

Holed paper
↳ Ambassador

DESCRIPTION OF AGRICULTURAL IMPLEMENTS AND PROCESSES
IN THE POONA AREA : 1789
(by the British Ambassador to the Peshwa)

A-10

I have already written you by the packet of Prince William Henry. This is intrusted to the care of Ralph Allen a midshipman of that ship and this accompanies a box of models of the implements of husbandry used in this country. As agriculture is in my estimation the firmest base on which a state can found independence and raise within itself the grand structure of civil polity, commercial interests and all those arts by which the nations of Europe are now so signally distinguished above the rest of the world. The means however simple by which that grand foundation can be improved and strengthened observation, nor in this point of view only, but also as enabling us some measure to form an idea of the present and past state of the arts of a society by the instruments used in the first grand object of all civilized nations (except I believe the Dutch) amongst which India has always held an eminent rank and is probably the source whence the western world has received through Egypt and Greece those lights by which it is now illuminated. The instruments of agriculture used in the Decan combining as you will perceive by the models now sent (p. 37) the grand requisites of perfect simplicity and exclusive utility -- the models if they were better formed or finished would give no idea of the rude construction of the originals, which a circumstance when combined with the ingenious design of the instruments leads me to conjecture that there must have been a time when mechanism was in greater perfection in the country than at present.

The soil of the Decan is generally good tho not deep rocklooin(?) succeeding to it, and in many parts it is much incommoded with loose stones. It is neither so stiff as to require much labour nor so light as to be termed arid and sandy. Consequently labors and fares of the husbandman are not oppressive -- shallow ploughing and the periodical rains suffice with few

exceptions of dry seasons for all the purposes of common cultivation, while the more improved and successive production are effected thro the year by the assistance of wells, whence the water is drawn as in Egypt by large wheels round which pots descending and rising (incessantly by the draft of oxen or turning of men) empty themselves into a trough placed as a receiver and conductor of the water.

The ploughing and preparing of the ground in all the common grains of which samples accompany (p.38) the models begins in April and lasts till the rains set in about the middle of June. After the ground is turned up by the hull or plough with one, two, three or four pair of oxen as the ground or quality of the cattle make requisite, the kuloo or bhukkur is next employed to break the large clods. To that succeeds the phullu or loar (to reduce them still more) assisted by a man who breaks them with a stick. Thus prepared and previously manured the seed is sown in drills with the paubar or teepun the correct formation of which is an object of the finest solicitude of the Culumbee or cultivator. To this again succeeds the kuloo lightly applyd to cover the grain to that the phullu or something lighter of the same kind with the loose boughs of a tree at once to press and as it were sift the earth over the new sown seed which thus deposited is left to itself till it makes its appearance. Soon after which the kolipa is introduced with muzzled bullocks to weed the ground and seems to me so ingenious and executive (?) a mode of performing a tedious and laborious part of agriculture (at the same time that it kindly loosens the earth) as to merit particular attention. As it is to be drawn carefully and lightly two bullocks and those steady (p.39) ones suffice, the irons are so constructed as to occupy the intervals of the teeth of the drill or paccla (?) about ten inches and the openings it scarce need be added are ~~so~~ ~~so~~ ~~so~~ ~~so~~ for the young grains to pass through unhurt, the division of this

instrument, one division being a little before the other with a man to each, the main stick or pole not issuing from the centre which at first sight looks like in its mechanism as in the kuloo, all arise from the principle of facilitating its operation in the ease of frequently turning up each division to clear the weeds which the conductors do with the handle of their goad or whip and to which some iron is fixed for the purpose. A second weeding of the same kind takes place when the grain gets 7 or 8 inches high which generally proves sufficient (tho a third is sometimes requisite) without further care than that of the bird keeper whose sling accompanys the instrument with which and balls made of the soil and baked in the sun he defends his charge.

Wheat and gram are not included in this mode of cultivation nor sown at the same seasons (p.40) but after the rains, when the quantity of water already imbibed by the earth the plentiful dews which refresh it during the cold season and a few flying showers that generally happen in November are sufficient for their nourishment. Very little rice grows in the high country the cultivation of which you know is quite different. To the best of my recollection the same drill mode of sowing and weeding as the above is used in Gujarat, but I am told that in the north of Hindostan the practice is with one drill fixed to the plough.

If you will do me the justice to impute the trouble to the right a desire of doing a little good you will excuse it from your sincere friend and humble servant.

(p.44) I send you another letter with a box containing models of the instruments of agriculture used in this country and an explanation of them in the letter. I think there is a society in London for the improvement of agriculture. If so and you think them worth it you may make a present of them to it.

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Col Robert Rydd to Sir William Jones: 1791

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Dear Sir,

In submitting the remarks on the vegetation and soil of the western side of the river Hoogley I never entertained the most distant idea of its meeting your approbation, being perfectly aware, (considered in a literary view) of its being grossly deficient, and of the political opinions, that you had long entertained a decided and opposite view of the subject, (ff 3v) namely of the fundamental impossibility of benefitting any country under the idea of the assumption of landed property by Government, a position which I have been prevented subscribing to from a view of the evils occurring under the migratory state of the administration joined to the improbability of ever remedying this fundamental defect by any means but one, which I apprehend may be justly considered visionary, (ff 4r) namely, by an edict enacting that whoever accepted any office in India, should be rendered incapable of ever returning to Europe, unless expelled for criminal malversations. But, I am wandering from the point in addressing you these lines, which you will perceive is far from asking an opinion respecting the propriety of any thing there-in advanced, for in this subject I (ff 4v) not at a loss; the only thing on which I hesitate, altho it has throughout principally induced me to commit these remarks to paper, I mean by bringing them forward either here or at home, to induce others better informed to produce more perfect; should it ever tend to the reputation of what has occurred to me. This point alone I am anxious to ascertain, and of which from past experience I ought to remain very doubtful (ff 5r) as well from the reception of some observations which have fallen from me, by the court of directors, as by the Board here, ~~instanced~~ in the late remarks respecting Rouscan (?) island.

I am Dear Sir, your faithful and obedient servant, Robt Ryd
Calcutta, 18th April 1791
(Recipient's name not written)

Dear Sir

It is not without much hesitation I send you the enclosed remarks on the soil and vegetation of the western side of the river Houghly, altho principally led thereto, in the view of inducing others better qualified to afford the completer information they may possess.

If I have glanced at other matters which you may consider not strictly connected with the subject, it is from my incapacity to form a due discrimination while impressed with the intimate union and importance of the subject and the not less critical situation of the national possessions in this part of Asia.

I have only to regret my inability to treat the subject in a manner more deserving your attention - a reflection (independent of losing the satisfaction afforded by obscurity) removes from my mind every the least desire of appearing in public (ff 9r) and induces me to request they may be offered (if you judge their insertion at all suited to the plan of the Asiatic Researches) under the anonymous title of Remarks of one of the Company's servants.

With great respect, I have the honour to be Dear Sir
Your most obedient and faithful servant
December 7th, 1791. Robt Ryd
To Sir William Jones

NOTE: Our P 95/I: The above piece is on ff . The sketches pertaining to it are in P 95/II.

NOTE: According to the IOR Robert Ryd was founder of the Botanical Gardens, Calcutta; was made Lt Col on 7.12.1782 and appointed secretary to the Military Department of Inspection about that time. This post he retained to the day of his death at Calcutta on 26.5.1793. The volume has come into the possession of IOR only recently and belonged to William Jones papers.

SOME REMARKS ON THE SOIL AND CULTIVATION ON THE WESTERN SIDE
OF THE RIVER HOOGHLY : AD 1791

MANUFACTURES:

The mechanic arts only exercised by the meanest orders among the aborigine community under every possible discouragement entailed by contempt and neglect in the higher orders who derive consequence only alone from the distinctions (originating in the prejudice annexed to the dogma of an original primitive inequality of birth, or the possession of power or wealth; these last alone constituting the supreme good in their opinion. (a) (ff 75v)

Distillation:

Their process conformable to that described in the Asiatic Researches by Mr A Kiar. (ff 76a.v)

The cultivators and fishermen engaged principally in furnishing the Calcutta market (ff 76a.v) with the succession of the fruits of the soil and species of fish in season.

Of the knowledge of agriculture possessed by the first something has been already offered in these remarks; and of the latter, they fall to be considered very expert, possessing the several modes of fishing known in Europe, and some processes it is apprehended peculiar to themselves. (b) (ff 77b.r)

Music:

The state of music by no means corresponds with the degree of civilisation and (ff 77v) their attainments in the arts of poetry, ethics, grammar, mathematics, astronomy or the mechanic arts. (c) The instruments in use are the Flute, Hautboy, Trumpet, Cittar, Violin, Cymbal, Castanets and Drums. (d)

Of musical characters or notation they appear to have no knowledge. (ff 78v)

Painting, Sculpture, Architecture:

Whatever attainments they may have made in these sciences no vestiges at present appear deserving notice. (e) (ff 79r)

Medicine, Surgery, Chymistry:

Their proficiency considerable, to (ff 79v) what extent I am not competent to delineate any more (ff 80r) than enumerate their *materia medica*, which is (ff 80v) most copious drawn the vegetable and mineral (ff 81r) worlds. (f) (ff 81v) blank (ff 83r)

The banks of this tract bordering the Hooghly river almost throughout their extent disfigured by excavations formed by Brickworks, the soil being adapted to furnishing this artificial mineral (g) the only one used in the buildings erected in Calcutta during the course of 25 years past. The ground so broken exhibiting an unexpected and disagreeable barrier, in some places rendering the access to the interior parts of the country difficult. The immediate margin much strewed with dismembered human bones and entire skeletons - the river often wafting carcasses in every stage of putrefaction, empoisoning the air with noisome effluvia not less shocking to the sight than offensive. (h) (ff 83v)

This tract throughout so level, that viewed from an artificial height of considerable elevation, such (ff 84r) as the spire of Calcutta Church, appears nearly overspread with dark forest wood; the intermediate plains however considerably foreshortened in the prospect in proportion to their distance.

IOR: MSS Eur F 95/1: The very long footnotes are separated here from the above text. Their connection with the above is indicated by (a), (b) etc.

The margin of the river generally exhibit a continued screen of high tufted monotonous dusky vegetation, unenlivened by the variegated tints which in a nearer view discriminate the component articles of the mass, excluding all view of the country and strewed with the habitations of the natives alike shaded.

The general face of the country examined internally exhibits a succession of plains of five or six miles, their greatest extent laying generally north and south, covered with rich vegetation. These plains skirted by what appears on a first and distant view, high (ff 84v) and extensive forest wood, which on examination is found to be only cultivated borders of the fruit trees peculiar to this tract. The mango, jack, & tamarind, coco, palmira, beetle &c interspersed with the bamboo, bhur (2), peepul, baubul &c and this artificial plantation throughout inhabited and strewed with houses and enclosures of the natives. These stripes appear to have attracted their residence from their original insensible undulating risings above the level of the country. The interior plains generally forming the species of ground termed Bonrah affording only one crop of grain from remaining overflowed or drenched with moisture until the end of December; rented at 1 Re per Biggah and where the skirts (ff 85r) border on the artificial eminences or more elevated banks of the creeks before described at 1½ Re per Biggah affording (the richer productions) in the Heymentic season a subsequent crop of wheat or barley intermixed with the kassary, kerella or muckoreundy, or in detached patches the water melon and phulwali. These last cultivated separately.

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SOME REMARKS ON THE SOIL AND CULTIVATION ON THE WESTERN SIDE
OF THE RIVER HOOGHLY: AD 1791

NOTES

Manufactures:

(a) These distinctions (of which they are not only tenacious but concealed to excess, in the supposed superiority over the rest of mankind) are diminishing within the Company's provinces. That from their unprincipled conduct when engaged in the service of Europeans, as from the evils entailed by the sacerdotal influence in corrupting the morals of the other orders of the community, unveiled principally in our courts of justice from the general litigious disposition ~~prevailing~~ pervading all orders of the native community.

The natives comprised in this tract principally composed of cultivators of the soil, fishermen, or mechanics such as smiths, carpenters, boat-builders, potters and weavers; of the last about 25 families residing in Seiboor, and about thrice this number in the extent of the margin of this district bathed by the river Houghley. (ff 75v)

The species of cloth manufactured principally confined to that in use amongst the lower orders, known under the following names sorrie and joro. But in the village of Ballesh Adaspore between 3 and 400 looms are said to be employed in the manufacture of the following species of cloth viz: Surrah-than, Rosaul, Dimiss, Cassaberie, Neinsoo and Ghullabund.

Their process in spinning, weaving and finally dressing their cotton manufactures, with the implements in use would require to be detailed (in the best manner) by an adept in the branch.

The striking simplicity characteristic of all their mechanic processes to a common observer appears to run through the whole, united to an uncommon degree of passive apathy patient and unremitting industry in the native.

Cements and Plaster: They have long been in possession of a glue formed with the gummy part of wheat mixed with lime, a preparation more impervious to moisture than the glues in common use. Nor is the preparation in use in Barbary (mentioned by Dr Shaw) composed of the curd of milk united with lime unknown.

They further possess two kinds of mortar probably peculiar to themselves, if not from time immemorial - viz: a cement composed of pounded bricks and lime mixed with water containing a considerable quantity of coarses (ff 76r) sugar: this last ingredient producing nearly the effect attributed to eszalnai or Terrace, causing the mortar to set quickly; and in a short time acquiring a great degree of hardness. The proportion of ingredients composing this mortar differs in relation to the degree of causticity of the lime employed. If long slackened two measures of brick-dust to one of lime and more sugar being added to mortar.

Another ingredient used in the composition employed in forming the flat terraced roofs of houses, obtained from soaking a species of grain (of the vetch kind termed natter-sams (?) by the aborigines) in water. The period for obtaining the proper state of the decomposition of this ingredient and drawing off the water, on its attaining a viscous ^{slimy?} quality joined to a very offensive smell; but the particular effect of this last ingredient not so obvious as that apparently produced from the acid of sugar used in the other process. An extract by fire of the fruit of the Burritukah (understood to be the Mirabolans ?) applied to the same purpose.

IOR: MSS. Eur F 95/1: by Col Robert Ryd (sent to W. Jones)

A plaster is likewise made from calcined shells which in its whiteness, gloss and durability may be said to rival Persian marble. This it in some degree owes to the labour employed in polishing it with a steel or agate burnisher and careful removal of the moisture, as it exudes, with fine muslin rags; equal care being taken in preparing the lime from the purest calcarious substances. The Cowrie shells said to afford the best. (ff 76v)

(b)

A line some hundred yards long furnished with floats, as used for suspending nets, is swepted in shallow water towards the tail of a bank. In the bite of this suspended cord a small boat is drawn along covered with a horizontal matting projecting considerably over the boat and but a few inches above the surface of the water with its edges turned up about 5 or 6 inches. The fish driven towards the bank endeavour to escape by leaping over the bite, when they fall upon the matting. This process mostly used for catching small and flat fish.

In inland deep creeks the fish are driven into ~~ways~~⁽⁷⁾ and nets extended across, by disturbing their auditory nerves. The fishermen in boats extended from side to side of the creeks proceed leisurely abreast, each boat being provided with a noisy clattering instrument, made of split bamboo which is plied whilst they approach the nets.

In the same situation a great quantity of brush and fagget ~~wood~~^(ff 77r) is thrown promiscuously into the creek but in a circular form reaching nearly from the bottom to the surface: this operation takes place about sunset. In the morning before sunrise this mass of brushwood is surrounded by a net extending from the bottom and supported with bamboo several feet above the surface. The fishermen enter this enclosure after sunrise and by diving and other means remove the whole of the brushwood throwing it on the outside of the net, which enables them to draw with the net all the fish collected there during the night.

The explanation given respecting the congregation of fish drawn together by this expedient they attribute to the shelter afforded by the brushwood to the small fish against being preyed upon by the larger species, and the presence of the first attracting the latter laying in wait for their prey.

The otter is also tamed by the Indians and rendered subservient to the catching of fish. This I have seen practised by individuals but is not in general use by the fishermen.

They are also in possession of several ingredients for intoxicating fish and robbing ponds. They also catch with their hands fish frequently muddy (ff 77v) bottoms by diving.

The configuration of their fishing boats appears well adapted to the limited sphere of their actions: the experienced rapidity of the tides - the degraded and precarious circumstances of the natives employed in the fisheries, their construction conformable to the ideas first probably called forth by the inexperienced primitive adventurers on the liquid element: a cone with the apex foremost. The form undergoes some approximation to the models obtained from contending with the more boisterous element, as the situation of the natives approach the mouth of the river.

But in the exertion of the mechanic powers of the human body they have called in aid resources unpracticed I believe in the western world, namely the action of the feet in plying the paddle or oar, exhibited by the left hand supporting the oar or paddle as a fulcrum in the place of the row-locks while it is plied with the opposite leg, grasping the extremity or handle of the oar or paddle with the toes. On such occasions the

fisherman is sometimes seen smoking the hookah held by the right hand, the boat continuing its course by this temporary substitute. In other situations the oar is grasped by both hands performing the office of a fulcrum whilst the extremity is plied by the opposite foot. On common occasions the oar or paddle is only plied with both hands. (ff 78r)

(c)

That they possess elementary treatises in chemistry, medicine, grammar, logic, ethics and theology, and in the latter sciences perhaps as deep as any of our ancient and modern writers, may be inferred from the enumeration in the following extract from the Ayyeonikbarry Vol 3rd page 95:

The Sciences of the Hindoos:

"The Hindoos have upwards of three hundred arts and sciences. The author of this work has associated himself intimately with the learned men among them, has heard and comprehended the various doctrines of each sect and profession. It is impossible in a single volume to give a particular relation of such a variety of subjects but for the satisfaction of those who are uninformed I shall sketch out the rudiments of each art and science, without offering any argument for or against them. This may prove an useful index to some future ingenious investigator who wishes to compare their doctrines with those of Plato and Aristotle the Sages? and commentators in the sacred text.

(page 167):

"In the extensive empire of Hindostan there are so many arts that they cannot be described. Something however should be said of them which may prove an acceptable present to the curious enquirer and perhaps excite his further curiosity."

(d)

Music:

Flute: something approaching melody, but an insipid, languid, monotonous taste is attempted on a flutebock made in a rude and artless manner from the joint of a bamboo pierced with holes by a hot iron. This instrument in use amongst only a few of the lowest orders.

Hautboy: used in the marriage and religious processions. Something like a wild kind of recitation, in a very harsh tone (doubtful if subjected to regular measure)

Of their vocal music; such songs as appear to approach to our melody, it may be doubted whether they are not borrowed from the upper country, of which the two following will convey some idea. The first an invocation of the Deity:

(Hurry Kirtnal Hurry Kirtnal Kistna Kistna Hurry Hurry:
Hurry Ram Hurry Ram Ram Ram Hurry Hurry)

The second some verses comprising a dialogue between a monkey and a bear:

(

(ff 78b.r)

An air performed on the Finoy (a species of the Hautboy) in their wedding processions : of this only an imperfect idea can be formed requiring a more minute examination than will repay the trouble in the opinion of most modern musicians.

Extract Communicated by Mr G L :

In recurring to the Indian musician I only found what indeed I expected, that without a very laborious and minute examination of their keys, measure, execution and cadences it would be very difficult to convey by our mode of notation to the European musician a distinct idea of their airs with the expression suited to direct the execution; their melody differing so wildly from ours that probably only a savage ear can relish it, or a sense of it duly conveyed by an aborigine musician after being instructed and accustomed to the performance of our melodies. (ff 78c.r)

But the justness of these strictures may probably be called in question. The same person on a more minute attention found this Air resolvable into the underwritten not inelegant if not original melody as performed by the Hautboys accompanied by two drums:

(ff 78v)

The chords of the Indian Violin, stopp'd by introducing the fingers between the strings touching them *languidly* with the flat of the nails of the finger.

Trumpets: constructed in the Europe form, only gives utterance to harsh jarring unconnected sounds utterly devoid of Air.

Drums: of different sizes in an octave progression. These drums are beat in a kind cadence alternate or more varied succession of strokes, but not embracing the extent of an octave, something like what is heard from smiths' shop when the anvil is beaten with hammers of different sizes. One of the smaller sort, altho a perfect cylinder and struck at both ends, one is rendered an octave lower by smearing the middle part of the parchment with a plaster of resin.

Cithar

Guitar and Violin: Their performance alike rude and unengaging; and are seldom seen but in the hands of the natives of the upper provinces.

(e)
Painting, Sculpture, Architecture:

From this remark must be excepted the temples of Cynh and frontiers (?) of Bishenpore adjoining to this tract constructed in a very different style and apparently from their massy solidity resembling Egyptian under a remoter period than the relation hereunto annexed refers to.

Sciences like these if not originating, fostered by taste and the enjoyment of liberty no traces can reasonably be looked for under the iron reign of despotic anarchy to (ff 79r) which they have been subjected. Of the remains exhibited in their temples a drawing has been given. Of perspective they possess no knowledge, altho under the tuition of European artists they become ready proficients in drawing colouring and carving.

Gunpowder, Cannon and Fireworks:

In use from an unknown period.

Arms: The bow and arrow, matchlock, pike, sword and buckler.

Printings:

Unknown altho modern stamps inscribed with magical characters, or from their holy writings recurred to on the occasion of consecrating and impressing their bodies with different colours on the particular festivals already adverted to.

Cotton Manufacture:

The finest cotton thread spun with a spindle but by a different process than practiced with the distaff in Europe. Lat the finest cottons are plucked from the seed with the fingers only, afterwards passed under action of a slender bow string for the purpose of arranging the fibres; it is then spread out and by means of a cylindrical stick formed into a hollow cone from which the fibres wind off by the mere extension of the hand holding the cone, the thread being twisted by the motion of the spindle impressed with the other hand, the lower end resting on a shell pen; the size of the thread conforming to the quantity (ff 79v) primarily selected from the cone forming the specimen intended the previous arrangement of the fibres and form of the cove allowing the cotton to wind off of itself conformably to the first impression given. Blank. The spindle a bit of iron wire a foot long the size of a knitting needle, to which momentum is given by a small compressed ball of clay surrounding the lower part.

Course cotton separated from the seed by two cylinders turning different ways and spun with the wheel as practiced in Europe.

Price of Labour:

In the country from 2 to 2½ Rupees. At the Presidency 3 Rupees per month. The rupee two shillings sterling, which makes about 2d to 2½d per day.

Cookery:

In their cookery they possess a process for rendering fresh meat tender, apparently unknown to the professors of this art in the western world, however reckoned, namely by steeping or stewing it in sour milk for some hours or macerating it in the juice of ginger; this without imparting any of the flavour of the articles produces the same effect in a more complete manner, than probably the slower and more insalubrious process of spontaneous putrefaction recurred to in Europe.

The bones of fish softened in the same manner so as to be eaten without any ill effect. (ff 80r)

Wax:

Obtained in considerable quantities from the mountainous east and west frontiers, as well as from the overflowed intermediate tract termed Lunderbunds.

In Calcutta it is manufactured into candles and sold at from 45 to 60 Rupees per maund.

The bee furnishing this wax is of a far more diminutive size and more inoffensive in its sting than that in Europe; the honey of an insipid quality.

Soap:

Of a coarse quality, prepared from a mixture of oil tallow and Sejomatty (supposed to be Natrum).

The fine cotton muslin purified and cleaned by steam. Gauze cloths and body linen with a lixivium obtained from the ashes of the plantain, and other vegetable matters.

Paper:

Formed from the Indian flat ~~hemp~~ ^{hemp} ~~sum~~ ^{sum} of various degrees of fineness. One species of paper used for records (independent of inscribed copper tablets) tinged yellow with orpiment to preserve it from insects.

Sugar:

The juice of the sugar cane obtained by a simple machine worked by hand on the principle of the cylinder used in the West Indian islands. The juice granulated into coarse sugar, crystallized into sugar candy, or refined into leaf sugar. This last process not in common use.

Leather:

The preparation of this article however necessary and in universal use, held in abhorrence by the aborigines and only practiced by the unfortunate lower orders reprobated by their (ff 80v) singular degen whose hopeless and degraded state has apparently entailed an equivalent dissolution of manners from being subjected to the performance of the vilest offices incident to humanity and being excluded from society often reduced to the necessity of feeding on carrion to support their wretched existence.

^w Linc, Burtocka (?) and Allus or a decoction of the tamarind are the principal ingredients employed in preparing the leather for use and dying.

^w An infusion of the fruit of Burtocka (?) (supposed the Mirabolum) employed in staining it black.

Red dye: An infusion of redwood or of a species of stick lac deposited on the branches of the Repul and Behr trees by a particular insect.

Yellow: From a decoction of the Lajsojah (?) (this tree not ascertained) and Burril bark.

Green: From a solution of the Lajsorah bark united with filings of copper and borax.

Various other substitutes are resorted to according to the means and abilities possessed such as the common ^{stick} lac and Quol root, the particulars of which the natives do not readily communicate.

Inks:

For common Bengal writing is formed of rice ^{blackn} ~~blackn~~. One Chuttuck in weight infused in 6 Chuttucks of water for 8 or 10 hours. This is also sometimes ground with lamp-black obtained by burning, common oil under an earthen pot until it attains the requisite consistence. For Persian writing a solution of shell lac and borax is mixt with lamp-black. (ff 81v)

(2)

Medicine, Surgery, Chemistry:

Inoculation long in use. All Chirurgical operations held generally in abhorrence and only practiced amongst the aborigines by the inferior orders; inoculation excepted by the Brahmins. Its origin probably lucrative in the practice.

Chirurgery (in which they are considered by us the least advanced) they often succeed, in removing ulcers and cutaneous irruptions of the worst kind, which have baffled the skill of our surgeons, by the process of inducing inflammation and by means directly opposite to ours, and which they have probably long been in possession of.

In the preparation of Cinnabar, Minium, Corrosive Sublimate, Vitriol, Sul ammoniac, Saltpetre, refining the precious metals; smelting and refining iron, lead, copper, tin and Talemug (?) (with the various combinations of the last three) preparation of steel of a very high temper, well versed. The manufacture of steel fallen into disuse from the introduction of European steel sold at a cheaper rate. Polishing and engraving precious stones. In the process of dying, extracting the precious essential oils for perfumes. Extracting sugar from the cane. Boiling the silk-worm probably from the remotest antiquity. On the process of refining gold and silver, see the appendix.

Alchymy in its application to the transmutation of metals still in vogue amongst the aborigines, and attended with the same impositions practiced in the ~~in~~ western world amongst its deluded votaries and by no means by the innocent and harmless process remarked by ~~M. Faure~~ (?). ☺

Glass not used in their windows and in the upper provinces where ~~now~~ the difference of climate it might sooner call for its advantages - the first more natural substitutes Talc (?) and transparent shells little if at all recurred to, altho' strong convex coloured glasses are found in the construction of the hot baths, in use only amongst the Mahomedans throughout Hindostan.

Oil:

Independent of the articles specified in the preceding remarks, oil is extracted from the following vegetables, principally used in medicine and for burning.

- 1st: From the seed of the Dhall Grinchah used in medicine but not cultivated (from 1 to 2 seers per Rupee).
- 2nd: Opium seed. One maund affording at the rate of 12 seers. price 7 seers per Rupee. (if 8lv)
- 3rd: Tobacco seed. One maund affording 8 seers at 7 seers per Re.
- 4th: Raddish seed. One maund affording 7 seers at 8 seers per Re.

The preceding articles already adverted to afford oil in the following quantities:

Seecnoo	1 Maund affords	11 Seers
Teel	1 "	11 "
Ghab (?)	1 "	10 "
Sarsaony	1 "	12 "
Rye	1 "	14 "
Coco Nut	1 "	10 "

The oil expressed in a mill of a peculiar construction worked by a bullock, capable of expressing about one maund of seed or 10 seers of oil per day of 12 hours and the relief of two additional bullocks.

The seed undergoes no previous preparation by heating or pounding, being only moistened with a little cold water, the machine uniting the powers of pounding and pressing.

Eighteen mills employed in Calcutta by eight families. (see annexed drawing of the mill)

The composition of glass not practised, whether known unacquainted, altho' they cannot convert our glass into weak and ill-proportioned phials.

Altho' at the period of the completion of the Aysen Akbari, gilded glasses are noted as the manufacture of the Behar province the same record asserts that the mountaineers of Berar (?) produce all the requisites for making glass and soap.

* A few lines of quotation in French from author mentioned.

Tobacco:

Probably cultivated from a far more remote period than the introduction of the use of it into Europe; if not known in the western world before the discovery of America; inferible from its very general cultivation and use throughout India, altho it is to be observed that it is still rejected by the rigid aborigines as reprobated by their dogma or ancient prescription. My enquiries respecting its first introduction and use have proved altogether unsatisfactory. (ff 82r)

Corn Miller:

Their corn ground by hand mills of the simplest construction; the cheapness of labour and horizontal surface of the country probably accounting for their not recurring to more complicated machinery; water mills being used in the north east ~~the~~ mountainous frontier of Berinagar, and the windmill, altho lately introduced by Europeans at the Presidency not likely to be recurred to by the natives from the expense of the machinery.

(in margin) (The corn either trodden out with oxen, by beating of the ears of the sheaf, against the edge of an inclined board; and freed from the husk in a wooden cylindrical mortar under a heavy stamper ~~or~~ moved by the foot.)

Purification of Water:

The impurities contained in the river and pond water are precipitated by the opulent natives by a solution of alum or rubbing the interior surface of the containing vessel with the nut termed Neemoney ~~or~~ (the plant producing this nut not ascertained) obtained from the western frontier.

The water is cooled in an unbaked earthen vessel composed of black clay and coarse sand of a texture sufficiently porous to allow the water to exude and moisten the exterior surface, which exciting a constant evaporation, particularly when exposed to a draught of air in the shade, cool the water sufficiently for common use; the luxurious recur to the use of saltpetre (the discovery of this process attributed to the Emperor Akbar: vide Ayeen Akbarry); Sal-mesniae altho manufactured in the upper provinces and capable of producing the same effect in a greater degree not having been recurred to by the natives probably from their abhorrence of the excremental ingredients from which it is formed.

/enclosed

Their sherbets congealed from a mixture of ice (collected in the cold season) sea-salt and sulphur. The liquid to be congealed/ in very thin earthen vessels: these last put into a cast iron pot lined with a coarse woolen blanket; the ice, saltpetre and sea-salt shoved on them and the whole covered up with a coarse blanket. The solution takes place in about half an hour and congeals the contents of the pot.

The ice preserved in ice houses wrapped up in coarse blankets until the setting in of the rains in the middle of June.

Lime:

Principally obtained from the Syhet frontier made from a general of a very hard texture and bluish colour.

Gluas:

A very strong kind made from the sinews of the buffaloes. (ff 82v)

~~@ This para under Tobacco should at "3rd" under "Oil" on preceding page.~~ ~~@@ In the original there is a short(rather illegible) marginal note against "Tobacco" regarding its introduction into England from some contemporary "History of England".~~

Pottery Ware:

Of the composition of porcelain and lacquered ware they appear to possess no knowledge, altho the materials are afforded in the East and most frontiers. The Chittagong frontier producing a very fine Gum known to Europeans under the title of wood-~~oil~~ oil. The Patchett and Rangur the Petmu and Kaolian. In the manufacture of China some progress was made by the late of Syah sufficient to ascertain its practicability.

Their pottery ware of the coarse unglazed kind made from brick clay turned on a wheel suspended horizontally on a pivot. In this article they are excelled by the bordering nations of Pegu and Siam who practice glazing their earthen ware.

In some of the ancient building (such as have come under my notice) of Mahomedan architecture small bricks glazed green and white are seen.

Wood turned in a turner's loom ~~is~~ is lacquered by the application of gum lac tinged with the different colours. Wood painted in *nīl* colours is also varnished with a solution of gum Copal ~~is~~ termed by the natives Karpah - this ingredient obtained from the ports of the Red Sea ~~is~~.

In the manufacture of gold thread - Enamel and Pilligree, long practiced.

Indigo:

By the fermentive and boiling process - the facula ~~is~~ precipitated with lime water or the gum of the Danti (?) apple. (ff 83r)

Gamb

(g)
Brickworks:

These bricks (prepared from a soil impregnated with salt) generally become friable ~~is~~ if exposed to the effects of the atmosphere without a covering of plaster to prevent their decomposition.

The apparent insensibility to such objects (exposure of the dying and dead on the banks of the rivers, heightened by the contrast of the men of a country diversified with the richest culture and vegetation under the canopy of heaven, considered in the western hemisphere as only attainable and connected with civilized and humane manners) greatly indisposes and prejudice, on a first view, the lower order of Europeans so as to induce them to consider the natives as beings of a (ff 83v) different nature from themselves, unanimated by the same feelings or ~~not~~ natives of action and from being insensible, undeserving of humane treatment.

This steeled inattention to the social duties often or tending even to the clamorous voice of the distressed objects of humanity, because they are not immediately within the verge ~~is~~ of their charge, or connected by the ties of affinity, convey impressions wildly differing from those imbibed under a free government, where every member of the community conceived himself interested in the protection of his fellow creatures however distant the relation.

This apparent insensibility (one of the dreadful evils accruing from despotism) to every participation in the public feeling commonly in disposing, on a first view, against the general Indian character, as conceiving them divested of all humanity, whereas by their configuration, they certainly possess it in an exquisite degree and ought rather to excite compassion from their being divested of its exercise by the influence of the government they have grovelled under - nor, independent of other observations, are instances wanting to confirm it.

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These observations drew from my amanuensis the following anecdote: "That during the severe captivity which some of the British troops suffered in the fortress of Darwar in the war of 1782 (ff 84v) in which he participated - a native traveller passing by and looking into the wretched place of their sufferings, where they lay linked in irons under the additional pressure of famine and sickness, from the bad quality of the scanty pittance of food allowed them - this traveller burst into tears and exclaimed aloud: what! is this treatment deserved by men, who bind up and the wounds of their prisoners and dismiss them on being restored to life with money and provisions?" the guards not less struck with remorse than astonishment at the audacity and danger to which the stranger exposed himself by the utterance of such sentiments after looking at one another for some time in silent wonder replied, ' what can (ff 85r) we do! We are helpless and should expose ourselves to worse treatment, if not death from disobedience of our orders by attempting to mitigate their suffering!

Truly concerned am I to remark for the sake of the national character that the appearance of an European in the internal parts of this tract besides proving a bugbear to women and children puts the labourers in the adjoining fields to flight until assured of the intentions of the visitor. This owing in some degree to the prejudices pervading the lower orders of Europeans in general against the native character but chiefly it has been represented to me to the violences committed by the numerous depraved race of native Portuguese, who under the garb of a European, possess nothing of his humanity, but all his defects, aggravated with the vices and imperfect part of the character of the natives of India unalloyed by the virtues of either. Let others determine whether it is not this depraved miscreant race which have discredited the European character so much throughout India. I offer this remark under the exceptions inseparable from all general characteristics, there being several characters among them who would do honour to the most enlightened society and whose names I should mention could my feeble testimony add any thing to their general acknowledged merit. (end 85r and this section)

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has not been fully gone into, that sufficient has been said to enable government to form a very near guess what expence will attend the causing five such Plantations to be made, namely, one at each Cavalry station—and I am of opinion that the expence will be warranted by introducing through these means generally, the cultivation of a tree which is stated to afford such excellent food for cattle, by which, no doubt, agriculture will be much assisted; and I will own to you that I look more to such general advantage, to be derived from it, than to its particular utility in affording food for horses, and that for a reason which I am surprised has not occurred to any of those Officers, whose letters I have now the honor to enclose, and that is (taking it for granted that it is good and wholesome food for horses,) whether it is wise measure, to accustom the horses in peace time, at their Cantonments, to a very sweet and nutritious food, which cannot by any means be carried to the field with them, as the sudden change of diet, and particularly from a rich succulent food, such as this is described to be, may occasion them to fall off, and become so weak, as not to recover their strength again during the campaign, which appears to me a consideration deserving of the most serious attention.

The situation I now hold, has caused me to think it a duty incumbent on me to state what may materially affect the service. I am nevertheless a great advocate for introducing the growth of these trees, on the general principle of their affording nourishment for cattle; and think Doctor Anderson has great merit in starting the subject, and as the Officers who have written on the subject all appear willing and desirous to superintend the cultivation, I cannot but recommend that the Plantations should be made.

JOHN BRAITHWAITE,

A true Copy, (signed) WALTER WILSON, SECRETARY,
Military Head Quarters, Madras, March 12th, 1795.

To JAMES ANDERSON, ESQUIRE,

I OUGHT to have acknowledged before now the receipt of your books, and of the plants you have been so good as to send me; I hope that the Jamaica Plant will do well here, as its foliage would be a great blessing in this parched country.

Although

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Although I have not done myself the honor of writing to you before, I have not been an inactive, nor an indifferent spectator, of the great and laudable exertions you have made to serve your country, and I now heartily rejoice to learn that you have succeeded to a degree that could not have been expected.

I wish I could give you a similar account of the improvements of this side of India; but we have hitherto had no person like you, to remove our prejudices, not to stimulate our exertions; a little indeed has been done in Sancetia. A few years ago, I procured two or three hundred acres of land on that Island, for the purpose of making trials of several kinds of culture: Mr. Stewart, whom you have seen at Madras, has been permitted by this government to reside there, and we have now a crop of sugarcane in great perfection. We find coffee and some other articles, answer very well, but we have hitherto not succeeded with indigo.

I should be extremely obliged to you to send me an account of your method at Madras of preparing chunam for buildings, terraces, tanks, &c. for I understand you excel us very much in these works; I believe that the chunam that you use is no better than what we have here, nor perhaps so good as that we import from Arabia. The difference therefore must arise from the ingredients that you mix with it, or, in some degree, from the method of working it; you will do me a very great favor if you will send a specimen of all the substances that you put into the chunam, and their history, as far as it is known. It appears to me, from whatever I have seen here, that the art of the Indians consists merely in producing an acid similar to the acid of sugar, which unites with the lime, and forms a compound superior to selenite in being insoluble in water, and in other respects.

I hope you will excuse me for the trouble that I have ventured to put you to, and I beg, as soon as is convenient, that you will favor me with an answer.

H. SCOTT.

Bombay, October 24th, 1793.

To DOCTOR SCOTT, BOMBAY.

I AM favored with your letter of October 24th, which gives me much pleasure, as the commencement you have made will no doubt be extended to the countries lately ceded by Tippoo, where in a lower latitude you will experience less difference of heat and cold, and thereby carry on the culture of tropical productions

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ductions with more ease than on Salsette, as well as that your pos-
sessions there are more extensive.

The only nicely I know, in the culture of Indigo, is to sow it at
the commencement of the season of heavy dews falling, which here
is the month of January, as by this means the plant is preserved
during its tender state; but no doubt the seasons must be very dif-
ferent on the Malabar Coast, where the heavy rains which are al-
ways hurtful to Indigo fall in the S. W. Monsoon when the sun
is in its northern declination.

I shall soon send you more seeds of the bastard Cedar of Jamai-
ca, which will very well reward every one who rears it in these
parched countries, in the feeding and preservation of their cattle.

I enclose a memorandum left by my friend Colonel Floyd, who
is very desirous of getting the kind of horse from Arabia, of which
he has given an account; in obtaining which, if you can give us
any assistance, it will lay both him and me under a very great
obligation.

I likewise send answers to your queries about chunam,
which I hope will prove satisfactory and applicable to use,
and will send you a copy of my farther Public Correspondence,
as soon as it returns from the Press.

And am, DEAR SIR, Your very obedient Servant,
JAMES ANDERSON.

Fort St. George, January 27th, 1794.

MEMORANDUM FOR DOCTOR SCOTT, AT COLONEL FLOYD'S
REQUEST.

HE wishes to provide an Arabian horse, of the race, called
Cachlani.—This is said to be preferred by the Bedouins inhab-
iting between Bussora and Syria,—he wishes the Horse to be
4, 5, 6, or 7 years old, of the largest size, and strongest
make, and if possible to procure a certificate of his Breed.
—The history of the Cachlani race, or even fables of their
origin.

Colonel Floyd would go as far as 500 or even 1000 Pag-
odas, for an unquestionable fine young horse, of an age fit
to ride, of this breed; and would prefer such an one as the
Arabians themselves esteem.

ANSWERS

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ANSWERS TO DOCTOR SCOTT'S QUERIES, REGARDING
CHUNAM, &c.

Question 1d.—The chunam here is found in low lands, and
in small detached pieces, never as in Europe, in rocks, or on high
grounds.

Is the same the case at Madras? what appears to be the reason
of this in tropical countries?

Answer 1d.—The chunam here is found in the same manner,
and chiefly collected from the ploughed fields, although we
have likewise great strata's of shell marble.

There is nothing in this peculiar to tropical countries, further
than as they are more favorable to animalization the means by
which nature operates the separation of calcareous earth from
the general mass.

Question 2d.—Have you any chalk?

Answer 2d.—Iac Luntz, which is the matrix of diamond here,
is the nearest approach that I have seen to chalk.

Question 3d.—What ingredients are added in different works,
to your chunam, and in what proportions? by what rule is it as-
certained that the infusion of these ingredients is in proper propor-
tion to the chunam?

Answer 3d.—One parrah, about a bushel, of chunam, well
mixed with two parahs of coarse sand, by beating, and water
added, till it is of the consistence of a paste, is all the preparation
it receives till it is brought to the bricklayers, who have pots of
water standing by them, in which an eighth part of as much jag-
gery (coarse sugar) is dissolved, that is to say, a pound of sugar to
a gallon of water.

With this sugar and water, the paste, or mortar is mixed with
only two or three strokes of the trowel, and more of the sugar
and water added, till it is rendered so liquid as to run into, and
fill up all the chinks and crevices of the building, when another
course of bricks is laid, and the application of the mortar again
repeated, and so on alternately, till the wall or building is
completed.

For this kind of work and for the quantity of lime above
mentioned, about ten polluins (the pollum ten pagodas weight) of
sugar is commonly used.

A wall so constructed, is afterwards covered over with a coat
of what is called coarse chunam; for which one parrah of chunam
is mixed by beating as before, with a stick resembling the
Roman

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Roman pilum, with an equal quantity of coarse sand, in the application of which five pollum of sugar is used.

To render the face of the wall perfectly even, and prepare it for receiving the polished coat, a second covering is applied, consisting of four parrah of fine chunam, mixed by grinding on a granite slab, with one parrah of white sand.

The sand is previously sifted, to prevent the mixture of small stones, no jaggery is mixed with this, or any addition but water, which should be perfectly sweet.

Last of all, the fine chunam, to receive a polish, is applied; for which the shells of shell fish are preferred, in the proportion of six parahs ground very fine on a granite slab with a granite roller, to one parrah of the purest white crystalline sand, till by the addition of water they become a smooth uniform paste.

To this, the following ingredients are added, while the paste is spreading on the wall. For twenty feet square, tyre (turned milk) one measure or three pints, four eggs, five pollum of ghee or butter, and three pollum of soap stone (*Lapis Olearis*) powdered and mixed with the hand, as they are used; they reckon that the work polishes better likewise, when two or three pollum of the soap stone has been previously mixed with the paste.

The fine chunam now applied, must be well rubbed with polished steel trowels for a considerable time, the more labour that is bestowed, the more beautiful it becomes: the water that exudes from it (and it will sweat like a person in the hot bath) must be wiped off, and if any cracks appear, the trowel must be again diligently applied; it will continue to sweat for some days according to the state of the weather, and the water should be carefully wiped off every morning with clean cloths, otherwise the colour will be tarnished.

It is now diluted with powdered soap stone in a linen bag, and the last polish given by rubbing with pieces of polished granite, or petrofilix; in short this labor continues, while there is any exudation of moisture, and until the work is perfectly consolidated.

Question 4th.—Is quick-lime preferred to lime that has been kept for some time, provided the latter continues in a sable powder?

Answer 4th.—They pay no regard to this, and for all the purposes I have mentioned the lime is generally brought hot from the kiln before it is completely slackened.

Question 5th.—Where do you get the sand that you mix with the lime? must it be pure silicious earth, or do they use such as is mixed with shells, calcareous earth, or alumine? are they in the habit of using powdered brick, instead of sand?

Answer

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Answer 5th.—For building, they use the sand of any stream where the water is sweet; which hereabouts is felt spar and quartz, being fragments of the granite rock of which the Peninsula chiefly consists; but for mixture with the polished chunam, we have a bank at Trivatore, on the sea Beach, of pure crystalline white sand.

All salars matter, except sugar, and the other ingredients I have mentioned, are deemed hurtful. Our walls are corroded here by the spray of the sea, and vapours from the earth, where the soil is aluminous.

They make terraces of broken bricks or gravel, and when the latter is silicious, such as may be found in the beds of rivers, the terrace will endure for ages. Bricks that have been thoroughly burned, and reduced to powder, answer as well as any sand, in the mixture of lime for building.

To lay a terrace, one parrah of broken bricks, one parrah of chunam, and five pollum of jaggery, dissolved in good water, and mixed together, is called jelly.

Lay this jelly to the thickness you require; for the roof of a house or choultry, it is common; not less than six or more than twelve inches thick, and beat it with the trowel till it comes even on the surface, and then rub it with wooden trowels, and frequently moisten it with jaggery water sprinkled upon it (or poured) for several days, continuing the rubbing till it is sufficiently consolidated.

This is afterwards coarse chunamed, with a mixture in the following proportions; one parrah of chunam, one and a half parrah of sand, and five pollum of jaggery, and lastly fine chunamed, either for terrace work, or to contain water, as a tank or pond.—Grind four parahs of chunam, and one parrah of crystalline sand together, and mix with the mass five eggs, three pints of tyre, and five pollum of ghee.

N. B. I have found oil of sesamum, and other expressed oils, answer as well as ghee.

While this mixture is applying, five pollum of the *lapis olearis* (*Balsum of the Tamuls*) is daubed upon it and worked into it with the trowel—the polishing is finished as beforementioned.

It is worthy of remark, that where a wall is constructed of great thickness, and faced with stone, which leaves great and irregular inequalities on the inside, they fill up the heart of the wall by pouring in the abovementioned jelly, an art probably imported into Europe by the Romans; but lost again by the barbarous tribes who subverted the Empire; as I have seen a place on the water of Leith, in

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In Mid Lothian, called Lennox Castle, on the estate of John Scott, of Millenie, which has been construed in the same manner.

The theory of the whole subject however, may be collected from the experiments of the Honorable Mr. Cavendish, on lime-stone, published in the philosophical transactions; and the subject farther elucidated by Doctor Black, in his researches into the nature of lime-water.

The art being preserved here, is a proof, either that this country has never been entirely conquered, or that the Conquerors have been less savage than our Progenitors,—much however may be attributed to the antiquity and fixture of castles amongst the Indians, in accounting for the preservation of their manners, customs and arts.

Question 6th.—In what proportions do they mix the chunam and sand together?

Answer 6th.—Vide answers 3d, and 5th.

Question 7th.—What is the reason of buildings decaying so soon in this country, in which lime has been used as in Europe, with, out the addition of the Indian ingredients?

Answer 7th.—Quick-lime is so powerful an absorbtive, it cannot cease to act till it is saturated, and the pubulum is supplied more directly by mixing the Indian ingredients, than the external contact of the atmosphere will admit, in the European method, by the absorbtion of fixed air.

Question 8th.—Do you make any particular addition when you form works that salt or fresh water is immediately to cover?

Answer 8th.—Nothing more than that an encrasement of the ingredients is held advantageous in all cases, especially in works that are to lye under water.

Question 9th.—Do they wet the mixture of lime and sand for some time previously to the addition of the other ingredients?

Answer 9th.—The mixture of lime and sand is only moistened with water while it is beat in a trough of granite slabs, with the pilum of wood, sometimes stod with iron; an operation that may last some hours, and the mixture is generally removed in wicker baskets, to the workmen, as soon as it is judged to be sufficiently beaten.—But I have known the fine chunam mixture of lime and sand, preserved moist and soft, under water in a tank, for several days, till such time as the wall where it was intended to be laid was esteemed thoroughly dry, and afterwards applied as effectually as if it had been recently made.

EXTRACT

(9)

EXTRACT OF A LETTER FROM JOHN BRISTOW, Esq.
Dated, May 22, 1794.

I WAS favored with the duplicate of your letter of the 9th April last, the original having miscarried, and immediately applied to Sir John Shore, respecting the shawl goats. Sir John expressed his great respect for Doctor Anderson's character, and would have been extremely happy to comply with his request, but the goats were procured by order of the Directors, for the purpose of being sent to Sir John Sinclair; their arrival here has been reported home, and the Court advised that they would be dispatched to England by the first ships which may sail in the proper season; under these circumstances, Sir John Shore thought he could not with propriety intrust the delivery of them to Sir John Sinclair, to any other hands than the Court of Directors. Colonel John Murray, and other gentlemen here, have been competitors with Doctor Anderson, for the honor of being the channel for presenting the goats to Sir John Sinclair, and were refused on similar grounds; I trust this explanation will prove satisfactory to Doctor Anderson.

Some of the goats have died; but to compensate three deaths, more have been born of the genuine breed; so that I hope a sufficient stock will be preserved to make the intended experiment in Scotland.

In consequence of my residence at the court of Owde, I have numerous acquaintances in the upper provinces, and will endeavour to procure some more goats, if I succeed they shall be sent to Doctor Anderson.

To SIR JOHN SINCLAIR, BART.

BY Captain Currie, of the Swallow Packet, I sent you a ram, with six horns, from Mount Ararat; and by Captain Chatfield, of the Rodney, another of the same breed, with four horns, which I hope you have safely received as the third, likewise presented me by Shamir Sultaun, is since dead, but this is of less consequence, as I now see by Truffler's habitable world, that Pallas found this many horned breed amongst the Tartars in Siberia, so that in case they should appear an object worthy the attention of your society, they, may be more readily procured by the way of St. Peterburgh. In my last letter of February 20th, I mentioned on the information of Doctor Roxburgh, the arrival of 13 shawl

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to the Bishop of Landaff, who I believe is the learned and elegant Dr. Watson; another to Mr. More, Secretary to the Society for the encouragement of Arts, and that the third may contribute to your own amusement, in the fine weather of the Indian Seas.

In case you write to these gentlemen, as I wish you may, let them know that West India Plants will thrive on any part of this coast, and I have this morning received a letter from Captain Read Collector of Barra-mall, of which the following is an extract; which you will be so good as communicate to them, as a commencement to the introduction of the productions of the high Latitudes.

"Allow me to trouble you for as many more seeds, to give Doctor Ord, who has been so good to take charge of a small, but seemingly excellent spot, for the cultivation of Exotic Plants; on the top of the Rock of Kistnagurry, which may be sufficiently supplied with water all the year round."

As you have so attentively made an offer of your services, and expect to return here in December, which is the most favorable season for putting plants in the ground, besides Cloves and Nutmegs, which we have never yet been able to obtain; I have taken the liberty to enclose a list, any of which will be acceptable from the countries which you may visit.

JAS. ANDERSON.

Fort St. George, August 13th, 1795.

TO DOCTOR ANDERSON.

VI)

I have had much pleasure since my arrival here, in visiting the mulberry plantation in this neighbourhood, which is in a very flourishing way, tho' not so extensive as I expected to find it; the trees are so luxuriant, that they will yield several thousand cuttings, which might be very advantageously planted, at this season, as the hot land winds are now over, and we may expect constant refreshing showers for some time to come; no place is more adapted for the extention of Mulberry plantations than Guntor; the soil seems favorable to vegetation in general, and there are abundance of wells, from which a plentiful supply of water can be had at all times of the year.

I should think myself wanting in that respect which I owe you, did I not step forward to offer my services to superintend the plantations here (which were originally under the care of my predecessor, (Mr. Mackenzie) and to extend them as far as may be thought necessary; I am the rather stimulated to this, seeing

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seeing that so many of my cotemporaries, professional men, have had this office intrusted to their care; and should feel much hurt, were it supposed I was not equally zealous to promote a matter of so much public utility.

I would not have addressed you on this subject at present, knowing that you had declined any farther interference in the business, were I not inclined to hope, that you may at a more favorable period re-assume your correspondence with government on this subject; and ultimately complete what your indefatigable exertions have already so far effected.

I have read with much attention all your late publications, on the introduction of the Silk manufacture, and the cultivation of the bastard cedar tree, sugar cane, &c. &c. and should be much gratified, were it in my power to aid you in your laudable endeavours to render the propagation of these plants general throughout the country; I am much inclined to think the sugar cane would thrive well here; the soil is a light red earth, with a mixture of loam; in some parts water is plentiful and the villages abound with rich manure.

The seed of the Bastard Cedar, which you have already sent up here has not succeeded under Major Wynchi and Mr. Ram; I would have much pleasure in giving it a trial, and think the season now more favorable to it than it was two months ago.

I have made a purchase of a piece of ground, which it is my intention to form into a garden, where I shall plant all sorts of plants, indiginous and exotic, such as country greens, cabbages, turnips &c. and shall be very happy to give the bastard cedar a place amongst them, if you will favor me with a few of the cones by the Tappal.

GEORGE WILSON.

Guntor, July 18th, 1794.

TO DOCTOR ANDERSON, MADRAS.

VII)

I received your obliging letter, and was much pleased with the account of your method of using chunam; it is much more simple than ours, and for terraces it appears to be preferable in every respect, whether it is also to be preferred for tanks and aqueducts, I cannot take upon me to judge.

I should perhaps have told you in my former letter, that I was anxious for information on the subject of chunam works, as Sir Joseph

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Joseph Banks has expressed a great desire to me, to be made acquainted with the art, I have written him all that I could learn on that subject; I had unfortunately sent away my letter to him before yours came to hand, for I found that I had been telling him some things that were not strictly true; I told him for instance that our method at Bombay was with little variation the practice all over India, I judged it therefore right to send him a copy of your account, which will be very acceptable to him; of this I hope you cannot disapprove.

I sent Colonel Floyd's Memorandum to my friend Mr. Small, Surgeon of the Company's Factory at Grain.—In a letter which I got the other day, dated June 24th, he says—“ I shall be happy to do what I am able to fulfil Doctor Anderson's wishes, I have at present a horse that would highly gratify him, if the circumstance of his being a gelding is not against him; he is two years and a half old, 14 hands and an inch high, of a roan colour—a more highly bred animal has not been seen in this part of the world; he is of the true *Chylaxi* or *Kylani* breed, as the Arabs call it; which I take to be the *Cochlani* of *Neibbur*, as the Bedowin Arabs here have never heard the name cochlane, I purchased two horses from the Bedowins in the winter, when a great Hord of them were in this neighbourhood.—The other horse is also of a very high breed, a gelding, he is four years old, of a sorrel colour, and large size, 15 hands and an inch high: he is of a strong make and runs very fast, I think he would be liked by an officer in the field.—I propose to send you them both to Bombay, if I can procure a passage for them, where you may be determined by the best judges whether it is worth while to send one or both of them to Doctor Anderson.”—I shall be glad to hear from you, respecting those horses; and whether I can do any thing farther for your friend Colonel Floyd; I am no kind of judge of horses myself, nor shall I send them till I hear farther from you, and receive the approbation of the judges here—on this occasion I am convinced that Mr. Small will not wish to make any thing by his horses.

We have this season two considerable and flourishing plantations of sugar-cane in Salfette, and we have reason to believe that the island of Jamaica is not better fitted for that produce.

I wish to get for Mr. Rivett, Chief of Salfette, some seeds of the Mauritius Cotton; we have heard that a plantation of it has been lately attempted at Madras, with great appearance of advantage, and we wish to try it here.

We have lately found on the hills of Salfete plenty of the *Nerium*, that gives indigo; as a great part of the island is moun-

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Mountainous and unfit for any other cultivation, we are thinking of raising that plant on a large scale; I am aware that it does not yield the colouring matter like the indigo-fern, by fermentation; but we have on our hills plenty of firewood for the trouble of collecting it; you would much oblige me by letting me know what success has attended the attempts to manufacture it in the Carnatic, whether they have cultivated it, or only collected such as is found wild? and lately on what plan they have constructed works for such a manufacture, with warm water?

I am still obliged to trouble you farther, but I hope the motive will excuse me.—you know that Surat is one of the most populous towns in India, and contains a great number of Parsees; these people from the border of the Caspian, still retain much of the vigor of a more northern land, they are poor and industrious, and being free from many of the prejudices of the Gentoos, they soon embrace any employment by which they can improve their condition.

Mr. Cherry of the Civil Service, now stationed at Surat, has expressed to me a wish of teaching the Parsees to raise the silk worm, as you have done in the Carnatic; he has written to Bengal for the worms, but has never been able to procure any from thence; can this be the consequence of a wretched policy, which prefers one spot of ground and one set of men, to the general welfare of mankind?

Mr. Cherry is a man well qualified by his abilities and from his situation, to make such a scheme succeed—we shall be greatly obliged to you for your opinion, on this subject; and for the silk worms, if you approve of a trial of them.

H. SCOTT.

Bombay 25th August, 1794,

To JAMES ANDERSON, ESQUIRE.
I SHOULD long ere this have acknowledged the receipt of your obliging letter of the 16th ultimo, together with its valuable enclosures, had not the daily expectation of the eggs you announced, induced me to defer my acknowledgements till the period of their arrival.

My brother has communicated to the minister your kind offer of assistance, to any people he may send to Madras, for the necessary.

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TO DOCTOR SCOTT, BOMBAY.

A Ssoon as I was favored with your letter of August 25th, I enclosed a copy to Colonel Floyd, and have now the pleasure to forward you his answer which, I have no doubt, you will think of importance enough to transmitt to Mr. Small.

Had I known your wish to communicate with Sir Joseph Banks, I could have said nothing more to the purpose regarding chunam, excepting that perhaps the various modes of workmen in obtaining the same end, may be considered a difference—as, in tempering steel, every workman has his own method, although the tempering of steel may depend only on one principle—the due proportion of heat; and the instantaneous saturation of lime, on the application of such substanices as will speedily supply the acrial acid, for rendering it mild and fixed.

I might have told you, for example that although the last coating of fine chunam, which is always very thin, and little more than a surface exposed to the air, is prepared by mixing it only with pure chrystilline sand, yet that I had seen some workmen mix a small quantity of oil of sesamum, and even vinegar, in the preparation.

I might have stated, likewise, that the work applied to cisterns and aqueducts, where the foundations are securely laid, is as capable of containing water, as Marble is; and after the work is consolidated, our Buildings of Brick, being struck with violence such as the blow of a sledge hammer, will not break in the direction of the cement, but only in the direction of the force.

I have been thus minute, in hopes that the learned President, who has devoted an ample fortune, and the vigor of life, to the most commendable uses of public economy may influence all Europe to construct buildings of duration, and enhance the value of our West-Indian Islands, by the consumption of sugar, for the saturation of which, there is great probability the Romans used honey, oil, blood, eggs, milk and mucilages, in the construction of their works.

The Nerium Tintorium likewise grows in great abundance, on all the hills in this Country; and I understand, that the Calico Painters, both here, and in the Eastern Peninsula, use it in their processes.

Doctor Roxburgh told me, that some colour which he prepared from it, was valued in Bengal, at seven shillings and six pence the pound.—Mr. Roebuck found, that the colour of it was obtained better by the cold than the hot infusion, but I do not hear, that any considerable plantations of this tree, have ever been made

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made, the latter gentleman having favored me with a drawing and description of his Indigo Works, in this neighbourhood, I have the pleasure to enclose them, for your satisfaction, and think that the Indigo-fern, being more easily collected, and yielding the most brilliant colour, is the only thing of the kind, that will defray the charge of expensive works.

Both the Roebucks are able Chymists, and expert Artists; they have erected a steam Engine, that acts with a force of two tons and a half, for pumping water, and driving the beaters; they have likewise laid cylinders, pierced with holes, in the bottom of the vats, for the transfrission of a blast of air; which renders the former practice of beating less necessary, as by exposing innumerable surfaces of the liquor to the air bubbles, a speedier, and more copious deposition of Indigo, than by the beating process, is obtained.

Although I was at the Capture of Surat Castle, in the year 1759, yet having had no opportunity of landing, I know but little of the place; but from what I saw at Bombay, have no doubt that the Parsees compose a considerable part of the population:—The lower classes of the Hindoos, have no repugnance however, to working in silk, and the culture of the Mulberry is exactly the same as the culture of the Suger-cane:—cuttings of the same length may be placed most advantageously, at the same distances; and in ground that is fit to raise a crop of sugar-cane, the Mulberry will arrive at the greatest perfection, for feeding the Silk-worm.

Having had some overtures from Hydrabad, for supplying them with Eggs of this insect, it will be easy, in case this takes place, to transport a breed, by the way of Arungabad and Poonah, to your friends at Surat; and recommend you to request the Resident at Poonah, to plant a few Mulberries in his Garden; for the reception of the monthly Worm; the annual Breed, I shall not fail to send Mr. Cherry, by sea.

JAMES ANDERSON

To DOCTOR ANDERSON, P. G.

I SHALL be extremely obliged, if you will be so good to send me the original description of the silk manufacture, which I am told, is printed in English and Malabars; and published by you some time ago.

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government in the Peninsula, of which, the Honble. Court, will not hesitate to approve, seeing the export must necessarily fall into our hands.

I have the honor to be, MY LORD, &c.
JAMES ANDERSON.

Fort St. George, February 19th, 1795.

TO THE RIGHT HONORABLE LORD HOBART.

MY LORD,

HAVING requested Captain Moony, to send on shore some Shawl Goats, I am sorry to find that the two which have been sent, are so lean that it appears to me very doubtful they will live, till they reach St. Helena; considering the safe arrival of these animals a National object, I take the liberty of recommending that the goats on board the Goddard and Asia, be landed immediately, to recruit; and not forwarded to Europe, till the next fleet, which I understand, will sail in April.

Captain Mooney says, that the goats have fallen off astonishingly, since they came here, and is sorry they had not been landed on their first arrival.

I am, My Lord, &c.
JAMES ANDERSON.

Garden, March 3d, 1795.

TO DOCTOR ANDERSON,

PHYSICIAN GENERAL.

I SEND you six Shawl Goats, by order of the RIGHT HONORABLE THE PRESIDENT IN COUNCIL, landed from on board the ship General Goddard.

J. GREENHILL.

Friday Morning.

TO DOCTOR ANDERSON, MADRAS,

BOTH your obliging letter, and the celebrated ram gog, reached me in safety; I return you and your respectable Armenian friend my best acknowledgements, for so uncommon a specimen

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of that useful animal. I expect the other with great impatience; I hope that it will arrive time enough to propagate the real antediluvian race in England, even this year.

A very curious fact has occurred, in consequence of your sending me this sheep; I had one from the island of Gothland, in the Baltic, where there is a very pure race; to my utter astonishment, upon comparing the two sheep together, they were exactly the same in point of size, shape, wool, &c. only the Swedish had four horns, and not six, like the ram from mount Ararat; this circumstance tends to confirm the idea that the Goths came from Asia, as some historians have asserted; they would naturally bring their flocks with them; so that the same race might be found in the neighbourhood of Mount Ararat, and in the distant Island of Gothland.

You will hear with pleasure, that the British Wool-society is going on successfully; you will find in this packet, some specimens of our manufactures, and two waistcoat pieces, one for yourself, and the other for your Armenian friend, of which, I hope he will have the goodness to accept.

We are at present deeply engaged in an agricultural survey of the whole Island of Great Britain, the nature of which will be sufficiently evident, from the papers herewith sent: the whole will be completed in about three months, and in nine months from its commencement.

I hope that your spirited exertions, for the advantage of the valuable possessions of Great Britain in the East, are succeeding to your wish.

JOHN SINCLAIR.

Whitehall, 17th April, 1794.

TO SHAMIER SULTAUN, ESQUIRE.

I HAVE the pleasure to enclose for your inspection, a Letter from Sir John Sinclair, with masters of stuff for Waistcoats, and accounts of the safe arrival of the Ram-gog in England.

I beg the favour of you to let me know your choice in the pattern.

JAMES ANDERSON.

Garden, March 6th, 1795.

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ter, dated the 7th instant, and to inform you that Captain Craig, of the Queen, has been ordered to receive them on board of his ship, and to be mindful of such instructions as you may judge necessary to send, for the care and preservation of them.

J. WEBBE, SECRETARY.

Fort St. George, 11th April, 1795.

Ex. R. SHERSON.

To CAPTAIN MILLIKEN CRAIG, OF THE
SHIP QUEEN.

I AM directed by the Right Honorable the President in Council, to desire that you will receive from the Physician General, Doctor James Anderson, six Shawl Goats, which upon the arrival of your ship in England, you will dispose of according to the orders which you may receive for that purpose, from the honorable the Court of Directors.

Doctor Anderson has provided a sufficient stock of provision for them during the passage, and has been authorized to furnish you with such instructions as he may judge necessary, for the care and preservation of them, which you are hereby required to observe and obey.

J. WEBBE, SECRETARY.

Fort St. George, 11th April, 1795.

Ex. R. SHERSON.

To SIR JOHN SINCLAIR, BART.

I WAS favored with your letters of April and July, with the reports which you sent by Mr. Cleghorn, who on this and every other account, will always merit my best regards to his welfare.

The Edinburgh Manufacture has been admired, as you will see by Mr. Shamer's note on the specimens of intended waist-coats, which I inclose, and the attention of my Armenian friend, will farther appear by a beautiful ram, from the province of Herivan with wool entirely white, which Captain Craig of the Queen, has taken charge of for you.

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The attention of the Court of Directors, in ordering Shawl Goats from Tibet, as it may greatly tend to introduce manufactures of this delicate substance into our Island, will not escape your notice; some that were sickly in the late Ships having been committed to my care, are now shipped by government on board the Queen, Indianmen, in good health, and I have the pleasure to inclose you my correspondence regarding them.

At first sight they appear like Welsh goats, both body and limbs being covered with long shaggy coarse hair; but besides the fine down or matter of which Shawls are made; what distinguishes them from other goats, is the divided state of the Scrotum, making the Testicles separate and distinct appendages.

The Shawl is a very delicate and thin matting of down, on the surface of the skin, amongst the roots of the hair, and I have only been able to find it on the younger, or half-grown goats, not only in the natural state which I have mentioned, but likewise falling off in small flocks, and entangled amongst the hair, which may be owing to their long stay at Calcutta.

I have read some of the reports made to the Society in which you so commendably preside, with great attention, and am satisfied, that from the public injury which appears by land lying nearly waste in commonage, it must be the wish of every well disposed person that they were appropriated and inclosed, after just compensation to those who have hitherto enjoyed the pasture and use of such lands.

Here a much greater proportion of land, comes under this description than in England, and if ever a reasonable mode of appropriating them is adopted, the improvements, I have hinted at, may be spread over the country with much public and private advantage.

JAMES ANDERSON.

Fort St. George, April 23d, 1795.

To JAMES ANDERSON, Esq.

I AM favored with your letter of the 15th instant, accompanying the eggs of the white and yellow silk-worm, they came perfectly safe, and will I hope put soon another face on the business here, and an end to my uneasiness at seeing such fine foliage as there is at present on the Plantation remaining useless,

The flannel and wax-cloth the bearer takes with him.

BOSWALL PARKINSON.

Yellow, April 16th, 1795.

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falls of cocoa-nut or palmira leaves, sufficient also to keep off any sudden fall of rain, will answer, and with these there can be no doubt the insects may be as numerous on each plant as is thought proper.—as they never can be cultivated to any extent if allowed to remain on the same plants, they are what is termed sown, that is, two or more females full grown are placed according to the size of the plants, at the divisions of the branches, in the most favorable situation for the young insects to spread over them, in bags, the corners being tied together, of 2 inch square pieces, of the fibrous covering of the stems of cocoa-nut leaves, the parenchyma of which has been destroyed by the weather, leaving only a network of the fibres, that the young may be able to pass freely through them, these females must be taken as soon as any young appear;—or what I have found answer very well, when a leaf of a nopal can be spared, is to cut it into pieces according to the number of females adhering, and with the thorns of the plant fix these pieces wherever they may be wished; when this is done, the only other attention that is required is to keep the ground clean about the roots of the plants to drive away vermin, and perhaps water the plants a little till young again appear, when such females as are wanted for breeding are without loss of time placed on fresh plants as before described, and the remainder of the insects gathered also as quickly as possible, and plunged into boiling water between two cloths, till the water covers the whole, when they are taken out and dried in the sun and then are fit for the market; the quicker all this is done the better, for the young constituting the finest colouring part, if they are allowed to escape, they cannot be collected, and the mothers become of little value, soon nothing but an empty husk; the plants are then washed and cleared of insects, and allowed to recruit for a month or two, for a succession of many insects on one plant will certainly destroy it. What is farther considered necessary, is to have plants in pots or boxes under cover or in places that can be covered, to preserve a breed from heavy falls of rain and in wet weather, I have now therefore and shall always have in the choultry, the only cover at the nopalry, a sufficient number of plants in pots for this purpose, so that they may be distributed at any time.

Having thus stated to your Lordship all regarding the culture of the insects that occurs to me, and what I have been doing, it may be only proper to add in respect to its intrinsic value, and value to this country, that the dye of the silvester cochineal, which this is, is by no means inferior to the grana fina, and is only of less value about one third, from the silky co-

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vering which adding to its weight makes equal parts not equally colouring, but this covering renders it more easily reared and a more certain produce than the other, so that in Mexico it is the principal culture of the poor, requiring no stock, and but few hands to earn a subsistence on frequently the worst ground, and employing only the feeble and old, women and children.

I am, MY LORD, &c.

ANDREW BERRY.

Fort St, George, August 26th, 1795.

To DOCTOR ANDERSON, MADRAS.

THE favor of your letter was received, and laid before the Board of Agriculture who expressed themselves much pleased with your communication, and having requested me to convey you their thanks, I take the earliest opportunity of doing so with pleasure.

Your continuing to communicate any thing interesting to the cultivation of our Indian territories will be gratifying to the Board, who are extremely sensible of the advantage to be derived from such assistance as yours, in the measures they are now pursuing.

JOHN SINCLAIR.

Board of Agriculture, Whitehall, London, March 10th, 1795.

To SIR JOHN SINCLAIR, BART.

PRESIDENT OF THE BOARD OF AGRICULTURE,
LONDON.

I HAVE the pleasure to inclose a letter from Shamir Sultaun, Esq, acknowledging the receipt of a vest of the new manufacture which arrived here on the Lord Thurlow, where by I am enabled to thank you for a similar mark of attention to myself.

The sentiments of the Board of Agriculture, conveyed in the hand writing of their President, I consider a great honor, and I shall be happy if any thing in my power can promote their laudable intentions of public welfare.

At present however, there is nothing I can recommend to your notice, except a letter from Mr. Bogle, surgeon of the Honorable Company's Bombay ship the Swift, in which if there appears any new information, you will do me the favor to lay it before the Board.

The Right Honourable the Governor here, has been so good as to receive the questions for agricultural surveys, you did me the honor

honor to enclose, and will no doubt exert the most effectual means to render them of use, as most of the questions can be answered immediately by the village writers, an immemorial establishment of record in every village in Hindostan.

JAS. ANDERSON.

Fort St. George, September 10th, 1795.

QUERIES.

PROPOSED BY THE

BOARD OF AGRICULTURE;

To be Answered by Intelligent Farmers.

- 1.—What is the nature of the soil and climate in your neighbourhood?
- 2.—The manner in which the land is occupied, and whether the farms are, in general, small or great?
- 3.—The manner in which the land is employed, whether, in pasture, in husbandry, or a mixture of both?
- 4.—If in pasture, what grasses are cultivated, what species of stock is kept; Whether the breeds can be improved, or whether new breeds ought to be tried?
- 5.—Whether any of the land is watered, and whether any considerable extent of ground is capable of that improvement?
- 6.—If the land is employed in Husbandry, what are the grains principally cultivated?
- 7.—What is the rotation of crops, and in particular whether green crops, as turnips, clover, &c. are cultivated, and how they are found to answer?
- 8.—Whether fallowing is practised or otherwise?
- 9.—What manures are made use of, and whether particular attention is paid to the making of dunghills?
- 10.—What are the usual sort of ploughs, carts and other implements of husbandry?
- 11.—Whether oxen or horses are made use of?
- 12.—What is the usual feed time and harvest?
- 13.—Whether the land is inclosed or in open field?
- 14.—What advantages have been found to result from inclosing land, in regard to the increase of rent.—quantity or qualities of produce—improvement of Stock, &c.?
- 15.—What is the size and nature of the inclosures?
- 16.—Whether inclosures have increased or decreased population?
- 17.—Whether

17.—Whether there are any common fields, and whether any division of them is proposed?

18.—What is the extent of waste lands, and in what manner are they at present depauperated?

19.—Of what improvement are those waste lands most capable, whether by being planted, converted into arable, or into pasture land, or by correcting the present mode of commonage?

20.—What is the rate of wages, and price of labour, by the day or the piece, and what are the hours at which labour commences and ceases, at the different seasons?

21.—Whether proper attention is paid to the draining of land, particularly the fenny part of it, and what sorts of drains are commonly made use of?

22.—Whether paring and burning is practised, and how is it managed and found to answer?

23.—Whether the country is well wooded, and under what system are the woodlands kept?

24.—What is the Price of Provisions, and whether the price is likely to be steady, to rise or to fall?

25.—What is the state of the roads both publick and parochial, whether they are in good order, and whether any improvements in regard to making roads have been discovered?

26.—What is the state of farm houses and offices, whether in general they are well situated and properly constructed?

27.—What is the nature of the leases commonly granted, and what are found to be the most advantageous convenants between the landlord and tenant, for the improvement of the ground?

28.—To what extent have commerce or manufactures been carried on in the district, and have they had either good or bad effects on its agriculture?

29.—Are there any practices in agriculture within the Country that could be of service to other countries?

30.—Are there any societies instituted in the country, for the Improvement of Agriculture?

31.—Whether the People seem to have a turn for improvement, and how such a spirit could be best excited?

32.—What improvements can be suggested either in regard to the stock or the husbandry of the Country?

33.—What are the situations, and nature of the soil; where the Rot in Sheep is the most prevalent?

34.—What are the sorts of Herbage produced from these lands?

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35.—Have any means been used to cultivate any of such lands, to prevent the rot, and what have been practised?

36.—What is the nature of the soil and herbage where the Sheep took rot last winter, and where they never were known to rot before?

37.—Are those lands old sward, or sown with seeds, or both?

38.—Are there any obstructions to improvements, and in what manner can they best be removed?

To DOCTOR ANDERSON, MADRAS.

I HAVE the pleasure of yours of October, and find you going on actively as ever. I am just delivered of a ponderous work, and have put a copy under the care of Mr. Gazeley, of which I beg your acceptance.

This has taken up so much of my time, that I have hardly been able to think of any thing else: I observe that Roxburgh is gone to Bengal, and expect soon to hear of his determination about returning to the Coast.

I hear that a proper gardiner is going out from hence, a specimen of engravings made from Roxburgh's drawings, will be given to the Court of Directors in a few days, together with a plan for their publication, agreeably to the scheme which I proposed to your Board when I was in India, if the Directors persist in their resolution, the work will be a splendid one.

The reviews contain accounts of all philosophical books; but politics take up the attention of every one—I am just setting out for the country.

PATRICK RUSSELL.

London, July 13, 1795.

To DOCTOR ANDERSON. P. G.

YOU gratify me highly, in supposing I may be any way serviceable in promoting the useful arts, I shall certainly aim at it in whatever comes recommended from you.

No doubt you will think it advisable to colonise your red-coat family in many stations, so as to prevent risking the loss of the species by any partial accident, and perhaps it might not be improper to mix some plants of the Kew nepal or other innocuous sort, with the naga calli, wth the intention of affording the insect an opportunity of taking to it if they will.

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The naga calli shall be planted here as you direct, immediately: I suppose it will be necessary to wait their vegetation before you send me any of the Cochineal insects, and if you think it proper, I request you will also send some of the innocentive napal.

I have made enquiry, and am informed there are three sorts of napals common here.

Trichinopoly, 28th Augt, 1795.

JOHN FLOYD.

TO DOCTOR ANDERSON, P. G.

Condapilly, August 27th, 1795.

I RETURN you my sincere thanks for the account of the Cochineal insects you were so good as to send me some time ago, which I should have acknowledged sooner but have been much indisposed with sore eyes, a disease very common here at present.

A great deal of this valley laying waste might with little trouble or expence be employed in the cultivation of the opuntia, indeed it seems fit for little else. I have no doubt, were Government to give the smallest encouragement to it, many people here would very soon be induced to cultivate the Cochineal, but without some attention from Government, they will not easily be brought to believe it a matter of any consequence.

If you will favor me with a few joints of the opuntia I will cultivate it myself, and do all I possibly can to make some of the more liberal part of the natives cultivate it also: probably if Government were to allow a small gratuity for every certain quantity of Cochineal manufactured by the natives, and taken in part payment of rents, it might prove a means of introducing the general cultivation of the little insect.

ROBERT GALLAWAY.

To Mr. GALLOWAY, ASSISTANT SURGEON, at Condapilly.

YOUR idea is so proper regarding the mode in which the Cochineal insects may be rendered productive that it demands my most sincere acknowledgement, and to assure you that by applying to Lieut. Freeman at Matulipatam you may obtain a supply of any number of plants that you may want, and I will take care that a breed of the insects are forwarded to you in due time.

The establishment of a Nopalty here having been made some years ago and now the compliance of Government with the orders

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communications to the Bd of Agriculture, 1797 ?

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This correspondence (2-9) between J. Anderson & T. Adlard in the Board of Agriculture (pp 9) is printed (with minor omissions and alterations) in Vol I of Communication from the Board of Agriculture (Jul 1797) pp 352-6 under the title "On the Drill Husbandry of the East". This piece also gives sketches of the four ploughs.

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square, may be enclosed at some of the Cusba villages under every collector, which Doctor ANDERSON thinks will be sufficient to begin the cultivation of the Cochineal, and which should be prepared by placing in it one hundred plants of the *Opuntia*, called by the Tamuls, *naga calli*; at the distance of five feet from each other.

A true Extract,
J. WEBBE,
SECRETARY.

To JAMES ANDERSON, Esq. P. G.

UNTIL lately, I imagined the drill plough to be a modern European invention, but a short time ago, riding over a field, I observed a drill plough at work, very simple in the construction; which upon enquiry I find is in general use here, and has been for time immemorial.

This led me to make some farther enquiries into their mode of husbandry here, and I find that drill husbandry is universally practised in the Innacoadah district, in the culture of all grain, except horse gram; and is also used in the culture of tobacco, cotton, and the castor oil plant.

In the practice of this husbandry they have two other ploughs in use here, exclusive of the drill plough, and the common plough, one of these has a horizontal share and immediately follows the drill plough at work; it is set into the earth about the depth of seven or eight inches, and passes under three drills at once. It operates by agitating the earth, so as to make the sides of the drills fall in and cover the seed again, which it does so effectually, as scarcely to leave any traces of a drill.

The other plough alluded to, is used after the corn is about eight or ten inches high; it cuts up the weeds between three drills at once, and earths up the roots of the corn at the same time. I cannot by writing, give you an adequate description of the three ploughs, but will send you a set of them if you wish it, accompanied by a man who has been in the practice of working them.

I have some reason to think this drill plough, simple as it is, possesses an advantage that the patent drill plough does not; for I remember reading in some publication, that the patent drill plough, was defective in not dropping the grain equally. This plough has no defect of that kind; it has three teeth about eighteen inches long and ten inches asunder; through the upper end of each tooth near the back, is inserted a hollow bamboo of

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an inch in diameter and about three feet in length; these three bamboos are set upright, and their upper ends are brought nearly together in the form of a triangle, and inserted through the bottom of a wooden cup;—this apparatus is supported and made steady by cords, in the way of shrouds, which lead to different parts of the plough.

In working the plough, the cup is not filled with grain, but is fed by hand; this labour is performed by a woman, who walks on the left side of the plough, with a bag or large pocket of grain before her; her right arm stretched out, and her wrist resting on the edge of the cup; her hand is filled with grain, and by moving her fingers she lets drop into the cup, as much grain as supplies the three drills in due proportion.

When the grain in her right hand is nearly expended, she fills it again from her left hand; observing never to take her right hand from the cup, while the plough is in motion, as that would leave a vacant space in the field.

The drill plough which drops the grain by some piece of mechanism, will probably never sow a field so equally as is done in this way; and here is a remedy for the defect complained of in the English drill plough.

Whether the expence of two persons to work this plough may or may not make against its being introduced into England, in preference to that now in use, I shall leave to be determined by those who are better acquainted with the subject; yet when it is considered, that supplying the cup, is a labour performed by women, and how soon an acre is sown in this way, perhaps it might not be rejected on account of the additional expence, which could be but trifling.—The first cost of a plough of this kind, could be but a few shillings; whereas the patent plough is an expensive machine.

A gentleman who is now here on a visit, informs me, that his grandfather who farms part of his own estate, practises the drill husbandry; but found the drill plough dropped the grain so unequally, that he laid it aside, and now from a conviction of the superiority of the drill husbandry, uses a drill roll which has a number of pegs upon it, and makes holes in straight lines, into which the seed grain is dropped by hand.

This is a tedious way and he informs me has also its defect, as it is done by children, whose hands in the cold season, when wheat is sown, are apt to get numb, and they often drop too many grains into each hole;—however, many prefer this method to the drill plough at present in use.

Whether the plough with a horizontal share for covering in the drills, is in use in England, I know not; if not, it will be an

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acquisition to those who practise the drill husbandry. I am also equally uninformed, whether the instrument used here for cutting up the weeds, between the drills is known in England: it is simply three small marmots set upon three teeth, placed at the same distance from each other, as the teeth of the drill plough.

By my sending you these instruments, you will have a better idea of them than I can convey in writing; but as I am informed by a man from the Carnatic, that the drill husbandry is used in some parts of it to the westward, you may possibly have seen these ploughs, and in that case it will be unnecessary.

You correspond occasionally with the Board of Agriculture; should you think these instruments will be useful in the drill husbandry at home, I will thank you to forward the set I shall send you to them:—if, however, you should find that the instruments have been already described in any publication, and that it is a matter known amongst Europeans, that the drill-husbandry has long been practised in this country, it will of course be worth no further attention; but so far as I know at present, I am the first European that ever noticed it; for although it has been practised under the eyes of every body in the Guntur Circar, no one that I mentioned it to ever observed it before, nor did I observe it myself till lately.

I remain, &c.

THOMAS HALCOTT.

Innacondah, December 31st, 1795.

To JAMES ANDERSON, Esq. P. G.

I AM ready for about 15,000 more mulberry cuttings, but I do not know when I shall be able to get them, as we have collected all that is in the neighbourhood:—we have sent twenty bullocks to Arcot for cuttings, and I am in hopes they will be here loaded in a few days.

I have supplied Mr. CARNIE, Surgeon, at Royacotta, with some Cochineal insects, and with all the instructions that I was able to give in regard to the care and cultivation of them, as he has made a small plantation, and has it pretty forward with the Nopal.

EYRE W. LYTE.

Trippatore, January 4th, 1796.

To CAPTAIN HALCOTT,

Commanding Innacondah.

I AM favored with your letter of the 31st ultimo, on the drill plough, which as far as I have been able to dis-

*A para or a cracker
in 'communication'*

not in 'lawn'

slightly ruptured

(5)

cover, is perfectly new to every European, and as a curiosity at least will be esteemed a valuable present by the President of the Board of Agriculture, to whom you may depend on my sending it by the very first ship.

JAMES ANDERSON.

Madras, January 5th, 1796.

To MR. LYTE,

Trippatore.

I AM favored with your letter of the 4th, and observing your uncertainty of getting mulberries for your plantation, as the gardens at Arcot, have all been covered with several feet of sand by the late storm—I this morning, dispatched 5 coolies with 4,500 cuttings dipp'd in liquified cow dung, which will all be budding by the time you receive them, but for the convenience of package and carriage, as they are 20 inches in length, it will be in your power to cut them in two, which will afford nine thousand plants; and I have directed this quantity to be sent every day till you are fully supplied.

J. ANDERSON.

Fort St. George, January 9th, 1796.

To JAMES ANDERSON, Esq.

ACCEPT my grateful thanks for your last communication, which I have perused with great satisfaction.

In Major M'CHLORFF's the Moravian Brothers, and our Mission's gardens, millions of cochineal insects are already feeding upon extensive plantations of the *Cactus Opuntia*, and the natives even start at them, and at the fine red colour shewing an inclination to follow our example.

We are at the same time much obliged to Doctor BERRY, for his observations which perfectly agree with ours, only we wish to find out an easier method to take off the white coverings of the insects.

If you would oblige me by a set of all your publications, I would esteem it a great favor, as I have sent all I had to several societies in Germany, and intend to draw from them a short history of the industry you have so much encouraged on this Coast.

I am &c.

C. S. JOHN,

Tanquebar, January 9th, 1796.

X not in 'lawn'

X not in 'lawn'

(6)

To DOCTOR ANDERSON, P. G.

I AM favoured with yours of the 5th, and will with great pleasure send a set of the ploughs, for the President of the Board of Agriculture.

This is not a rice country; but a Carnatic man, whose family practises the drill husbandry somewhere to the westward of Madras, informs me that it is there used in the culture of rice, and is vastly superior to the method generally used of making a seed-bed, and transplanting it by hand.

At the commencement of the rains, he says, the paddy field after being well ploughed by the common plough, is sown by the drill plough, and left to the natural rains, till it gets into ear; and it is then, and not till then, flooded by art; so there is not only a great saving of labour, but of water, which in years when the rains are scanty, is a more material saving than even that of labour.

He informed me, the drill husbandry to the westward of Madras, was only partially used, and that chiefly by the wealthiest and most intelligent of the ryots. I asked him how it could happen, that the poorer sort did not avail themselves of so obvious an advantage,—he said, the people were poor and ignorant, and it could not be attempted by those who had less than three yoke of stout oxen; one for the drill plough, another for the horizontal plough which follows, and allowance made for the accidental lamenesses and sicknesses of cattle. The weaker kind are not able in aairy soil, such as paddy field, to draw the plough so straight as is required; and buffaloes, are seldom so manageable, as to plough very strait; these he said are the reasons why the drill husbandry is not more generally adopted in the culture of rice; for all agree in this, that it saves a great expense of labour and water.

Every thing in this district, except horse gram, is cultivated by the drill husbandry; I may mention hemp, in addition to the articles I before enumerated; of its superiority in the culture of cotton, I had a convincing proof the other day, when I saw more weeds cut up by the mamoty plough before described, in an hour, than could have been done by hand by many coolies in a whole day.

This cotton was of a dwarf species, and was sown by the drill plough; I saw another field of a different kind, the drills about thirty inches asunder; this I understand was sown by hand; the drills were made by the common plough. In the same way is sown the castor oil seed, the drills about a yard asunder; in short, the drill husbandry is practised by every ryot in this district, without a single exception.

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You shall have the ploughs by the latter end of the month.
I remain, &c.

THOMAS HALCOTT,
Innacindah, January 10th, 1796.

To JAMES ANDERSON, Esq.

I am just favored with your kind letter, and happy to hear that it lies in your power to furnish us with mulberry cuttings for which Captain READ deserves his best thanks. Having collected all that is in the neighbourhood and other parts of the Barramah, I have the pleasure to inform you, that I have now in the ground about twenty-five thousand cuttings, all of which I am in hopes will do very well, and am ready for as many more.

Captain READ is desirous that you may be acquainted that although the expence be great from Madras to Trippatore, he would wish you to keep forwarding the plants as you mention, until you have sent a pack, as we are very desirous of getting as many in the ground as possible, while there is plenty of water, to be had for them.

I have the pleasure to inform you, that we have got the black pepper plant from Tinnevelly, and Captain READ has the promise of the Cinnamon in the month of March, from Mr. MARTIN, Resident of that place;—he is likewise promised some coffee plants from Saut Gurr.

EYRE W. LYTE.
Trippatore, January 11th, 1796.

To JAMES ANDERSON, Esq. P. G.

I HAD the pleasure of receiving your last publication yesterday upon many very interesting subjects, for which I return you sincere thanks, from the very favorable event of the experiments made by Dr. Berry, relative to the dye of the Cochineal, I hope that the culture of that valuable insect will now meet with every due encouragement.

It is nearly three months since, I planted about two thousand slips of the prickly *Opuntia*, on some waste ground, which I cleared in the jungle, and which from its being well sheltered on every side from the winds, by the hills and woods surrounding it, I hope will be a favorable spot for the culture of Cochineal.

A fortnight ago, I received some insects upon a plant, from Mr. LYTE, at Trippatore, which I have since transplanted,

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and the young are now beginning to appear in numbers, upon many of the plants.

To remedy the great inconvenience which must arise in collecting the insects, by the prickles upon the nopal, I have observed, that young prickles full grown can easily be pulled off by the fingers, and the old ones broke across upon the edge of a knife, by which means the plants can be handled at pleasure; and in this way, one person may clear several plants during the day.

I have the honor to be, with much respect,
JOHN CARNIE.

Reyacottab, January 11th, 1796.

To DOCTOR ANDERSON, P. G.

I WITH pleasure acknowledge the receipt of your last publication, and am happy to observe that you have succeeded so well at Madras in the cultivation of Cochineal. The last method proposed by Doctor BERRY, for killing and preparing the insects, appears to be by much the best, as by that none of the dye can be lost.

The Cochineal insects which Doctor BERRY forwarded me sometime ago, produced as many young as covered twenty small plants. On the 3d ultimo, just fifty days from their first appearance, they again began to bring forth, and have stocked a considerable number of plants; so much so, that Mr. HANEY, who saw them the other day, says, I have now as many as would supply all the Barramah.

As the plants which I first planted were rather young when the insects were attached to them, they have suffered considerably in their growth; for which reason I have planted another piece of ground with strong, juicy nopal, each about a yard high; on which I intend to have the insects placed for the next breed, which I expect will be very numerous; and when they come to their full growth, I mean to prepare a quantity of them for use.

SAMUEL MAC MORRICE.
Salem, 11th January, 1796.

To the Officer commanding on board the Rodney.

SIR,
PLEASE to receive on board four ploughs, directed to Sir John Sinclair, President of the Board of Agriculture.
W. CARRUTHERS.
Madras, 11th February, 1796.

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Received on board the Rodney, February the 22d, 1796.
four ploughs directed to Sir John Sinclair, Bart.

J. C. LOCHNER.

To SIR JOHN SINCLAIR, BART.
President of the Board of Agriculture.

SIR,
I HAVE the pleasure to transmit you an account of the drill hebandy of this country from a very intelligent person, Captain HALCOTT, and to illustrate the subject, I have shipped on board the Rodney; a complete set; viz. the common plough, the drill plough, the small horizontal plough, for covering the seed in the drills, and the weeding plough.

As they are put in separate packages to save room, I have caused the parts that are disjointed to be marked with the same letters and figures, to enable you to put them together; and although they may appear very simple, yet as on farther enquiry they will be found to be, in use over the Peninsula, I have no doubt you will think them deserving the attention of the Board.

I am, &c.
JAMES ANDERSON.
Fort St. George, February 22d, 1796.

To DOCTOR ANDERSON, P. G.

IN the present infant state of the Cochineal it may be satisfactory to you to be informed of its progress, wherever it has been attempted.—I have, therefore, sent you a small sample of my production, and also a proof of its quality in a piece of cloth dyed with it by Mr. FLEMING, marked A; with which, I have sent you another piece of Cloth dyed at the same time with some *grana fina*, procured at the dispensary here.—In doing this, Mr. FLEMING observes, that the quantity of Bengal Cochineal used, was to that of the *grana fina*, as three to two; viz, two drachms of the former and one drachm and one scruple of the latter; in every other respect the two processes were exactly similar.

The nopalry I have confined at present for production in about an acre: I am, however, very cautious not to load the plants too much with insects, until they have taken strong root.

In December, I collected about four pounds, which Mr. FLEMING, has sent home to the Court of Directors.—My situation I am sorry to say, will not allow me to give any attention to it, so

in colour
somewhat modified

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residence in India. the medium heat appears to be justly placed at 86° although I believe it might be fixed with propriety two degrees lower at some places north of the Kista, such as *Samalivive*, *Waltaire*, and *Ganjam*.

Although I did not keep a regular diary, I constantly during three years (1792, 1793, and 1794,) observed the state of the thermometer at Waltaire, which on a comparison with the diary kept at Madras, was always two or three degrees lower; in December I have seen it at 60° , and in June at 95° but never higher, and then only for three or four hours.

At Ganjam, I have seen the thermometer exposed to a northern aspect stand at 55° , this was in the latter end of December 1792, and in January 1793, I saw the thermometer, in a room at Balafore so low as 50° it rose in the middle of the same day to 65° .

At Sankerry-droog and Ryacotta in August last, I observed the thermometer at sun-rise, when it stood at 72 , 73 , and 74° at the same period at Madras, it was about 86° .

The result of all the observations is, that we enjoy a fine salubrious climate on the Coast.

JOHN CHAMIER.

Madras, October 19th, 1795.

To JAMES ANDERSON, Esq. P. G.

AFTER hoping that these few lines will find you well, I take this speedy opportunity of acquainting you that the insects I so seemingly gave over in my last, on account of the weather, after being tied to the trees nineteen days, at length have made their appearance very thick.

Our having had very heavy rains on the first 5 days after they were tied to the trees, led me to think the spider went into the bag rather for a shelter than any thing else.

A part of them had a blade over them, and the other part not, which induces me now to believe that the erecting of pandals is needless, as I see no difference in the having them sheltered or not in regard to their increase.

Captain Read's time, being much taken up in other business, he has just desired me to present his compliments to you, and requests you will be so good as send, besides what I wrote you for in

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in my last, some of the best cuttings of the Mulberry, seeds of black Pepper, and any other seeds you would wish to bring forward in this country; and that if you have not as yet despatched any, that you may dispense with sending the Cochineal Insects, as it is thought, there will be sufficient here for us to proceed.

ERYE W. LYTE,
Trippatore, October 20th, 1795.

To SIR JOHN SINCLAIR, BART.

President of the Board of Agriculture, London.

HAVING distributed some hundred copies of your Queries, about the middle of last month, I was in hopes that Answers might have followed, but no answers appearing from any quarter, and the packet by the Ship Mary being to close this evening, I have written what occurred on the instant, and enclose it for your satisfaction, till such time as you may be informed by higher, and perhaps better authority, as you know that my opportunities in this way must be very limited.

JAMES ANDERSON.

Fort St. George, October 25th, 1795.

Answers to some Queries of the Board of Agriculture.

Answer 1st.—A stiff clay; but in different parts of the country there are all sorts of soils.

2d.—The occupied lands in the country are by villages, which are small communities.

3d.—The land is employed by the villages in both pasture and husbandry, in the proportion generally that appears in the Cowle of the Maghae of Pooroor, the present population being only equal to the cultivation of two thirds of the land that was under crop, in 1780.

4th.—No grafts are cultivated.—The stock is chiefly Buffaloes, and a small breed of cattle for the plough, some hairy sheep, and goats, all of which may be greatly improved by better breeds from other countries.

5th.—All the rice grounds are watered, which is the most valuable crop, and as far as the population and stock extend, these are therefore cultivated; but it will appear from survey, that much may yet be done, in further watering the country.

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6th.—

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6th.—In the watered lands rice, in the higher lands what are called dry grains, of which *Holcus*, *Sorghum*, *Cynodon*, *Corocanus*, *Sesamum*, and various kinds of *Phaeoli*, and *Delicis* are the principal.

7th.—A rotation of crops is unnecessary, as the lands here, are never exhausted as in Europe, but I do not know that green crops, such as Turnips or Clover have ever been cultivated for feeding cattle.

8th.—Fallowing and frequent ploughings are esteemed of great use, and universally practised, as soon as the earth is a little softened by rain.

9th.—The mixture of soils, such as sand with clay, or clay on sandy soils is perhaps the greatest improvement, and the country people are acquainted with the use of mud, that settles in the bottom of Tacks, on their light soils, but neglect the dung-hills made by the litter of their cattle, and the ashes of their fires.

10th.—A plough of the most simple construction is used, where one man both holds and drives, the harrow is a branch of the nearest tree, or a bundle of brushwood.

11th.—Oxen and Buffaloes only are used, no horses are employed in agriculture.

12th.—The setting in of the rains in October is the time of transplanting the great crop of rice from seed-beds, which is reaped in January or February.

13th.—The land is open Field.

14th.—No experiments have been made, but in all the dry grain countries, there can be no doubt, that enclosures would prove highly advantageous.

15th. and 16th.—Answered by the foregoing.

17th.—The waste lands are common fields of the village, in the records of which they are so specified, and in the neighbourhood of which they are situated.

18th.—Extensive tracts over-run with shrubs, the site of villages depopulated by the war of 1780, are only inhabited by wild beasts.

19th.—Where water and labourers can be found, the waste lands are capable of the same productions as other lands, which might in general be effected by the establishment of hereditary property, in the lands, to individuals.

20th.—

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20th.—Three farams for a man and two for a woman by the day, which may be understood in Europe, by reckoning 2 shilling five farams; piece-work, is chiefly practised with mink diggers, where the price depends on the distance to which the earth is removed.

Gardeners here come to labour at seven in the morning, go to dinner at twelve, return at three o'clock in the afternoon, and go home at sun-set.

21st.—Improvement here is to flood the land, so as to render it fit for rearing rice, which is esteemed the most valuable Crop.

22d.—There is nothing similar to the Bent and heath of Muir Land here, to be paired and burned; but in clearing land for cultivation, the underwood and branches of trees being burned on the ground, afford a rich and valuable manure of vegetable alkali, which more than any other manure, promotes vegetation.

23d.—Those parts of the country, that have been depopulated by war or famine, are over-run with shrubs chiefly of the genus *mimosa*, and the great use made by the natives of the bark of trees for medicinal purposes, destroys most of the timber trees by barking them.

24th.—The price of provisions is perfectly arbitrary.

25th.—The roads are tolerable in the dry season; but as there are few made roads; in the wet season, they are difficult and dangerous.

26th.—The natives in general dwell in houses of clay, the dampness and lowness of which renders them very unwholesome abodes in the wet season.

27th.—There is the copy of a lease, for promoting a new Manufacture, in my last publication.

28th.—Manufactures, and commerce must ever be favorable to agriculture, in all countries.

29th.—It would require a dissertation to answer this question.

30th.—There are no societies amongst the Natives, independent of sacred shrines, and pursuits of amusement.

31st.—The people are acute and intelligent as may be expected in a pure air and warm climate, where immemorial usage has established a very simple diet.

32d.—Let the husbandman reap the fruits of his labour and every suggestion of improvement will be attended to in this, as in the most cultivated state of society any where else.

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33d.

33d.—Sheep die in my garden (where the soil is clay) during the rains ; and in case the liver is let fall on the ground, it breaks like a mass of clotted blood, whereas in the up-land gravelly ground, they keep healthily all the year.

34th.—Chiefly kali, and plants impregnated with mineral alkali.

35th.—No means have been used, as these lands are flooded in the wet season, the sheep are necessarily on the higher grounds.

36th.—See answer 34th.

37th.—These are waste lands, excepting where they are employed for making salt, in the dry season, which is effected by baling brakish water from the mouths of rivulets to evaporate and crystallize.

38th.—The greatest obstacle to improvement, is the monied interest being in the line of Renters, and dependants of Revenue Officers, whose authority enables them to lend money at a very high interest to the Ryot, and to oblige him to give them the crop, at the lowest rate of the season; which is kept up for months, and afterwards sold at a high price; whereby an artificial scarcity is in general produced, and frequently no grain allowed to be sold till what has thus been mortgaged is disposed of; and thus the Ryot is deprived of the advantage of his labour, and all incitement to industry checked. To remedy so great an evil may be difficult, but surely the Ryot should be supported in the means of cultivation, and the rents not demanded till the crop is realised.

TO DOCTOR FRANCIS DUNCAN,

I AM favored with your observations on the temperature of this climate under date the 1st instant, which being a subject of the greatest utility to the illustration and better ordering all physical matters, I consider of great importance to the success of the objects of this sort, I have endeavoured to recommend, for improving the welfare of this country.

Having published on the instant, whatever in the view of liberal enquiry, seemed worthy of notice, to this end, for nine years past; I last month distributed Queries of the Board of Agriculture lately instituted in London, as the most part of the Questions seemed well adapted to the investigation of the local situation of men employed in husbandry in all countries, but hitherto no answers have appeared from any quarter.

JAMES ANDERSON.

Fort St. George, October 27th, 1795.

To

TO JAMES ANDERSON, Esq. P. G.

I ACKNOWLEDGE the receipt of your judicious letter of the 15th instant, and in reply thereto I beg leave to state, that Māhāubhārātā, consists of above one hundred thousand stanzas, and is divided into eighteen systems (viz.) 1st, Audē Pārvām, 2d, Tābhāu Pārvām, 3d, Aurānyā Pārvām, 4th, Vērāutā Pārvām, 5th, Odyoyā Pārvām, 6th, Bēśhmā Pārvām, 7th, Drōṇā Pārvām, 8th, Cārnā Pārvām, 9th, Sālyā Pārvām, 10th, Tōuhīptēkā Pārvām, 11th, Streē Pārvām, 12th, Sūntē Pārvām, 13th, Aunōśāśānīka, Pārvām, 14th, Asvāmēdhēkā, Pārvām, 15th, Auśramūvosa Pārvām, 16th, Mōūsalā Pārvām, 17th, Māhāprāstānīkā, Pārvām, and 18th, Svārgāurāhāna Pārvām, add to these Hārēvānsām, commonly called Bhāvēshyāt Pārvām.

Bhāgavāt, Gēēta, belongs to Bhēśhma Pārvām, the sixth volume of Māhāubhārātā, and is an episode, containing the dialogues of Kriśnā and Arjona, in 18 chapters or lectures, consisting of seven hundred stanzas, of which dialogues we have the translation made by the learned Charles Wilkins.

As for the circumstance regarding the valuable present made by the Chinese of Pāttā Kētās, or silk worms, to Yōōdhēśṭera during his reign at Endrāprāśādā, I refer you to the second system entitled Sābhā Pārvām, Chap. 86, where read the following verse.

Chēēna, Höōnāh, Rāshāh, Cāuchāh,
Pārvāntārā, Vāusenāh,
Authārishtōor, dasa Sāuhāfrām,
Vēnēcētāh, dētchōo, Vēsrōtāh,
Cāshnēcēshām, cāmbilāñchīvā.
Pātā, Keetāun, Stādhyvāchā,
OR
Pāttūjām, Kēētājām, tādhu,

The Tranlation,
Chēēnās, Höōnās, Rāshās, and Cāuchās,
Who lived on Mountain-Summits,
And who were famous,
With obedience brought (to Yōōdhēśṭera),
Ten Thousand Caps, and Haircloths,
And also silk, and silk worms.

Note, that Chēēnās, Höōnās, Rāshās, and Cāuchās, were four classes of people so styled amongst the Chinese, and that the number often thousand here figuratively signifies a great number.

Here

plantations can be established as private property through the country; and sensible likewise that extensive plantations may soon be destroyed if the insect gets amongst the plants; I could wish you at a leisure hour to examine the Cali jungles about Arcot, and in case you see insects upon them to employ people to collect and cure them in the manner you will see described in my late publications,

From the writings of Thiery de Menonville, transmitted me by the Honorable Court of Directors, it appears that in Mexico the Cochineal is cultivated in small gardens of about an acre or an acre and a half, which the person to whom they belong, who is sometimes a freed negro, looks after and manages himself with the assistance only of his family, and that those gardens seldom exceed two acres.

In Guaxaca likewise, it is not every one that cultivates Cochineal, nor do I mean that the Bramins, who ever since the Bhoo Avatar, have professed more respect for animal life, should be expected to adopt this cultivation.

The Bramins of a neighbouring village, have however promised to plant the nopal on the bank of their tank, and a small compensation will obtain even their permission to collect the insects.

It being thus necessary to investigate, why the orders of Government have produced but little effect, will account for my particularly noticing the Bramins, as the quarter from whence opposition might be expected.

There are besides, some descriptions of people, without reckoning the ryots who may have employment enough in the usual cultivation, such as Rashtra-pur, Guzuratier, Cannarier, Marratier, and Raja cast, who are too genteel and delicate to be employed in any menial office.

Over the inhabited parts of the country, and in all the villages however, there are many useful people, from amongst whom the collectors, certainly may, by the means of their amildars, and subordinate officers, select proper persons to cultivate Cochineal, such as the following:

<i>Vellayer and Cavarigul,</i>	Upper Servants and Managers,
<i>Yerayer,</i>	Cow-keepers,
<i>Parlar,</i>	{ The lowest cast, who apply to all sorts of work,
<i>Cecalaver,</i>	Weavers,
<i>Vanier,</i>	Oil-men,
<i>Corawar,</i>	Basket-makers,
<i>Chittigul,</i>	Shop-keepers,
<i>Pali,</i>	Labourers,
<i>Kumaler,</i>	{ Gold-smiths, Iron-smiths, Braziers,
<i>Chikili,</i>	{ Stone-cutters, and Carpenters,
	Tanners and Shoe-makers,

<i>Anmatia,</i>	Barbert,
<i>Vannan,</i>	Washermen,
<i>Cuthavai,</i>	Pot-m. kers,
<i>Elavanier,</i>	Fruit-sellers,
<i>Carriar,</i>	Boat-men,
<i>Tulakar,</i>	Musslemen,
<i>Lubbegul,</i>	{ Musslemen-dealers, in pearls, beads,
<i>Mootakur,</i>	{ and other articles,
<i>Wetter, Upparawur,</i>	Porters, commonly called Coolies,
<i>Mundravur,</i>	Tank-diggers,
<i>Camatigul,</i>	Bamboo Basket-makers,
	{ Stone Masons, brick-layers, and mud-wall-builders.

More distinctions might be enumerated that are eligible, as well as others which are not eligible to the cultivation of this insect; but what I have said will be sufficient to give an idea how the business may be carried into practice, as it appears to me, that your attention to subjects of this nature, may be advantageously directed to the collection of insects, that now destroy the wild plants; as well as to the establishment of plantations, where both plant and insect should be kept under management.

It appears from the Gentleman's Magazine for March last, that the bill for the cultivation of the waste lands, and commons of the kingdom is in great forwardness, the Breviate of which seems so completely drawn up, as to comprehend all possible cases. There cannot therefore remain a doubt that the principles of this bill, will have an influence in operating to the advantage of the Nabob's as well as the Company's possessions.

I cannot better conclude this request than in the words of the instructions to Captain Parker from the East India House—" As the Court are truly anxious for the success of this undertaking, they entertain the strongest hopes, that you will cheerfully lend your assistance, in accomplishing their views by every exertion in your power, in the doing which, you will have the satisfaction of reflecting, that as well as being instrumental in benefiting your Country; you are at the same time rendering a most acceptable service to your employers."

I am, &c.
JAMES ANDERSON.
FORT ST. GEORGE, September 14th, 1796.

To DOCTOR BERRY, Madras,
On the Elizabeth, I have the pleasure to send you a box of
Ceylon Plants.

JOHN PETER ROTTLER,
TRANQUEBAR, September, 1796.

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Sri Shri Andai:
Correspondence (1831)

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438 XXV. MISCELLANEOUS CORRESPONDENCE.

have the honour to be, with esteem, your faithful and obedient servant.

JOHN SINCLAIR.

15. Parliament Street, February 1799.

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General Martin's letter has not been found; indeed, was probably given to some of my medical friends, who took a great interest in the inquiry I had undertaken. But my reply is subjoined.

SIR,

The inclosed printed paper will explain the circumstances, which have induced me to take the liberty of troubling you with this application. You will probably have heard of the institution of a Board of Agriculture and Internal Improvement in this country; the object of which is not only the improvement of the soil, but also of every useful art that can tend to promote the real comfort and happiness of the people. Amongst these, any useful discoveries, for the preservation of health, or the cure of diseases, are included.

Of all the disorders to which the human frame is subject, there is none of a more distressing or excruciating nature than the stone, which I understand you fortunately have found the means of curing by a new, and in this country, almost incredible process. As it is of essential consequence, that every discovery of that nature should be generally known, I have to request, that you would have the goodness to favour me with an account of the case, with an exact drawing or model of the instrument, with which you effected the cure, and how far, in your opinion, the same remedy is practicable in other cases.

To prevent the risk of miscarriage, more especially in time of war, I shall take the liberty of troubling you with two or three copies of this letter, by different conveyances; and I have to request, that you would take the trouble of sending two or three copies of the answer.

XXV. MISCELLANEOUS CORRESPONDENCE. 439

Your early attention to this application, will much oblige, Sir, your very faithful and obedient servant,

JOHN SINCLAIR.

Edinburgh, 20th December 1796.

The following is the last letter which I received from this respectable correspondent, in which he alludes to the "Questions" I had transmitted to him, from the celebrated Dr Monro, and Dr Anderson.

General Martin was a native of Switzerland, which renders his language not so pure as might be expected from a general officer in the British service.

MY DEAR SIR,

I have with much pleasure received your kind favour of the 12th November 1799. You will improve your new town, Thurso; but, my friend, you must expend great deal to bring inhabitants to so far in Scotland, and God knows if you get proper returns for all these immense expenses.

I received the questions put on me by the celebrated Doctors Monro and Anderson, to whom I now answer; and I send in separate letters to each a file, such as I had made, and introduced in the bladder, as described in my letter, without any tube or any thing else, as I don't think it would admit to go in a tube; however, I never tried. I had a man that made the file somewhat better than those; however those never injure the canal of the urethra. You see, in my letter, that I passed the file between the flesh and the stone, and when past the stone, I pressed the file on the stone, and drew the file, proving on the stone, by which means I filed the stones, as you may try on your nail, and you will find that the file cut much. As, not to drive the stone in the bladder, I inclined my body against the wall, and I was so expert, that I could file the stone for half an hour, without driving the stone in. I had often some spasm, which keep the file fixed as in an handvice, but never occasioned any inflammation, though sometime bleeding; and when I could not get at the stone,

and being inclined to file it, I injected warm water, or mallow water, till I made water; and when the bladder became empty, the stone always came at the mouth or neck of the urethra, which gave room to file it. This is the whole process I followed for about eight to nine months, having a silver cup in which I made water, and collected all the pieces I could, of which I have the pleasure to send you some of the larger pieces, that you may make your observations on them. I also send you some of the sand filed, of which I could not collect the whole, as I filed as well in the night as in the day. I collected ten days' filing of the sand, being in weight, (the diamond carat), 3 carat and 10 grains; and I collected of the pieces, 6 carat $12\frac{1}{6}$. I think you may reckon filing for six good months, at the rate of four to five times a-day, and you will find that that stone has been pretty large ones. I am in hope this will be satisfactory explanations, besides my former letter. At this moment am not well, having been attacked with the liver, and now free; but the urinary passage is still very painful to me, not being to make water but with a pipe, which luckily I introduce very easily; and if I recover my strength, I intend to make use of the caustic and bougie, and I wishes you would advise me if I could put red precipitate on the bougie, so as to broaden the passages, and the stuff I could make the bougie of; and if any of the unguent made by M. Daran is made in England, to have sent to me several pound weight, as sending bougie, they arrive dry and crack. Messrs Cokerell, Paxton and Company will pay for it, and send it to me. Excuse me this trouble, and believe me, my dear Sir, your most obedient servant,

C. MARTIN.

Lucknow, 5th September 1800.

It was extremely gratifying to procure from the East Indies, information respecting a practice of such importance. It soon reached the Continent, and the lively genius of the French, led them to think of improving upon it, by introducing an instrument into the bladder, which, instead of filing, *crunch-*

ed the stone. This plan has certainly answered in several cases, but how far it can be employed, to any great extent, remains to be proved.

3.—*On a Plan by which the British Settlements in the East and West Indies might be most essentially benefited.*

When carrying on some improvements in manufacturing potatoes into flour, I found it necessary to employ machines for grating them. Having circulated some engravings of those machines, it struck Mr Wilson, an intelligent planter at Trinidad, that they might be of great importance in the West Indies, where they have a root, called the Cassava or Cassada, which could not be safely used, unless it was grated; by which process, and at a moderate expense of hand labour, a poisonous liquor was got rid of, with which the root was naturally impregnated. He was so much impressed with this idea, that he sent a machine to Trinidad, that the experiment might be tried.

When meditating upon this subject, it accidentally occurred to me, that a plant which thrives in every part of the West Indies, might likewise be cultivated with advantage in the East, and to such an extent, as might prevent those famines, by which our Indian empire is so frequently afflicted. There are various species of this plant; but the two most valuable are called the Sweet and the Bitter. The first sort is already known in the East Indies; but the bitter cassava is a plant of much superior importance, 1. From the immense produce of the root *per acre*; 2. From its remaining in the ground for more than two years in perfect security, without being liable to injury by rain or hurricanes; and, 3. From the safety with which it can be preserved for several years, after it has been converted into meal, from its not being liable to the attacks of insects.

The introduction of the bitter cassava, therefore, is one of the greatest boons that could be presented by Europeans to the natives of India, as it would prove an effectual means of preventing future scarcities in that country.

friendship of a powerful minister. After the acquittal of this remarkable man, and his retirement to Daylesford, in Gloucestershire, Sir John Sinclair frequently corresponded with him upon the subject of agriculture and finance. Those who have considered Hastings merely as a grasping and ambitious despot, bent on extorting the last rupee from a distant and unprotected population, would be astonished to observe the kindly feeling, the anxiety for the comfort of the poor, and the interest in the details of rural economy, which are continually evident throughout his correspondence with my father.

In January, 1797, Mr Hastings writes, "I will venture to promise, that, if you are fortunate in the choice of your agents (and very able there are), India, and Bengal especially, will furnish you with more new materials of knowledge in all that relates to the useful arts of life, than all the societies of Europe united. I particularly specify Bengal, because it possesses a greater range of enquiry than either of the other two presidencies, and a vast field of discovery lately opened to it by the acquisition of the Sanscrit language, and the numerous writings of a remote antiquity, which are yet extant in the possession of the Bramins, and easily attainable from them."

On the 25th of July, in the same year, he renews the subject, and advises that his correspondent, then President of the Board of Agriculture, should request

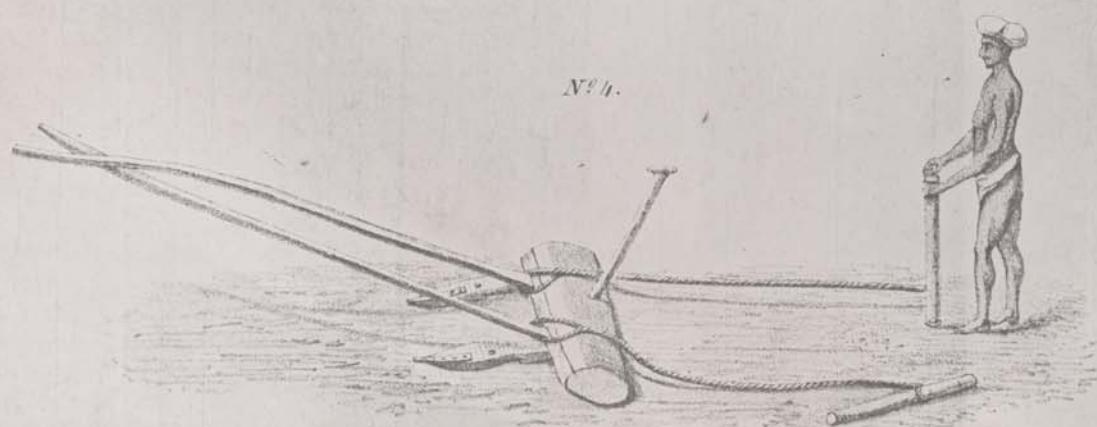
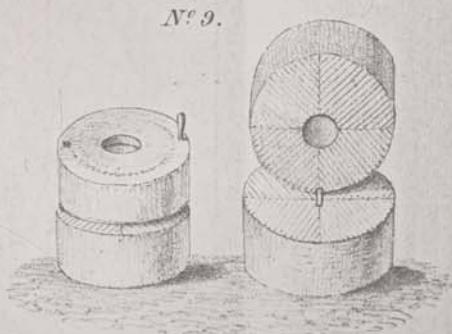
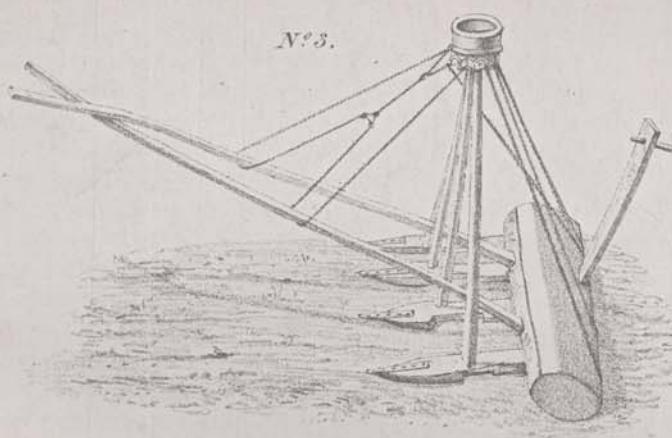
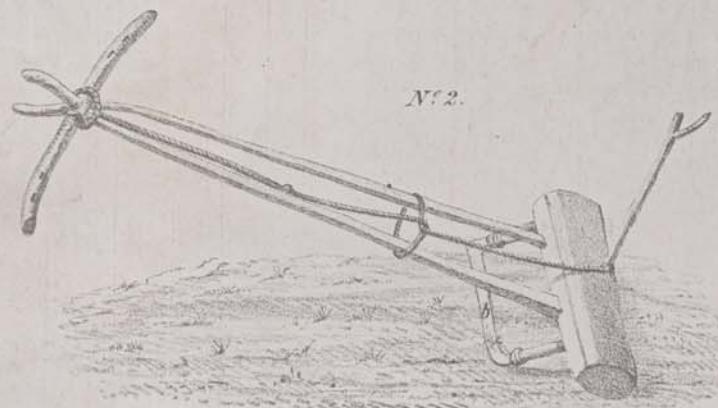
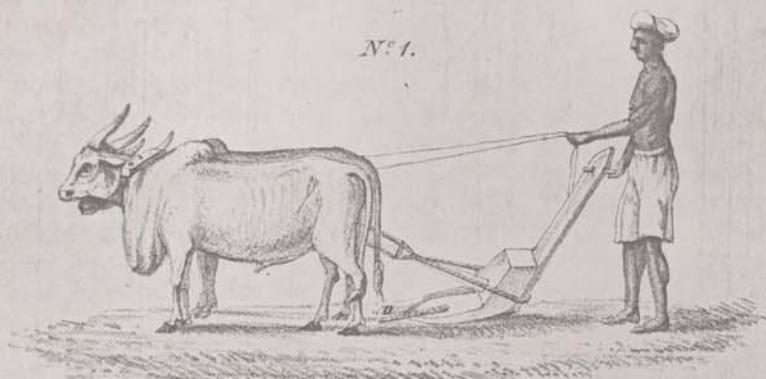
Sir John Shore, the Governor-General, to cause a search by the Asiatic Society into the ancient Sanscrit records for information upon the subject of husbandry. He bestows upon Sir John Shore a commendation, which he himself deserved, that of possessing "a liberal mind, capable both of extending its operations beyond the present bounds of his official charge into the researches of science, and of making their results useful."—"I regret exceedingly," he adds, "that it never occurred to me to make enquiries concerning the husbandry of that country, as I have reason to believe that it is conducted upon excellent principles; though there, from the poverty of the cultivators, who are almost of the lowest rank in society, and from the inconsiderate rapacity of their landlords, and of others placed in occasional authority over them, they are not always perhaps applied so completely as they ought to be."

In the year 1795, when a scarcity was apprehended, Mr Hastings wrote a letter to my father, suggesting a plan, "not," he says, "as the means of remedying that evil, which I hope has no existence, but as the means of remedying the effects which proceed from the belief of it." The plan is not stated; "but," says he, "I should be sorry that it were published, because that part of it which may lay claim to any thing like argument, ought most especially to be kept from the public eye; since every suggestion of a probable insurrection of the people deduced as a

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AGRICULTURAL IMPLEMENTS, &c.

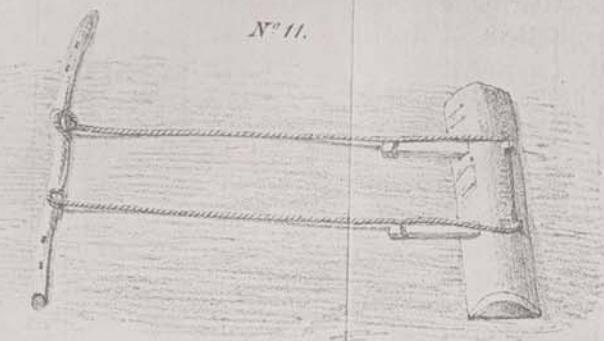
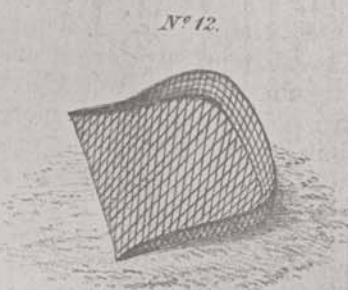
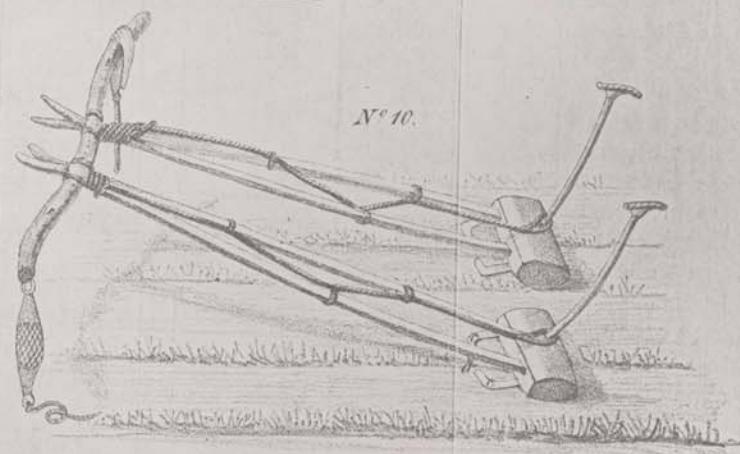


N^o 1. The Réntee.—N^o 2. Koonté.—N^o 3. The Koorcheege.—N^o 4. The Cotton planting Koorcheege.
N^o 5. Rice Land Saw-knife.—N^o 6. The Koorcheege.—N^o 7 & 8. Reaping Hooks.
N^o 9. Rice Hand Mill.

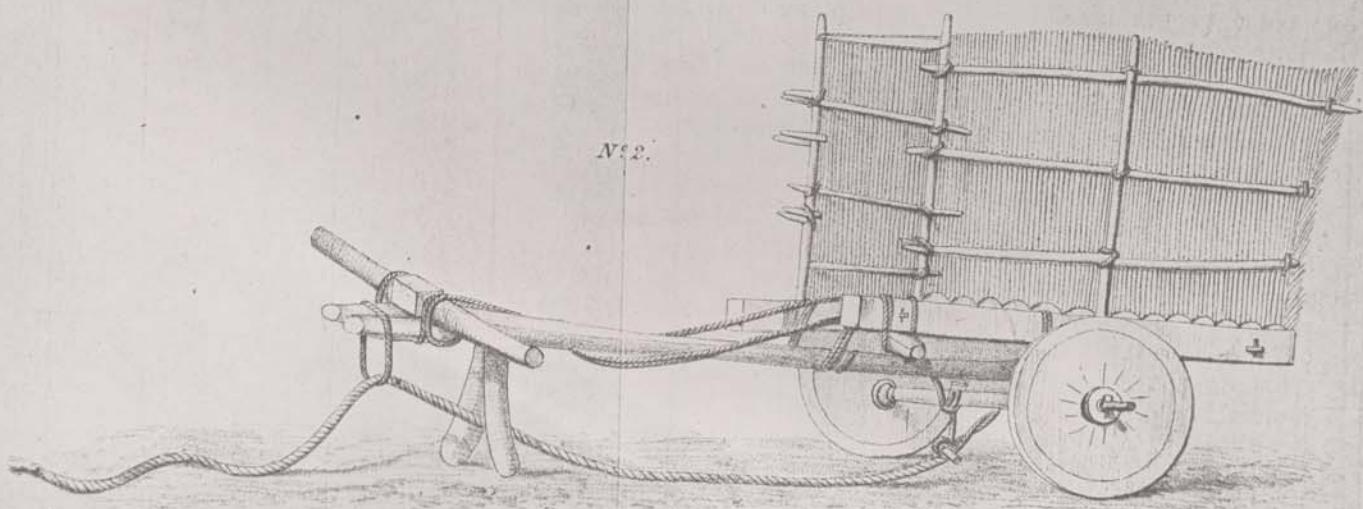
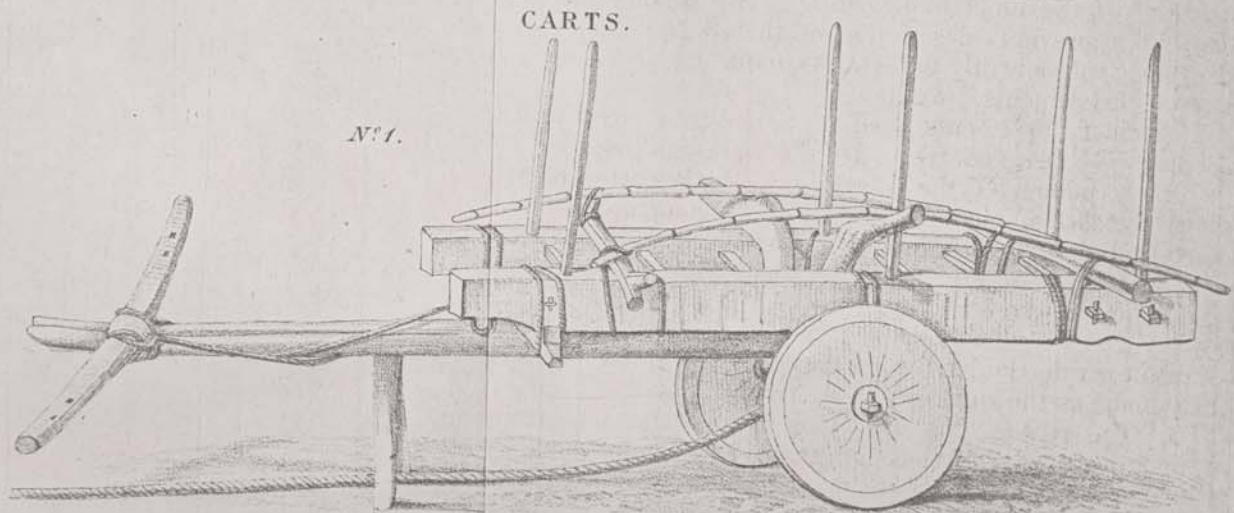
N^o 10.
N^o 12.

GENERAL IMPLEMENTS, &c IN THE BUNKAPOOR TALOOKA.

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CARTS.



CARTS.

N° 10. The Yedee Koontie.—N° 11. The Keradeo.
N° 12. Winnowing Basket.—N° 13. Grain Safe.

N° 1. The largest kind of Cart.
N° 2. The Manure Cart.

No 999. Ordered, by The House of Commons, to be Printed, 20th August 1853.
Henry Hansard, Printer.