jadwár; jadwár khatai; ámba haldí.

(1472) Amritsar.

(1645) Lahore (nirbisi).

(2463) Kashmir.

(1953) Lahore (amba haldí).

Said to be hot and dry. Used for purifying the blood, and to cure disorder of wind and mucus, and in cholic; also to stop pain and vomiting; also as an external application to wounds.

It is a aromatic stimulant and carminative: it dyes yellow; it is employed in cholic, cramp of limbs and cardialgia.

Dose.—4 ratis. Price, 3 annas a seer.

1509. Curcuma longa. *Vern.*—Haldí; zard chob (Pers.)

(1296) Jalandhar.

(1487) Amritsar (haldí ágrai).

(1062A)

(1573) Gurdaspúr.

(1054) Lahore.

(1202A) Simla.

(62A) Pattiala.

(1485) Amritsar (zard chob chuan).

(1486) Amritsar (dar-haldí).

(1952) Lahore (amba haldí).

In small cylindrical pieces; yellow externally, orange within; eaten as a food, and also used as coloring matter. Considered by natives hot and dry;

useful in bruises, boils and swellings; also skin affections, and special diseases.

It contains much essential oil and starch, and acts as a stimulant and aromatic tonic; but is not often used internally, but principally as a test for alkaloids and boracic acid, which turns it brown; it is also used in dyspepsia, intermittent fever and dropsy; also as an application to ulcers. It is used both as a food and a dye stuff: the kinds best for the one purpose are less suited to the other.

Dose.—3 máshas. Price, 4 annas a seer.

N.B.—With reference to these species of *Curcuma*, see also page 299, &c.

1510. Alpina galanga. *Vern.*—Kálinján; kulanjána (Sanscrit).

(1642) Lahore.

Roots tuberous, covered with rings, brownish; inside dirty white; smell aromatic. It acts as a pungent and aromatic, and forms a substitute for ginger.

1511. Eleteria cardamomum. *Vern.*—Iláchi chota or khurd.

(1648) Lahore.

The fruit is a yellowish three-cornered capsule, much corrugated, it contains numerous dark red triangular seeds with a white interior. The seeds and fruit contain much volatile oil and coloring matter. They act as aromatic stimulants and carminatives.

By natives they are considered cool, aromatic and bitter, and are said to be useful in rheumatism and bilious complaints; also in flatulency and calculus. The native visitors sometimes present them on paying visits.

They are principally used in cholic, dyspepsia and fever in combination with other remedies, but are principally used either in food or with other medicines as adjuncts.

Dose.—5 to 20 grains.

1512. Amomum dealbatum or Cardamomum. *Vern.*—Iláchi bari or kalan.

(1110) Delhi.

(1647) Lahore.

Said to be more powerful than the smaller kind, but to resemble it in other respects. An agreeable aromatic stimulant.

1513. Hedychium spicatum. *Vern.*—Kápúr kachri; kachúr.

(1644-5096) Lahore.

Grows on the route to Kashmir. Is warm and aromatic, but is said only to be used by the natives in veterinary medicine.

1514. Costus speciosus. *Vern.*—Kut talkh; kut karwá.

(1503) Amritsar.

(2025) Lahore.

Said by some to be the Putchuk root, though this is usually referred to the *Aucklandia costus*.

It is an aromatic acid tonic, which becomes bitter on keeping. Used by hakims as a tonic and aphrodisiac in debility of the nerves and stomach; also against intestinal worms, in suppression of the urine and menses. Externally it is employed to remove freckles and patches from the face.

IRIDACEÆ.

1515. *Crocus sativus*. Crow Saffron. Vern.—Kanganmundi; kesar; zá'frán; kangan.

(1654) Lahore.

(2413) Kashmir (bark-i-zá'frán).

Considered by natives hot; useful in headache and vomiting, and to cure boils and eruptions of the skin. The stigmata are used; they consist of red filaments, broad and undivided at one end, but tripartite at the other. They contain volatile oil and a peculiar coloring matter, polychroite. Used in epilepsy, tetanus and special diseases; also as a dye, and in food. By the hakims it is used in fever, melancholy, enlargement of the liver, and retention of urine.

By Europeans it was considered stimulant emmenagogue and diuretic, and was used in hooping cough, measles and chlorosis, but now it is seldom employed.

In moderate doses it stimulates the stomach, in larger quantities it excites the nervous system, having a specific influence on the mental faculties.

Dose.—Grains 10 to 20. Price, 8 annas a tolah.

1516. *Iris florentina*. Vern.—Bekh sosan; ersá (Kashmir).

(1639) Lahore.

(2413) Kashmir.

(2368) Kashmir (ersa).

The fresh root is said to be a drastic emmenagogue; when dried it is an aromatic seologogue; principally used to form tooth-powder and hair-powder, and to make issue peas. Used for cough and rheumatism.

Dose.—3 máshas. Price, 8 annas a seer.

AMARYLLIDACEÆ.

1517. *Narcissus tazetta*. Vern.—Nargis. (1657) Lahore.

(2605) Kashmir.

Used for purifying the blood. Said to be an emetic in doses of 30 grains, and to be useful in hooping cough and epilepsy.

Dose.—1 másha.

MELANTHACEÆ.

1518. *Colchicum illyricum*. Vern.—Sárinján; talkh or shirín.

(1253) Jálándhar.

(1943) Lahore.

(1129) Ludhiana (talkh).

(2296) Kashmir.

Grows in Kashmir. Used in rheumatism and gout; the sweet kind is given internally, and the bitter used externally: seed also employed in gout.

By Europeans it is principally used in gout and rheumatism; also in affections of the heart and bladder.

Dose.—4 máshas. Price, Rs. 1½ a seer.

LILIACEÆ.

1519. *Scilla indica*. Vern.—Jangli piyáz; ishíl?

(1128) Ludhiana.

Used as a diuretic: it is quite as bitter as the ordinary squill, which is employed as a powerful diuretic and expectorant; and in larger doses an emetic.

1520. *Asphodelus fistulosus*. Vern.—Bhangár bij.

(1957) Lahore.

Said to be diuretic.

1521. *Allium cepa*. Vern.—Piyáz; gandhana (Pji.); basl (Arab.)

(1170) Ludhiana (seeds).

(1369) Amritsar (seeds).

(1650) Lahore (bij).

(33A) Pattiala.

Used as a food, and in special diseases. The bulbs contain an acrid volatile oil, and act as stimulants, diuretics and expectorants; they are occasionally used in fever, dropsy and calculi, catarrh and chronic bronchitis; also in cholic and scurvy; also externally as rubefacients, and when roasted as a poultice. It is considered by natives hot and pungent; useful in flatulency, and to prevent the approach of snakes or venomous reptiles.

Dose.—6 máshas. Price, 8 annas a seer.

1522. *Allium sativum*. Vern.—Lasam; thom (Arab.); gandhana?

(1169) Ludhiana.

(33A) Pattiala.

(2413) Kashmir (seeds).

Considered by natives hot and moist, aperient; useful to increase the knowledge and lengthen the hair! also in fever, coughs, piles, leprosy and special diseases. It resembles the onion in its active principle. It is used in hooping cough, fever, catarrh and convulsions of infants; also in dropsies and as an application for deafness. Used for food; also as a remedy for cholic and cholera. Externally its juice is applied to the ears for deafness and pain.

Dose.—1 másha. Price, 1 anna a seer.