

THE JOURNAL

OF THE

Agricultural & Horticultural Society

OF

I N D I A.

A Diary of Chinese Husbandry, from Observations made at Chusan in 1843-44, illustrated by drawings of the Implements of Agriculture. By ALEXANDER GRANT, Esq. Bengal Medical Service.

“ And he gave it for his opinion, that whoever could make two ears of corn, or two blades of grass to grow upon a spot of ground, where only one grew before, would deserve better of mankind, and do more essential service to his country, than the whole race of politicians put together.”

April.—Week ending 9th April, 1843.—Rice fields being ploughed over, and rice beds for seed plants prepared. These beds undergo several ploughings, and after being flooded, and worked up into a state of mud by heavy three-pronged rakes, are made as level and smooth as a billiard table, the seed previously steeped in water, or water and urine, is now thrown in by the hand, the sower distributing it thickly, but very equally. Exactly one inch of water is left on the surface, and small channels are made, so as to keep the water always at the same level; the ground is highly impregnated with the liquid manure, and the water which forms the only covering to the seeds, holds urine in solution.

Large fields of mustard in bloom, and the trefoil and lupine attaining their full development. Peas and beans in bloom, and barley springing into ear.

16th.—Ploughs at work every where at the rice fields, only one small bullock or buffalo is used, but although the soil is heavy, and very wet, the furrow turned up is clean, and fully as deep as that by European draught horses. The manures now in use are cow-dung, the coal black deposit from canals, and the liquid composition in its fermented state. In procuring the second of these, many boats may be seen on the canals, with two men in each; the instrument employed resembles a pair of antique snuffers, and is formed by attaching to the extremities of two long bamboos a couple of scoops either of wood or iron, which may be opened or shut at pleasure by connecting the bamboos about their upper third. The fields to which the cow-dung and coal deposit were applied had not been under green crop. Small patches of trefoil are being ploughed in,—the process is as follows: The field is thoroughly ploughed, it is next flooded, and thereafter harrowed with a heavy machine having two rows of horizontal and concave knives fixed in the cross bars of a substantial frame-work, and to add to the weight the bullock driver stands upon the frame. This harrow is dragged through the field in every direction until the roots and stalks of the plants are effectually cut up, and in a measure incorporated with the soil, in which they soon enter into new elements through the process of decomposition, accelerated by the heat and moisture. Mustard springing into seed, and the flowers of the lupine opened; that of the trefoil scarcely. Wheat, buck, barley, and beans in full ear, and a crop of green vegetables being housed. The rice seed rising above water, and showing its green coat; other rice beds in course of preparation. Fields being reploughed across former ridges, and manured. Mustard in the full seed, and lupine being cut for ploughing in; the trefoil not yet complete. Dun oats on the slopes and summits of hills in a loose, poor and dry soil; the crop short, and altogether inferior, it is now in ear. Beans and peas in the market.

30th.—The rice in the seed beds about two inches high, fields being turned over, and some trefoil cut, and harrowed in as already described. Peas, beans, and cherries in the market. Rice beds still being prepared.

May 7th.—This has been a very busy week, all hands having been employed from dawn till long past sunset, cutting the trefoil and lupine, and harrowing it in; not more than one-third is left to enrich the soil in which it grows, the remaining two-thirds being carried to other fields, from some of which a crop of mustard has been only just removed. Considerable quantities of beans have also been ploughed in without removing the pods, as these have ~~grown~~ ^{grown} in a rich moist soil, the stalks are high and the foliage abundant. The weather has been often close and sultry, and the temperature equable; decomposition has been active, and the smell arising from the decomposing vegetables is very strong; many of the fields show the carbonized matter floating on their surface. The transplanting of the rice has commenced; the plants are about six inches in height, they are removed from the seed beds in small bundles, and carried in baskets to the fields; these fields have been finely worked up, smoothed and flooded, after which the plants are set in by the hand in rows about twelve inches apart. Wheat, buckwheat, and bean; becoming yellow in the ear, and the mustard pulled up and stoked to dry. Peas and beans becoming too old for the table.

27th May.—The two past weeks actively employed in ploughing and preparing fields, and planting rice; during the last few days a second plantation of rice plants has been put in, previous to which the fields had been weeded, well irrigated, and the soil and water thoroughly stirred up. This process seems equivalent to the hoeing of other crops, and is performed by a flat square piece of wood set with short wooden teeth, and fixed to the end of a long piece of bamboo. The mustard seed has been dried, beaten out, and

winnowed, much beans and barley cut down, dried and beaten out on the field, the straw stoked in preparation for stacking. Beans cut and dried for seed and domestic use. Indian corn raised in beds, and transplanted into ground from which mustard had been removed; this ground had been well ploughed, broken, and set up into beds by three-pronged rakes, and manured from the farm yard. Green peas pass out entirely with this month, and are succeeded at our table by a tolerable good species of French bean.

May.—The highest range of the thermometer has been 80°, the lowest 48°. The greatest range in 24 hours 15°. Upon the whole the temperature and weather have been favorable to vegetation, with rain more than sufficient to keep the canals filled, although not enough to supply the rice fields without drawing upon the stock in the canals.

June 7th.—The whole of the grain crop has been nearly got in, the seed removed from the ear, and the straw stacked. The weather has been particularly favorable for these processes, but the farmers dread the long continued drought, as it may endanger the rice crop, and it requires their utmost exertions, by means of constant irrigation, to keep the soil under water. In taking a survey of the vallies, hundreds of wooden chain pumps* may be seen thus employed, and each worked generally by only one hand—other labourers may be observed stirring up the soil with the water after the manner already described, which is said to have a fertilizing effect, and may also retard evaporation. There is rising a fine crop of cucumbers and melons in the sheltered faces of the hills, in light soil, having a warm southern exposure, and in the low grounds; planted in ridges, are extensive fields of brinjals, a vegetable in much favor.

14th.—During the early part of this week, the whole native community became much alarmed at the prospects of the season; rice advanced considerably in price, and a

* Plate vi. fig. 3.

famine seemed impending. The canals were pumped dry, many of the fields beginning to crack, and the plants showing in some places a withered top. With the exception of a slight shower on the 1st instant, there had not been a drop of rain for a fortnight, and the weather being particularly dry and hot, was consequently favorable to evaporation. On the evening of the 10th, there were some electrical phenomena observed, but followed only by a slight shower. Had it not been for the large supply of water in the canals, the rising crop must have long ere this time been completely destroyed; human exertion could not procure water; earnestly therefore did they appeal to their Gods, and often have I seen the aged and experienced anxiously scanning the setting sun for the indications of the blessed shower. The morning of the 11th was calm, close, and sultry, and towards evening there were thunder and lightning, accompanied with heavy rain. For the three following days it rained almost continually; the canals were filled, and the air was for weeks afterwards loaded with moisture, so as to affect very strongly all articles of iron, leather or woollen; vegetation now made rapid strides, and the appearances of the failure which were so threatening, have at this time (25th June) completely passed away.

July.—The whole of this month has been dry, clear weather, and at times very sultry, the nights close and calm; particularly towards morning, with heavy dews, and forming altogether a temperature equable and highly favorable to vegetation. Some rice and vegetables were laid down at its early part upon spots of ground, from which wheat, barley, and mustard had been removed. Many ^{of} those, generally the youths of the family, have been employed to keep the rice fields under water, and others ^{at} weeding them as it becomes necessary; the weeds are pulled up by the hand, thoroughly twisted, and buried at the roots of the plants; the labourer wades along in the mud often on his knees,

having his face protected by a shield made of bamboo twigs; he will continue at this toilsome work from the earliest dawn until long past sunset, that is from five A. M. until about 7 P. M. But the chief occupation has been the care of vegetables and fruits, which are in great abundance all this month. The brinjals of good quality are very extensively cultivated, as are also cucumbers, pumpkins, and several kinds of excellent melons. Indian corn in small patches is now in seed; also millet and another grain very similar to it, and used in the distillation of spirits. Of fruits, we have apples, pears, peaches, plums, all indifferent; but the first the best. The Chinese do not take much pains to improve the qualities of their fruits, for which they have no great partiality, but choose rather to bestow their labour upon grain and vegetables, and of the latter, they consume immense quantities. Lieutenant Colonel Warren, H. M.'s 55th Regiment, has raised potatoes in the immediate neighbourhood of the barracks, they have turned out tolerably productive, are sweet, but waxy. No doubt the loose dry soil on the sides of the hills (a disintegrated gneiss) would be more suitable to their habitude, than the low damp ground in which they have been grown.

August 1st.—To-day, I have for the first time observed the sickle applied to the rice crop; a small bill hook is used, (see plate) and when a bundle is cut, the reaper conveys it to a square tub enclosed on three sides by a mat screen; against the side of this tub the grain is beaten out, and when it is sufficiently filled it is borne off the field, it is water-tight, and having a round bottom, it can be easily slid along the muddy flats. The straw is piled up in bundles, much after the manner of our sheaves, and when dry, it is carried to the farm yard, and stacked. The principal occupation of the farmer this month has been the reaping and thrashing the earlier rice crop, and weeding and irrigating such as will be late. In many of the fields might be observed one-half of

the plants in seed, and being cut, while the other half, whose growth had been checked by the exclusion of light and air, become now exposed, and in their due season, arrive at maturity. The manner in which the field is laid down, and the short reaping hook in use, makes the separation of the plants very easy. The vegetables and fruits have been much the same as last month, with the addition of lettuce and large chillies.

September.—A great deal of rain has fallen during this month, keeping the paddy fields under water without artificial aid. On the morning of the 2d, there was experienced one of those severe hurricanes not uncommon within the tropics, but rare in this Northern latitude. A great deal of damage was done to the houses of the farmers and to the crops, the filling of which has been somewhat delayed. We now (25th,) see fields of rice yellow in the ear; this is the great body of the first crop. The second is green, and spreading well out, has been carefully weeded, and the soil thoroughly stirred up. Onions, lettuce and buck-wheat are already springing up on ground, from which a crop of grain has been just removed.

Millet housed early this month, and the stalks are being now collected for manure.

30th.—Rice still being cut, thrashed and housed, and large patches of ground ploughed, set up in beds, and sown with wheat, mustard, and various kinds of vegetables. In the bazar, we have sweet potatoes, pears, chestnuts, walnuts, and limes.

12th October.—Upon the 1st and 2nd instant, we were visited by another hurricane, and the whole country was laid under water. The crops were thrown down, trees rooted up, houses unroofed, and many of them undermined. The weather, however, during the last 10 days, has been very fine, and on the water being drained off to its proper level, it was found that the crops were not so much damaged as

had been apprehended, nevertheless it must materially affect both the colour and weight of the grain. Old and young have been actively employed in reaping and thrashing, many of the fields are now undergoing ploughing in order to be sown with trefoil. The process is simple, and combined. One manages a plough drawn by a single bullock, he is followed by three labourers with heavy four-pronged hoes, who raise the soil into ridges; a fourth follows levelling these ridges, and indenting them on the top with the back part of his hoe, and into these small holes, the seeds are laid, previously mixed up with mud from the bottom of canals. They are finally covered over with ashes and pulverized soil.

An inferior sort of cotton on the plains is being now gathered; on the loose dry soil on the sides of the hills are patches of a plant having a white flower: this is the polygonum, or buck-wheat.

31st.—Towards the conclusion of this month all is activity and change, one crop being ready for the sickle, while another on the same ground is seen springing into existence. The second rice crop has filled out well on the rich low lands and is now being cut, and thrashed out on the field. The plants are much more open in the light soils, and in the interstices of the uncut grain, trefoil has been already sown; a small hole is made with a rake, and the seed thrown in and covered with a handful of ashes and pulverized soil; in this open, dry, and stimulating bed, germination is rapid; and the plant in its present state looks exactly like European clover. When it has attained some size, the earth is hoed up about it, and by this time its roots have become sufficiently strong to penetrate the hard clay: this it could have ill done in the first stage of its growth, hence perhaps one cause of the failure of clover seed in stiff clays. In other places, may be seen turnips and wheat planted alternately on the same piece of ground, the one arriving at maturity long before the other has attained any considerable height; some patches of

buck-wheat in full blossom, others passing into seed ; in the spaces between the full-grown plants a young crop is now springing up. There are also large fields of a small species of French bean, much used in the preparation of bean curd. In the interspaces of these, trefoil is being sown. The land in this double cropping seems supported solely by assiduous irrigation with water and liquid manure, and the small allotment of vegetable ashes and pulverized earth already referred to, in which the seeds are sown. The young plants are also occasionally sprinkled over with the same preparation, and its stimulating effects are soon observable in the *deep green colour* of the leaf. Fine beds of radishes on the slopes of the hills, on ground lately cleared ~~up~~ of cucumbers and millet.

21st November.—During last week much of the low paddy ground has been drained, ploughed, and collected by the heavy 3-pronged hoe into beds, and laid down in mustard ; the plants of wheat had been raised in forcing beds carefully prepared for that particular purpose. Of each little farm, about one-fourth is thus laid out in a crop of mustard ; another fourth with trefoil, and the remaining two-fourths in wheat, barley and beans, leaving only a very few fields uncultivated, and these are either under water or ploughed over and exposed to the keen frosts of winter. Nearly the last sheaf of the second rice crop has been housed, and old and young are now busily employed in getting up the sweet potatoe crop, and cutting and tying up in bundles the species of bean already mentioned, and which after being dried in the sun is afterwards used to prepare bean curd, a very favorite article of diet among the natives. The soy bean is also much cultivated here. On such patches as had been under cotton cultivation, the plants have been pulled up, and the ground sown with trefoil. The cotton is of inferior quality here, and less attention appears to be bestowed upon it than in the other details of the farm. I think it probable, that the

foreign manufacture may eventually in a great measure supersede the home growth, as much on account of the greater cheapness of the foreign growth, as by reason of a steadily increasing population demanding an increased supply of grain.

During the first half of this month the weather was particularly mild, clear, and cool; but during the latter, there was much rain with fresh cold northerly winds, the thermometer being as low as 47°.

1st December.—The trefoil all sown, and much of it well advanced, being about four inches high, with a rich deep green-leaf; wheat and barley about the same size, looking fresh and filling well out. Ground for barley still being prepared and sown. These grains are not transplanted; the ground is first well ploughed, then formed with the heavy hoe into beds about three feet wide, in which rows of small holes are made with a stone dibble, at a distance of about one foot apart each way: a few grains of corn are thrown in, and over this again, a handful of the ash and pulverized earth, without which no seeds seem to be raised. In this open and dry bed germination is both quick and favourable. On the long slopes of the hills much of the land from which sweet potatoes has been removed is being laid down in grain; it is not ploughed but turned over with the hoe, and instead of planting the grain in a layer of ashes, it is more common to pour into the hole a small quantity of liquid manure; the soil is yellow, deep, and open, and formed of disintegrated rock. About one-half of the sweet potatoes lately taken up, have been cut into thin longitudinal slices and exposed upon mats to the sun; when perfectly dry they are packed in gunny bags, and preserved for use. In appearance they are quite white, and have a sweet and mealy taste. As potatoe is the best preventive of scurvy, might not these be found serviceable in long voyages, and even in the field when vegetables are not to be procured? Cabbages, turnips, radishes,

and a species of lettuce very plentiful. Observed in many places rotted straw, and placed on the surface of the soil between the rows of young plants, apparently with the intention of affording them heat, and preventing evaporation. Fine beds of onions, the tubers of which, however, are very small. It may be observed of all Chinese vegetables, and is indeed in some degree perhaps dependent upon the use of the liquid manure, that the leaf is most luxuriant, while the root, as in the carrot and turnip, is small, and has not the flavour of the European species.

18th December.—Crossed the island to-day from Tinghai to the opposite shore by a circuitous route, having rode about a distance of twenty-six miles through an alternation of beautiful cultivated vallies and bleak mountain passes. Many people employed on the sides of the hills cutting the long grasses for firewood, while others are busily engaged in plucking the leaves of the tallow tree (*croton sebiferum*.) The men ascend the trees by ladders, and with a sharp hook attached to a long bamboo, lop off the slender twigs from which the seeds spring. The women and children (and this is almost the only out-work I have seen these engaged in) pick them up, tie them in small bundles, and remove them in baskets to the farm-yard; they are then either sold to the tallow chandler, or sent to be expressed at the manufacturers. Still sowing barley, chiefly in the low lands; also transplanting mustard plants from the beds into the fields; hoeing and setting up the earth about the wheat and mustard, which are well sprung up; after each of these hoeings the liquid manure is applied, and in addition to this, many fields present a thick layer of dung spread in the spaces between the plants, and this again is covered with a layer of earth taken from the furrows on each side of the bed, which are not more than three feet wide.

31st December.—The weather during the last fortnight has been more mild than is common at this season of the

year; but the winds have been occasionally sharp, and the evidences of winter are every where very apparent, particularly in the bleak appearance of the hills, whose brown rank grass is being cut for fire-wood, conveyed to the farm-yard, and piled up in square stacks. Few labourers are now to be observed in the fields, and these are chiefly employed in hoeing about the mustard plants, laying cow's and pig's dung between the rows, and covering it with earth from the furrows, as already noticed. This both shelters the plant, and affords it sustenance; after each hoeing they are also watered with the liquid manure much diluted, and to such plants, whether of bean, barley, wheat, mustard or trefoil, as look backward or withered, an additional quantity of wood ash is applied to the leaves, and around the roots. There is still some ploughing in the wet clay soils, for the purpose of exposing them to the air, which the Chinese are well aware has a fertilizing effect. At home people cleaning and preparing the rice may be every where seen, while the other members of the family ^{are} are repairing the tombs of their ancestors, thatching afresh the coffins of wood that are exposed in the open air, and burning with some ceremony the old thatch, cutting the grass over the graves, or building more or less expensive monuments of hewn stones to those who have lived long, and worthily, and died respected. Where the peasant has spent and ended his life of manly toil, there he is buried, and around each hamlet may be observed the monuments, some of them very humble, but all very chaste, which have been dedicated by grateful descendants to the successive cultivators of the same piece of land through many successive ages; hence springs one powerful cause of the cherished fondness of a Chinese for the place of his birth, and his unwillingness ever to forsake it.

15th January 1844.—A few people still engaged on the hills and among the graves in cutting the long grass and brush-wood so much needed as fire-wood, and the ash of which we

have had so frequently to make mention of: others hoeing, and thinning the mustard plants, the young shoots of which are used as a vegetable. The wheat and barley have been kept carefully weeded by the hoe, represented in plate IV. fig. II., and this process presents something worthy of observation. I have remarked, that the soil, which has been for sometime in immediate contact with the plant, is removed, and replaced by that between the rows, thus affording a supply of earth undeprived of its fertilizing properties, and as it were diffusing equally over the field the degree of exhaustion occasioned by the rising crop.

The nights and mornings have been cold, but the sun powerful during the day, and the progress of vegetation is very marked, particularly in the rich leaf of the trefoil; many fields of this important crop which had been sown late in the season, and more particularly on unploughed ground, are just receiving a very fine sprinkling of ashes applied directly to the leaf. The turnips grown betwixt the rows of wheat and barley have been nearly all taken up for domestic use. Observed one or two fields manured from the farm-yard, and then ploughed over and exposed to the air.

30th January.—During the last fortnight the labours of the field have been much similar to those just detailed. The whole of the rising crop of mustard, grain, and vegetables has been well hoed, and between the rows of plants farm-yard manure laid down, and this again covered with earth taken from between the beds, to prevent evaporation. The liquid manure has also been applied in a very diluted form, and the appearance of the crops is now very promising. A second application of the wood ash has been made to the leaf of the trefoil, and in quantity varying with its late or advanced appearance. There cannot be a doubt but the ash acts as a stimulant, for although the several sowings are often at very distant intervals, still the farmer manages so well, that all arrive at maturity about the same time in spring.

The supply of fish during this month is most excellent. Solcs, seer-fish, (equal to salmon,) rock cod, and mullet in great abundance. Oysters of good flavor, and other shell fish, as cockles, muscles, &c. Vegetables of the usual kinds; the best are the large Shan-tung cabbages imported from that province. Pheasants, hog deer, wild duck, ~~duck~~ and teal, very cheap. The mutton in high condition, averaging about one mace (three annas) per catty. A few woodcock have been shot on the island, but snipe are again scarce, and do not become plentiful until spring. The weather has been keen and frosty within the last few days with snow, and the canals are now frozen over.

10th February.—Thinning mustard fields, the young plants being sold in the bazaar as a vegetable. The plants along the sides of the foot-paths have been sprinkled with a saturated solution of soot; this is done with the view of rendering them unfit for edible purposes, which makes them less liable to be stolen by passers-by or eaten by cattle. Observed a small patch of wheat which had also been thinned, and the thinnings transplanted. A few labourers to be seen hoeing, but more are engaged either in applying the liquid manure, or in forming dung heaps. Observed on the corner of a field fifteen deep square pits dug out in the thick clay, and in the course of being filled up with manure of almost every description; those I could distinguish were pigs, dogs, human fæces, ~~bones~~, bones, and other offal. These were all worked up with water, layer after layer, by means of heavy rakes, into a homogenous mass, then packed well down, covered over by mats, and plastered with clay.

Groups of villagers are to be met with in almost every valley, assembled together by a common interest, and all partaking equally in the labour and expence of repairing the roads and bridges, and forming embankments. These are much required this year on account of the heavy damage occasioned by the late inundations and hurricanes. Many of

the people's houses have remained up to this time with the walls unbuilt, and with only a temporary thatch covering to protect their inmates from the hard vicissitudes of most severe weather; the care of their fields had demanded every moment of their time.

The preparations for the holidays are now commencing with great activity.

14th February.—The labours of the farmer, even those of the artizan and shop-keeper, are for a period suspended, and the attention of the people is carried away to other duties than those requiring the sweat of the brow, but no less called for by the customs of the country, than impressed upon them by the laws of nature. Great numbers now visit the temples for devotional purposes, while all present offerings at home. In every house, and in the meanest huts, may be observed a table well laid out with pork, fowl, fish, rice, salt, tea, sugar, oil, vegetables, and fruits, in fact with all that they consider the necessaries of life. These are the first fruits of the harvest, and with lights burning, gongs beating, and amidst the most humble prostrations of every member of the family, are they presented to the Giver of all gifts. The degree of order, and gravity with which this is done, does credit to their sense of decorum. Among the other relations of life enjoined upon the people at this time, is the payment of their debts; and so deeply is the character of individuals at stake in this matter, that every possible shift is made to discharge their obligations. They will even pawn their furniture and dress, or borrow money at heavy interest, rather than incur the censure of the public voice. This is also the favorite season for entering the bonds of Hymen, and the gay processions with their rude music that accompany the bride to the house of her accepted suitor, are none of the least interesting spectacles of the period.

I need scarce observe much of the visits of ceremony paid at this time; the feasts, and theatrical performances both

private and public; the more humble representations of Punch and Judy, rope-dancers, jugglers, and other like gentry, that are now let loose on ~~the~~ society by acknowledged privilege. Well have the people earned this brief relaxation from long continued toil, and young and old, rich and poor, all share in, and enjoy ^{the} gaiety without care or reservation.

1st March.—Victoria, Hong-Kong. These notes have been rather abruptly terminated by my being ordered to Hong-Kong with Her Majesty's 55th regiment on the 17th ultimo.

There is little however of practical interest in the husbandry of this month, as far as I can recollect from observation during the spring of 1842 and 1843, so that upon the whole the diary will be found to furnish nearly as much as can be derived from observation alone, but comes far short, I doubt not, of what could be ascertained by any one well conversant with the language of the people.

The weather was cold and clear on the 1st February, with ice on the canals; for the following week it was mild, with slight rain on 5th and 6th, and vegetation made some progress on the 11th, 12th, 13th and 14th. The thermometer stood at 34°, 29° and 26°, accompanied with piercing cold N. West winds. The change from this, into the mild, and often hot and sultry weather which prevailed during the latter part of the month at Hong-Kong, made a strong and disagreeable impression on the feelings.

April, 1844.—Whilst lately travelling over the island of Hong-Kong, I observed several small patches of ground being prepared for rice; the process was similar to that already described, but I was sorry to see that women were employed in the fields, and in its most laborious duties wading knee-deep in the mud planting the rice seedlings; there is certainly some influence within the warm regions of the tropics that derogates from the manliness of the people. The story of the vain empress, who to improve her deformed feet resolved

to contract them, and to make this contraction a rule of beauty, at once occurred to me, and it now struck me for the first time, that the good lady had more likely affected a spurious taste to save her sex from slavery, and that by inculcating the confinement of their feet, she had adopted the only means of confining them to their proper duties, those of the domestic circle. The custom prevails universally in the North, and I have never there seen a woman at any laborious work in the fields.

Remarks.—The preceding notes place it beyond a doubt that the Chinese, even in this northern climate, and with a long bleak winter, during a greater part of which vegetation is suspended, can nevertheless procure from the soil one or two grain crops, besides two of vegetables. In the south three crops of grain are I believe not unusual. The ground is never fallow, still there is no evidence of its exhaustion after ages of continued cropping, and the rice that is raised presents as large and fine a grain as could be wished.

A knowledge of the practice which ensures such results, must indeed be interesting; its leading features are these:—

1. A soil retentive of moisture.
2. A most abundant supply of water for irrigation.
3. The universal practice of drill, and dibble cultivation.
4. Repeated ploughing, hoeing, and stirring up the soil.
5. Attention to the weeding, and *ventilation* of the plants.
6. The green manure incorporated with the soil, whereby its due proportion of vegetable matter is kept up.
7. The wood-ash mixed with earth in which the seeds are sown, and the same ash applied to the leaf of the plant.
8. The direct and often daily application of the liquid manure according to the seeming necessities of the plant, and the soil.

Each of these might form the subject of a separate paper; I shall however dismiss them at present in a few words. The

bearing of all of them must be obvious, and their *modus operandi* is well explained in the excellent work of Liebig, of whose doctrines they are indeed a strong confirmation, a confirmation so extensive, practical, and yet unknown to him, that he may have cause to be proud of it; it is seldom that theory and practice, science and experience, do thus accurately tally.

The universal practice of drill cultivation enables the labourer to keep the weeds under, and by his periodical visits to the fields he retains them clear at little labour, or cost. By this process also the seed is placed in the ground under favourable circumstances for germination, the ash and pulverized earth in which the seeds are sown, form a light open vegetable soil in direct contact with the germ, which it stimulates as well as nourishes. The ventilation of fields laid out in this manner is also perfect, not as may be daily observed in our heavy wheat fields, where the ground and roots never receive either light or air, although the wind is whistling over them. The stalks of grain planted by the dibble are generally strong, and resist the elements. By the same method two kinds of plants may be reared on the same piece of ground; the one, generally vegetables, arriving at maturity long before the other has attained any great height. This is often done as much to keep the farm people employed as to preserve a continued supply of young vegetables, which with rice and a very scanty allowance of fish, form the diet of the labouring classes. The Chinese seem also to have some notion that a change of crop is beneficial, and not so exhausting to the soil, but I am not well informed as to the principles that guide their cropping.

The system of hand-weeding is here in full operation, and the weeds are buried in the soil. The Chinese farmer knows well that when weeds are allowed to perfect their seed, the ground undergoes a comparative scourging, hence the trefoil and lupine are plough-

ed in as the flower begins to open, and the bean as the pod is forming. The soil is for the most part (and particularly in the plains) highly retentive of moisture, hence tanks are rare, and canals retain the water equally well, serve as a medium of transport, and winding among the fields afford greater facilities for irrigation.

Soil and canals.

These imperishable veins of wealth that cover the whole face of the land, are the noblest monuments of legislative wisdom, and of the nation's industry and enterprize; while the glory of successful wars, and extended empire, has passed away and is forgotten, the memory of those who planned, and executed these less dazzling, but more solid works, is cherished, indeed almost adored, by a grateful posterity. Famine has been almost banished from the empire, or its operations are become so partial, that the plenty of one district fully supplies the scarcity in another. Without such works how could China support a population whose great density has not been exaggerated, and where early marriage is enjoined, a numerous family, viewed as the highest gift of heaven, and where polygamy is sanctioned to all, and generally prevails among the middle classes; these are symptoms of a healthy state of the empire, and present a strong contrast with modern Europe in its most palmy days, where prudence and necessity so often enjoin a cheerless celibacy.

2d. The care of the Yellow river, to restrain it within due bounds, and to regulate the sluices, is one of the most important trusts under Government. All other great rivers, and the grand canal are equally looked to by the State, but smaller streams and canals are regulated by the individuals whose grounds benefit by them. At Chusan, for instance, where the small streams are apt to be dried up during occasional droughts, their waters are prevented from wasting themselves in the sea by means of dams and sluices at their mouths; the canals are thus always kept filled; however low

the stream, none of it is lost, and it is only on the occasion of a very unusually prolonged dry season, as occurred in 1843, that the rice crops become endangered.

The grand canal and all others fed from the Yellow river, Yangtzekiang, the Min, and other great streams, can never be deficient in a supply of water, as their sources are never dried up.

A glance at a good map will show how admirably this country is watered by nature and by art; its great rivers running from west to east traverse the whole breadth of the country, water every province, and render the agriculturist almost independent of local rains. Intersecting these again, and fed by them, is the grand canal running nearly north and south, connecting both extremities of the empire, watering the intermediate country by innumerable channels that branch off from it, and affording a safe means of transport for a people who are unskilled in navigation, and whose ships are exceedingly rude, and can only make coasting voyages while the monsoon is favorable.

Would that some such great work as this canal could be accomplished in India. What consolidation of our empire, what increase of revenue, of population, and of human happiness! Those fearful famines that carry off their tens of thousands, sweeping away whole communities, their stock and their habitations, and rendering a once fertile region a very desert. The miseries of such awful visitations, the lingering deaths, the ruin of families, the loss to the revenue, and the danger to the public health, exceed that of the most destructive wars; witness only the recent famine in the Guntoor district, where 150 thousand men, women and children with all their cattle perished of hunger and thirst.

China is nearly exempted from such calamities.

The noblemen and gentlemen of England have formed rich and powerful societies for the promotion of agricultural improvement, the best means of enriching the soil, of improv-

ing the quality of the grain and the breed of stock, and by mechanical invention to diminish the expence of agricultural labour; these are undoubtedly high motives, and have done great good. China is behind in all such institutions, but her paternal Government are opposed to any measures for diminishing agricultural labour, the instruments of which are intended rather to direct than to abridge it, and on the principle that it is the duty of the Government to find employment and food for her industrious classes, she has given the labourer a deep interest in the soil by fixity of tenure. She inculcates, and indeed enforces (with that unity of decision which is the best feature of her despotism) industry and prudence, and points out to the farmer that if he repose in these virtues he will best secure his own independence, and that degree of comfort which makes life worth possessing. I have never seen in this country that painful, and often mournful sight,—a flitting,—that parting from a hearth consecrated by old and kindly associations, and deep in the prejudices of a half civilized people. Powerful ought to be the necessity or expediency that can justify such a step, and hard must be the heart that can condemn these sacred feelings, or look on them with indifference.

The produce of Great Britain and Ireland, might, I think, be doubled, by following the Chinese system; but the example must be shown by the landed proprietor under whom the most prudent and intelligent of the people ought to be employed to show ^{the} example to their countrymen; perhaps the system of model farms might best carry out these views. There would be necessarily,—

1st. A judicious system of small allotments under the eye of a responsible head.

2d. The prudent and intelligent among the poor to hold these at a small quit rent, conditional on their adopting the drill cultivation.

3d. The practice of irrigation ought to be encouraged, and stall feeding in preference to pasture, as they obtain in China.

4th. The careful storing up of the night soil and urine of cities and towns, which form the bulk of Chinese manure, but in England run almost wholly to waste.

5th. All wood-ash to be preserved, moors to be cut, and burned for the same purpose, and peat moss would in the Highlands of Scotland form an inexhaustible source for a supply of carbon, it might become indeed an important article of export. Abundance of water, of carbon, and of the salts contained in urine, are, among the Chinese, the leading nutriments of vegetables. The soil is not really richer than other favored spots of the globe, but it is made artificially so by a great amount of labour, and by the careful storing up of the waste in the animal and vegetable kingdom (little attended to by other nations), and by never stinting the plant in its supply of water, of light, or of air.

A Chinese farm is indeed a perfect picture of order and neatness, its like is nowhere else to be seen on a small scale. The question of how this arises, involves the history of ages, for nations like men are very often the children of circumstances. In the neighbouring Spanish (the Philippines) and Dutch settlements, with a climate and soil superior to any parts of China, but one crop of rice is obtained, and few if any vegetables are cultivated.

In July and August last I had an opportunity of examining some of these islands, the paddy fields bore every evidence of neglect, and rank grass which had nearly perfected its seeds covered their surface. On questioning an intelligent Chinese emigrant as to the cause of the difference between the condition of fields here, and in his native country, he replied "that by one crop the people made sufficient to supply their wants, and that they were too lazy to work for more." The destitute state of the poorer classes in Great

Britain and Ireland, would imply that a strong necessity exists for additional zeal in the prosecution of agricultural improvement, with greater encouragement to the practice of husbandry. In small allotments at home we too frequently observe the soil exhausted, and the rising crop being buried by luxuriant weeds, or sinking after drought, although a river lie but a few yards distant. The agricultural class is the most robust and most patriotic of a nation, they owe this perhaps to their position, but they ought to be fostered; let us hope they are not being allowed to degenerate. It has been observed by one of the best of men, and it accords with the experience of every age and every people, that a population is always more orderly and virtuous when scattered over a district than when congregated in masses. It is also less liable to be agitated by political speculators, when afforded the means of constant employment and moderate subsistence, than if subject to the fluctuating condition of the manufacturing market so contingent on our foreign relations, and the progress of mechanical science in other states.

EXPLANATION OF THE PLATES.

Plate I.

Fig. 1.—Reaping hook. The edge is smooth, and finely tempered. It is used for a variety of purposes, as to cut brushwood and vegetables.

Fig. 2.—The plough. The frame-work is wood, it comes to pieces, and the whole is so light, that at even-time the labourer carries it home over his shoulders. The *share* is made of east iron: it has no coulter.

Plate II.

The common harrow. The row of large perpendicular teeth are made of iron. The driver stands on the cross bar of the frame *a*, resting his arms and breast on the bar *b*. The yoke which is made of wood, is seen at *c*.

This harrow I have only seen used in paddy fields, which are always ploughed and harrowed, partially inundated. In dry soils the Chinese

do not use a harrow to break up the clods, they find the heavy hoe do this much more effectually.

Plate III.

Represents the heavy harrow for cutting up the green manure, and incorporating it with the soil. *a. a.* and *b. b.* the strong frame-work. *c. c.* the rows of horizontal concave knives.

Plate IV.

Fig. 1.—A light shovel for scooping up the earth between the beds, and placing it between the rows of plants.

Fig. 2.—The hoe most commonly used in weeding.

Fig. 3.—The wooden rake for stirring up the water and mud between the rows of rice plants.

Fig. 4.—The heavy four-pronged rake in general use for breaking up all stiff soils, after ploughing; this rake is used to form the field into rigs or beds, in which the seedlings, whether of grain or vegetables, are planted.

Plate V.

Represents the method of carrying heavy burthens of every description. The pails *a. a.* are those used for conveying the liquid manure to the field; they are often furnished with covers.

Plate VI.

Fig. 1.—One of the pair of baskets used to convey farm-yard manure or earth to the fields. It is made of twigs of bamboo.

Fig. 2.—The shield worn over the face for protection while the labourer is on his knees weeding the rice fields.

Fig. 3.—The wooden chain pump. This is the only means of raising water used on the Island of Chusan. For the modifications of this machine, and for an account of others in use among the Chinese, vide Mr. Davies's Work.

Plate VII.

Fig. 1.—A bamboo rake for dressing corn, and turning it over to dry.

Fig. 2.—A heavy hoe for breaking very stiff clay soil, it very much resembles our mattock.

Fig. 3.—A rice mill, *a.* is the hopper, *b.* the stone roller which traverses in the stone gutter *c.* The opening at *d.* is the outlet for the cleaned rice. *e.* is the yoke, it is drawn by a bullock.

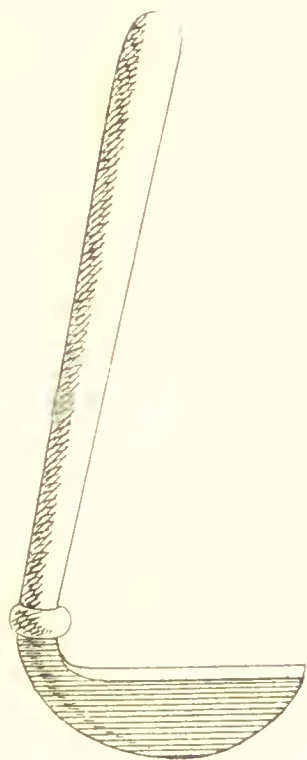
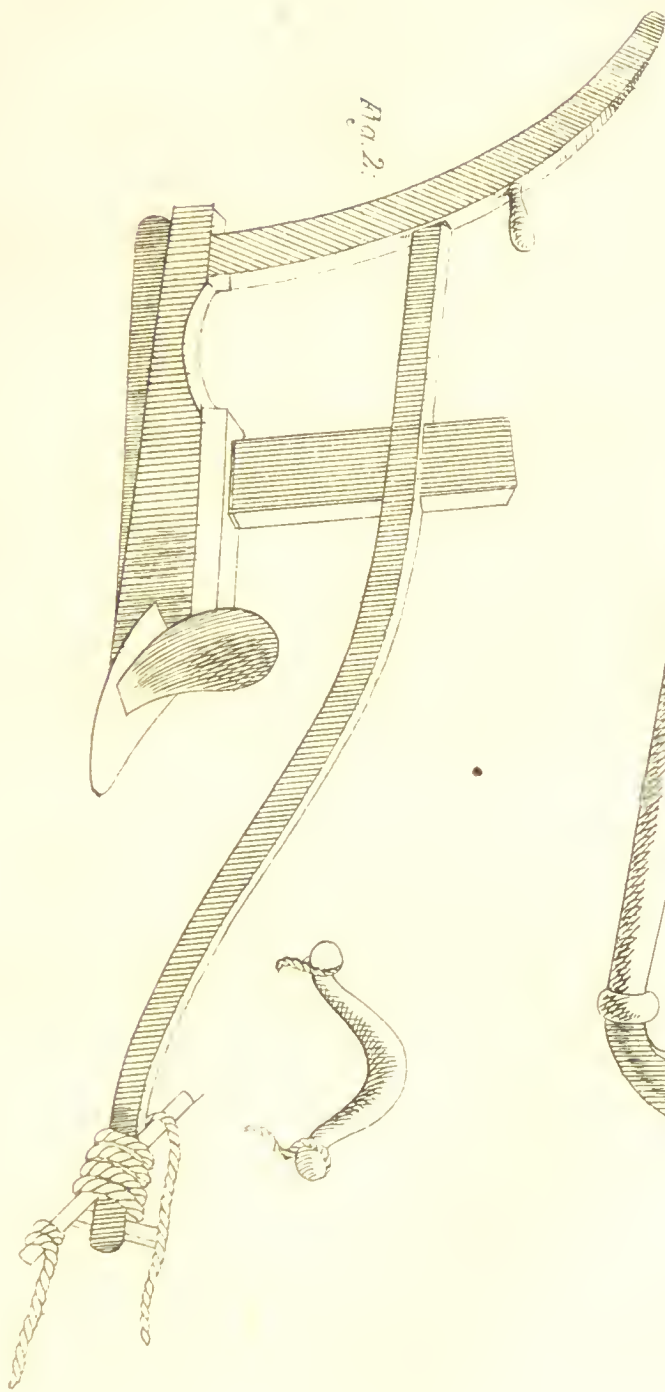
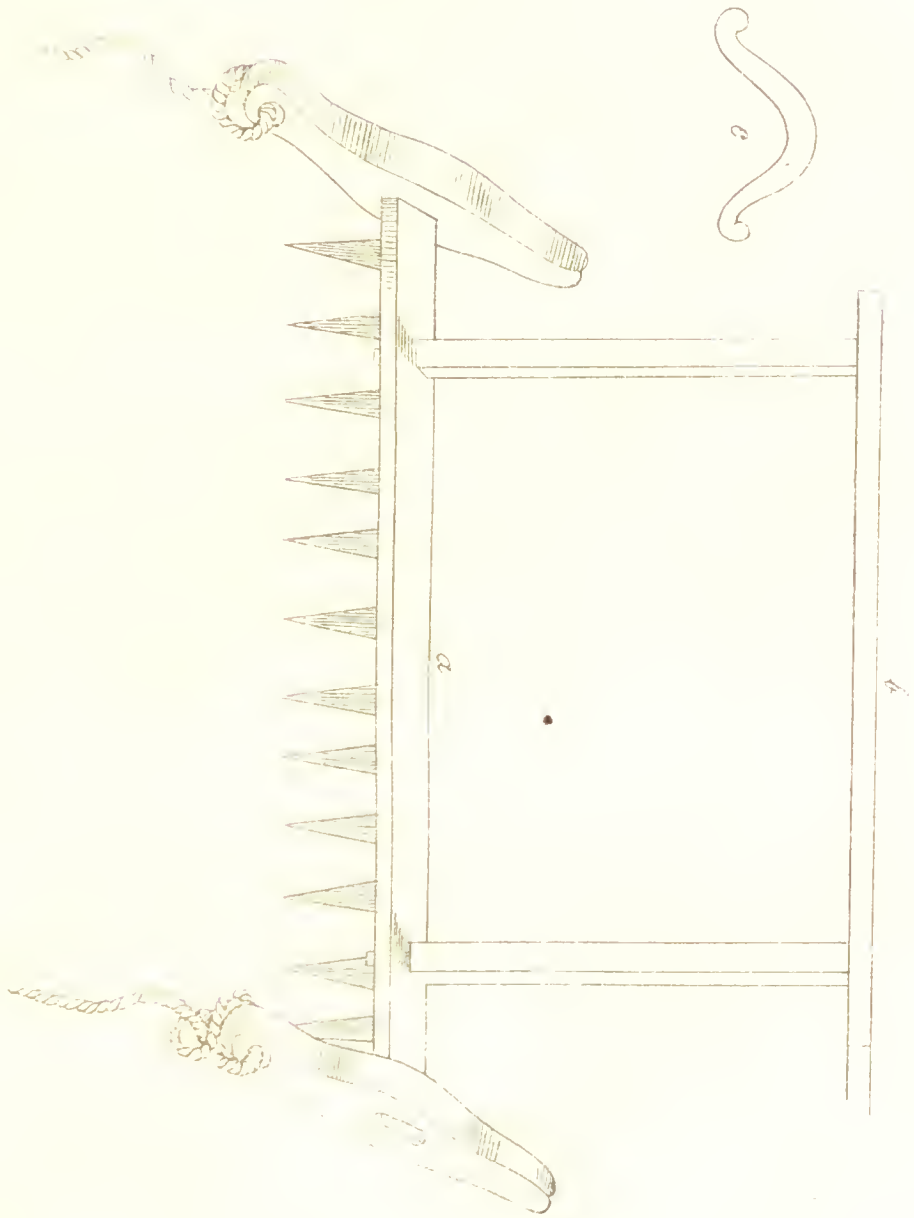


Fig. 1.



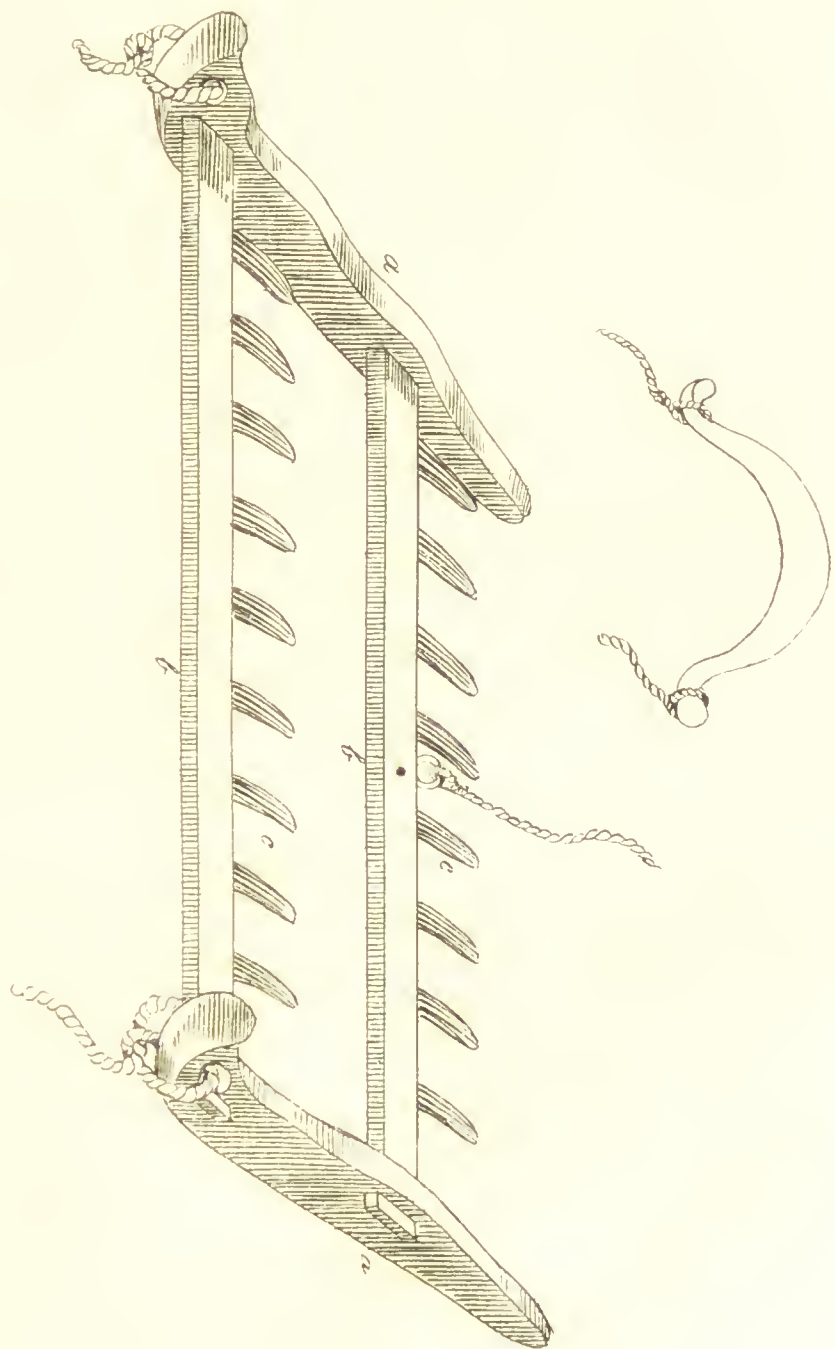




Fig. I.



Fig. II.

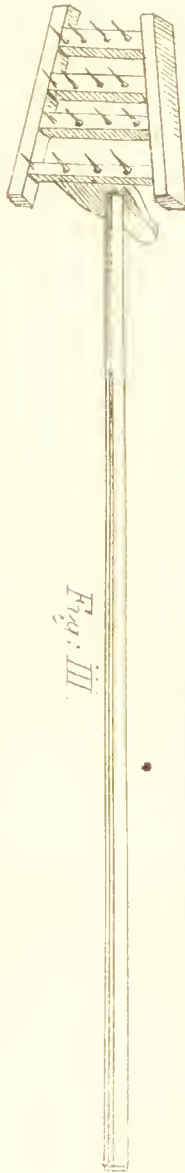


Fig. III.

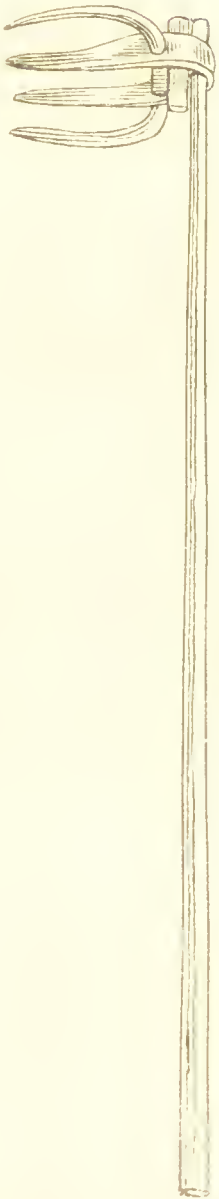


Fig. IV.



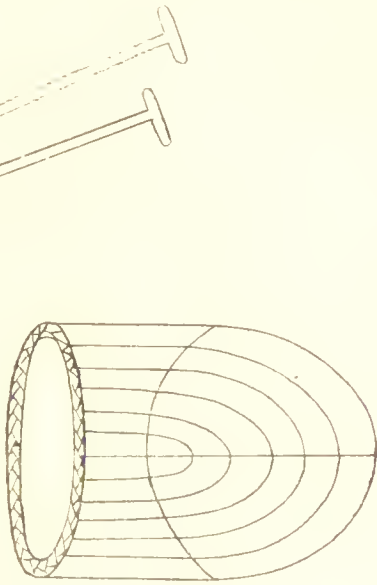


Fig. II

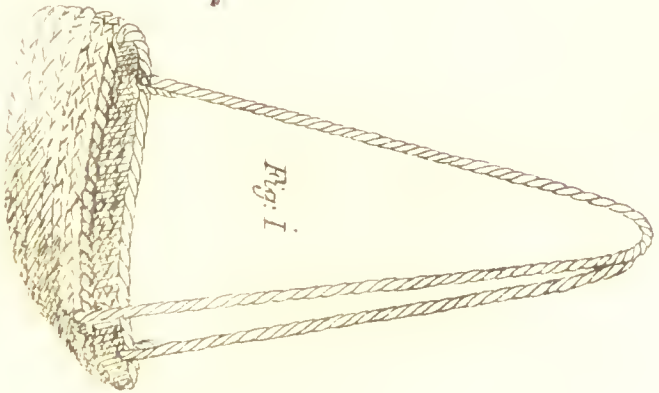


Fig. I

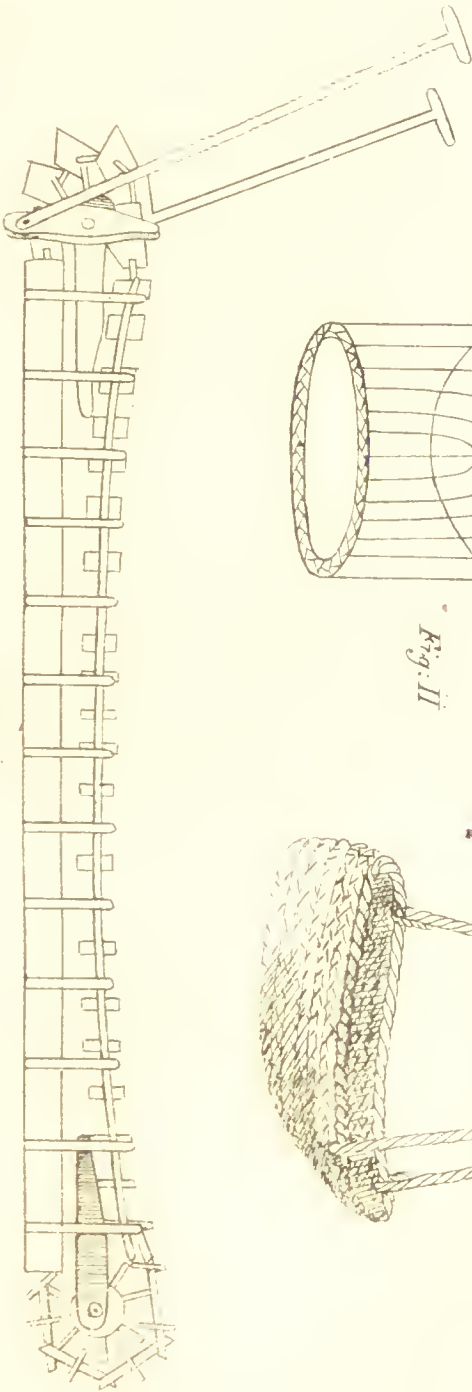
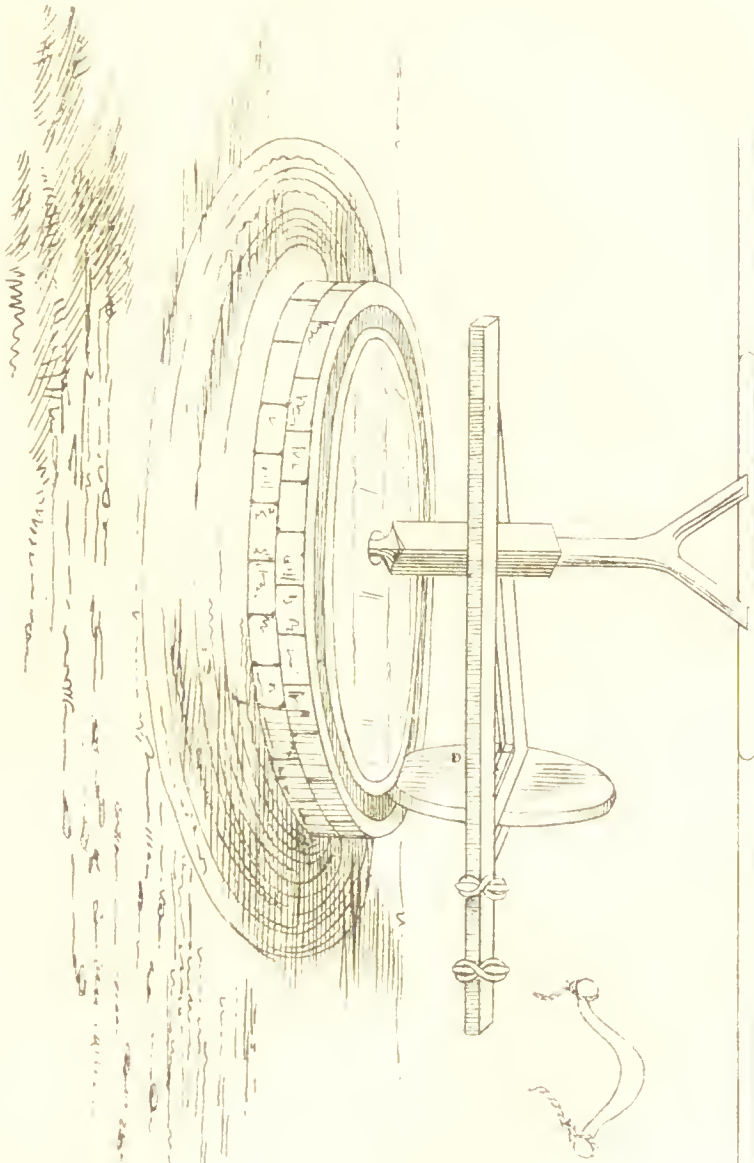


Fig. III



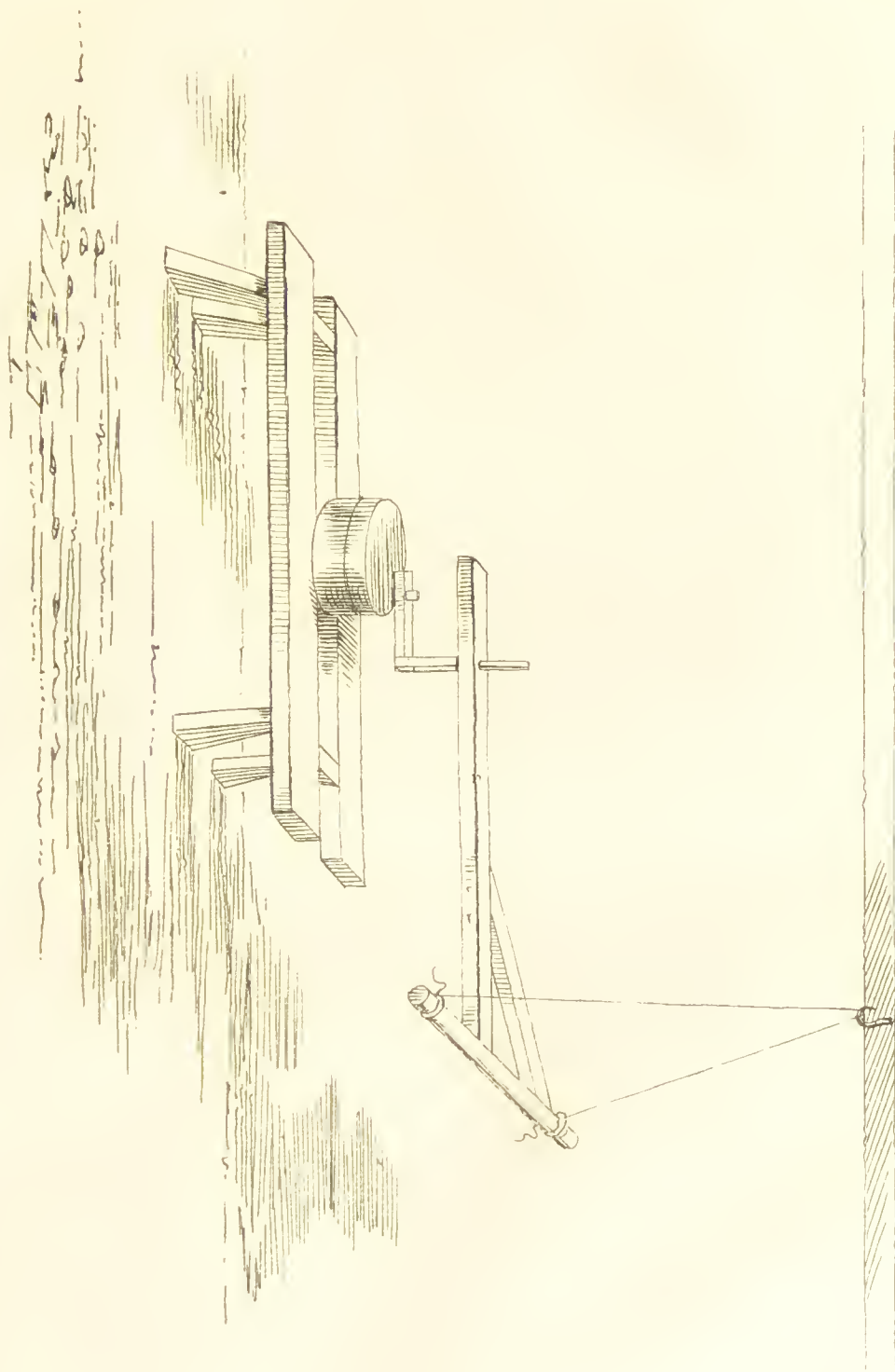


Plate VIII.

Represents another kind of grain mill, which is most commonly used to grind millet. *a.* is a stone roller which traverses in the gutter *b.* This machine is worked by a small bullock.

Plate IX.

A mill for making bean curd, also used at times to grind rice: it consists of two granite stones, the lower one, fixed to a heavy stool, has a groove round its upper margin, in the upper stone there is a hole at the top by which it is fed, close to this the handle is attached, it is worked by hand.

for paying the bottoms of boats, and in Malabar, according to Rheede, for book-binding, both on account of its adhesiveness and being obnoxious to worms.* An infusion is employed to steep fishing-nets in, to render them more durable.†

I have not been able to find any notice of a dye produced in this family, but the character of astringency, which as I have said in one, at least, depends on the presence of tannin, may explain the capability of producing a black dye. At the same time it throws a doubt upon the statement, that the dye is an independent one; a doubt certainly indicated by the analysis of the dyed stuff by Dr. Mouat.† In con-