Series
XII

Vol. 9

(Commonplace book)

Mayor's Court [illegible]
" " " pro[illegible]
(d) Private miscellaneous

25,000—4-5-32.

Block	7
Rack No.	
Shelf No.	
Serial No.	14
General No.	12418

608

183

(5)

Chunam ground very fine well wrought and Smoothe to prevent Cracks –

The Casements and under Ground Works to have two Coats of Chunam on the inside, the first to be of equal Quantities of Chunam & Sand as before directed and to be properly dried before the Second is laid on which Should be of Stone Chunam well Smoothed, mixt as for a last Coat.

Plaistering 10 feet Square of Chunam Work half Inch thic

	Chun.	Sand
1 Coat	2	2
2 do	3/8	3/8
3 do	3/8	1/8
Ghee	10 Pollam	
Tyer	1/2 Measure	
Balpon	10 Pollam	
Eggs	3	

Calculate of the other Side.

Chunam 2 3/4 parrah @ 3.68	10.39
Sand 2 1/2	1.20
Ghee 10 Pollam	2 40
Balpon 10 Pollam	1 –
Tyre 1/2 Measure	4
Eggs 3	6
Jaggree 7 lb	7
Workmanship	1 –
Pagods	1

N.B. Jaggree not here mentioned but should by Coll. Ross Directions be 7 Pound.

Plaistering Corniche Work for ten feet,

	Chun.	Sandy
1 Coat	3	3/2
2 do	1/2	1/2
3 do	6/8	3/16
Ghee	15 Pollam	
Tyar	3/4 Measure	
Ballapom	20 Pollam	
Eggs	4	

N.B. By Colonel Ross: Account
to for every Square of Chunaming in

12 Eggs
2 measures of Tyre
1/3 measure of Ghee
Proper Quantity of Ba
7 Pounds of Jaggree.

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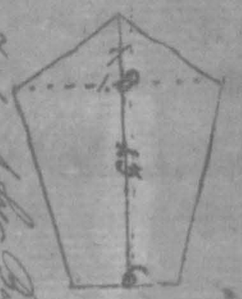
At Trichenopoly

1 Basket Chunam } plaistered 5. by 12. 5 } ½ Inch thick
1 do. Sand.— }

1 Basket Chunam } plaistered 5 by 19. 4 }
2 do.. Sand. }

20×20 = 400.
6×6 = 36
20×6 = 120.
556 triple Square
.7854
2224
2780
4448
3892
4366.824
5⅓ height
2183.4120 content of Basket
733. 0400 — — — top
2916. 45 20 Content of whole —



Trichinopoly Basket
for making Chunam

Madras Panah 22×22×9 = 4356 Inches

At Masulipatam

The Panah 22 by 16½ by 9 Inches or 3267 Cubic Inches

e parrah Sand weighs —— —— 147½ lbs
—— Shell Chunam —— 104.
—— Stone do. —— —— 77½. —
—— Unburnt Stone for making Chunam 143. —
35 lb Blue paint covered 2387 Square Feet
ers 47 Square, Feet.

s	Length	breath
ldes —— ——	9.3	4.7.
u. (for a Muster) ..	6.	5.—
/ do. /	12{0 6.5}	
. . . .	22.—.	

At Tanjore the Panah

25/8 by 25/8 & 8½ or Cub. Inches 5365¾
½ d. 16. by 16 — 8½ —— 2176.–

Prices of Materials charged to the Company Tanjore 1777

Wall Bricks	1 Sort	½ Pag. ℘ Mill
do.	2 do.	¼ do. .. do.
Arch do.		1 .... do.
		¾ .... do.
Terrass do.		
Chunam	1 Sort	4 f. ℘ Panah
	2 do.	4 f. do.
		1¼ Parr for a Fanam
Sand	1	
Jaggue		from 1 to 1¾ ℘ lb
Flat Tyles		@ 15 f. ℘ Thousand

Weight of Bricks at Tanjore

	Length	Breadth	Thickness	Weight
Riverside Clay	9.	4⅜.	2½	
do.	8⅞ 9 }	4¼		
Red Clay of pootopettah	8⅞ 9 }	4⅜		

5 Burnt Bricks weighed

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(8)

Trichenopoly

Making Arch 9½ Feet Square

Vizt

Bricks	2450	1 . 31 . 40	
Chunam Baskets equal to 57 Par.	25	1 . 33 . —	
Sand Loads	38	— . 9 . 40	
Jagary seer	10	— . 27 . —	2 . 101 . —
Bricklayers	14	— . 42 . —	
Coolies	24	— . 36 . —	
Women	20	— . 20 . —	
Boys	20	— 15	
Ropes	30	— 15	
Pots		— 5	. . 133 . —

Making 2 Pillars which is 15 Feet high 2¼ feet thick beside the Foundation. —

Bricks	4550	6 — 31 . 40	
Chunam Baskets	35	2 . 21 . —	
Sand Loads	62	. 13 . —	
aggary Seer	8	. 22 . —	8 . 87 . 40
icklayers	10	. 30 . —	
lies	12	. 18 . —	
en	16	— . 16 . —	
	16	— . 12 . —	
	10	— . 5 —	
		— . 2	. 83 . —

king Terrace 10 Feet Square

	2500	1 . 33 . —
Baskets	28	2 . — . —
	42	— . 10 . 40
	8	— . 22 . —
	5	— . 2 . 40
		— 1 .
	8	— .
	20	
	20	
	20	

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(9)

List of Materials prices at Trichenopoly
29 July 1795.

Company's Price

No. 1	Timber from 18 to 20 feet long		@ Pa 1½ each
2	Ditto do. 15 to 17 do.		@ Pa 1¼ each
3	Ditto do. 12 to 14 do.		@ Pa 1 each
4	Ditto do. 10 to 11 do.		@ Pa ¾ each
	Flat Tyles		@ Fan. 9 pr Mill
	Round Tyles		@ Pa ½ pr Mill
	Large Wall Bricks		@ Pa 1½ pr Mill
	Coarse Chunam		@ Fan. 3 pr Basket
	Sand		@ Fan. 1 pr 4 Bullock loa
	Fine Chunam	1 Sort	@ Fan. 5 pr Colam
	do	2 Sort	@ Fan. 4½ pr Colam
	Bamboos No.	1	@ Fan. 6 each
	ditto	2	@ Fan. 2½ each
	ditto	4	@ Fan. 1½ each
	ditto	10	@ Pa 1½ pr %

At Tanjore Decr. 2d. 1773 delivered to 10 Bricklay

1st	6200 Wall Bricks
2	2000
3	1200
	9400
Remained Evening	340
	9060 laid

10 Bricklayers	@ 4
40 Boys	1
Bringing Water 10	1
Chunam Beaters 20	1¼
Cooly people making Chunam	

9000 / 127 / 1⁷⁄₁₄ ⁶⁄₉ pr Thousan
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Tanjore Weight

2 puccaseer … is 1 Do of a Tolam … weighs 3 lb 15¾ oz each seer 68 Doodies
8 puccaseer … is 1 Tolam … 15 lb
32 Tolam …… is 1 Candy 512 lb

Tanjore Measure

88 Polla Novapagodas fine Rice … is 1 Seer (Cukha)
4 Seer … ——— is 1 Measure
2 Measures — ——— is 1 Mercal

10 Weights of 1/10 is 11 Pagodas — 1 pollam
8 Pollam ………… 1 Seer
4 Seer ………… 1 Measures
2 Measures ………… 1 Mercal

Besides the Tanjore Measure a puccaseer is used of 68 Dudies weight for Buying — of 62 selling in Naup Cawns Camp and Town delivered out to Nabobs Servants.
A puccaseer of 60 dudies weight was used in Camp during both sieges of Tanjore — All weighed with New Horse Gram.

…e Espence of Laying Telly & Clay of 5 Inches deep p Square

…lly 4½ Carts load @ 16 Carts p Pagoda	11 . 65
…1 Hire on do @ 5 f p Cart	22 . 40
… Clay 4½ Carts @ 3 f p Cart	13 . 40
…rentship for Laying Watering …mming	4 . 40
	1 - 10 : 25
25 p Cent	13 . 6
Pag 1 - 22 …	

…a for … Streets at the Black Town
… 4 …
…square … P. 1 - 5 -
p Square … C. 1 - 31…
M Wardlaw.
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P…

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able of the Thickness, Yarns, Length, Weight, & Value of Coir, Cables & Cordages. Wg.t at Madras in 1778.–

Inches	Yarns	in	in	in	in	Fath:	Candy Md lb		Pag. Fa. Cash
						100	1 „ –	@ P30 p Can.	1 „ 18 „ –
1½	12						2	@ 22½	2 9 –
2	20						2 17		3 „ 1 „ 10
2½	32						4 6		4 28 10
3	48						5		5 22 40
3½	60						7		7 31 40
4	80						8 15		9 24 5
4½	100						12 15		14 6 25
5	140						14		15 27
5½	162						18		20 9
6	180						19 20		22 14 50
6½	192						1 8		31 18
7		4¼	3¼	6½	½		1 11 6¼		35 5
7½		4½	3½	7	½		1 16		40 18
8		4¾	3¾	7½	½		1 19 16½		44 2
8½		5	4	8	½		2 5		50
9		5¼	4¼	8½	½		2 6 15		54
9½		5½	4½	9	½		2 13 8½		6
10		6	4¾	9½	½		2 7 4		
10½		6¼	5	10	½	125	3 17 22¾		
11		6½	5	10	1		4 4 16¼		
11½		6¾	5¼	10½	1		4 10 20½		
12		7	5½	11	1		4 18 2¼		
12½		7¼	5¾	11½	1		5 6 13		
13		7½	5¾	11½	1½		5 15 7¾		
13½		7¾	6	12	1½		6 4 11		
14		8	6¼	12½	1½		5 12		
14½		8¼	6½	13	1½		7 3		
15		8½	6½	13	2		7 1		
15½		8¾	6¾	13½	2		8		
16		9	7	14	2				
16½		9¼	7¼	14½	2		9		
17		10¼	7½	15	2				
17½		10½	7¾	15½	2				

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Inches	3/4 in	in	Yarns in	in	16	Fath.	Canvas	Mt	lb	[illegible]	Reg	y.	
18	10¾	8	16	2		125	11	5	"	Reg 22½	253	4	
18½	11	8¼	16½	2			12	2	20½		273	6	
19	11	8¼	16½	2½			13	1	6½		293	32	50
19½	11¼	8½	17	2½			14	"	7¾		313	130	40
20	11¾	8¾	17½	2½			15		"		337	10	"
20½	12	9	18	2½			16	"	7¾		360	13	40
21	12¼	9¼	18½	2½			17	1	6¼		383	32	50
21½	12½	9½	19	2½			17	0	"		391	10	"
22	12¾	9¾	19½	2½		150	18	2	4		407	15	40

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Appendix

No. 1.

Calcutta 10th July 1792

Substance of a Conversation with Godadur* Mundil, of the
Village of Deca, in the Pergunnah of Renalty, & Provin
of Burdwan, distance about 24 Coss (50 Miles) from Calcutt

Question. What is the Size of your Begah

Answer. It consists of 20 Cottahs, each Cotta 80 Cubits long, & 4
bits broad or, 320 Square Cubits of 20 Inches long, wh
makes 6,400 Square Cubits to the Begah equal to 17,777 9/10
Square Feet — or Square Yards 1,975 2 9 inch about 2-5 the
Acre.

Q. Is the soil of your Village well adapted for the Cult ting
Sugar Cane?

A. Yes, it is reckoned to be nearly equal to any of the Be
the Province of Burdwan.

Q. What is the nature of the soil of your Villa
renders it so fit for the Produce of Sugar Cane. & with lies

A. It consists of a mixture of whitish Clay or two,
Sand, nearly in equal Proportions. Their vei

Q: Is the Situation elevated or low. & receive no

A. It is considerably elevated or low? at

Q. ... rs Tree (about 30 feet) above Calcutta

Village, too much rain, but are sometimes settle in your

moned What mode of Cultivation do yo him, but who

... becaine. ... iments of hust

Business ... ent our Canes at the di to perform all

... elevatio the whole char:

The 60 from each other. If the him to culti

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the upper part of the cane, which yields little Juice; we first
plant them close together. as the canes are cut in the months
of Decr. January & February; in moist Grounds at the Edges of
a tank, or near Water, where they remain about Six weeks
or two months and when they are grown about 6 Inches high
we remove them to dry earth for a few days and water them
there, and then transplant them to the Ground they are to
occupy in the Months of March & April. Before the Canes
are transplanted, we plough the Ground Several times, &
manure it with a Compost made of the Soil or mud from the
bottom of tanks, rotten Vegetables, & Cows Dung; and when
the plants are put in the Ground, we Strew it over with coil
(oil cake) broken to dust, in the proportion of 10 Seer (20 lb)
to a Begah, watering them at the same time. Two days af-
ter planting we throw up the Earth around every young
plant & continue to water them constantly when no rain
falls; we are also particularly careful in weeding them fre-
quently, & Suffer no grass to grow amongst the plants.
When they attain the height of a Cubit, we again Strew
the Ground over with the dust of oil cake, in the pro-
portion of 2 Maunds (164 lb) to a Begah. Each plant
on an Average produces 12 Stalks, or shoots; I have
some with 30, others 4 or 5 only. When the canes
above the Height of a cubit we tie the stalks of each
together; and when they rise to the height of 3 Cu-
bind the produce of 4 Plants together and conti
ing up the leaves, and tying them round the
the time they are about 1 Cubit high, until they
the canes are very long we bind the Stalks of
ther. We begin to cut our canes about the
Decr. and generally conclude about the mid
. Ten or twelve days before we commence; cut
ground abundantly, which makes the
down our canes with a coda
cut off the heads, reserving
heads and leaves, if green
ones, together with the
the juice into gour. When
up the roots, by

plough first between, then through them; after which we
gather them together in a heap, & let them rot for manure
We do not plant the same ground with canes two succeeding
Years but after canes we Sow mustard seed or teel and some-
times potatoes for the ouse (August) crop. Industrious
Ryots cut their canes early, and sow their teel in all the
month of February, which gives them a crop ready to
cut in may; when they plant rice for the ouse crop, which
they reap in Septr. & then Sow mustard seed, gram, wheat,
or barley; which is cut down in Feby; when after the usu-
al ploughing, manuring, &c. canes are again planted; and
this is the usual course of husbandry in my pergunnah
on land where Sugar cane is planted.

Q. What is the usual tax or rent of such land as you have described your village to be?

A. Four Rupees ꝑ Begah for land planting with Sugar cane, for land in general taking in all sorts of produce the medium rent may be about 2 1/2 to 2 3/4 rupees per Begah.

Q. What may be the annual expence of cultivating any given quantity of land in your village (say 60 Begahs) which is planted with Sugar cane?

A. A Ryot performs most of his Business with his own family, and perhaps a hired Servant or two, who if engaged for 12 Months usually receive their victuals and 12 Annas ꝑ Month wages, if they receive no victuals they wages are 2 rupees per month.

Q. Suppose a new Ryot what was to settle in your
lage, with no Family to work for him, but who
money enough to buy all his implements of hus-
build a house hire labourers to perform all
Business and in short, to bear the whole char-
ltivation, what would it cost him to culti-
The or 60 Begahs of Ground; though the cou
be about 4

need

of husbandry you have described

(18) A. I have never known such a person as you describe and it would take much time to calculate the labour of hired workmen; but I will make the best calculation I can & bring it to you in two or three days hence.

Q. What is the usual produce of a Begah of sugar, under your own immediate cultivation, when manufactured into gour?

A. I have for many years planted five Begahs annually with sugar cane and the medium produce thereof in gour has been 150 Maunds or 30 Maunds (of 80 Sicca weight to the seer) to a Begah; of a very good quality, such as would sell in Calcutta for 3½ sicca Rupees per maund, and in general 2 Sicca to 2½ in this market or 1½ to 2 sicca rupees on the spot. A very good season will 35 Maunds per Begah a very indifferent one 25 Maunds. As we water our canes the produce does not so much depend on the variety of seasons as on the care & attention of the Cultivator; & most of the Ryots who cultivate cane being rich, they can generally afford to bestow proper Labour and manure on their cane grounds, so as to return them constantly an abundant crop.

Q. Is not the weight of a seer in your pergunnah 60 siccas, and are you sure you mean the Calcutta maund of 80 sicca weight to the seer.

A. I have generally sent my gour to Calcutta market and have therefore calculated it by that weight. Gour in Burdwan is sold by the Pol, which pol is estimated to contain but 24 to 25 seers of 60 sicca weight but its real weight is always found to be 30 to 32 seers i.e. Sicca weight, from which arises great profit to the merchants and loss to the Ryots.

Q. How many seers of the juice of the cane

to make 1 seer of Jaggery?

the 4 60
the 2 30
25
wt 32.0
3 17 3

A. From 5 to 7. if the juice is rich or produced from Canes that grow on high grounds, (tatton): 5 seers of juice will make one seer of gour; if from canes produced on low grounds, called hodgebatty, it takes 7 seers of juice to make one seer of gour.

No. 2

Calculate by Godadhur Mundol, of the expence & produce of Sixty Begahs in the ordinary course of Husbandry, in the Pergunnah of Renalty, which have before been brought into Cultivation. Supposing the whole to be done by hired Labourers.

Expence

1st Ground rent as follows:

		S.R.	A.	P.
" Five Begahs Sugar Cane at 4 R.		20	0	0
" Five Begahs for Gram ditto	3	15	0	0
" Five Begahs for mustard & till	3	15	0	0
" Five ditto tobacco, Subjee, &c. &c. esculent roots and Vegetables, such as Yams, brinjalls, potatoes, melons, pumpkins, turmerick, ginger &c.		20	0	0
" Five Begahs for cotton at 4 R.		20	0	0
" Thirty five Begahs for rice or dhan	2 R.	70	0	0
Sicca Rupees		160	0	0

Medium of Ground rent, 2 sicca rupees 10 Annas to 2 Rupees 12 Annas per Begah.

" The B
measured
975 yard
1st N

used

To Amount brought forward 160.0.0

2nd Cattle, Implements of Husbandry, &c

" Four Bullocks .... at 10 rup:	40.0.0	
" Stable for ditto	4.0.0	
" Two ploughs (the best) Shod with iron	4.0.0	
" Six koddalies, or hoes	3.0.0	
" One hatchet	1.0.0	
" Two Cuttaries, or small cleavers	1.0.0	
" Six poor, or instruments for weeding	1.0.0	
" Six castia or Sickles	1.0.0	
" Twenty four baskets, common	1.0.0	
" Four ditto for water	0.8.0	
" Jute ropes, water pots, sieves &c	1.0.0	
" Oil cake to manure the cane ground	5.0.0	
" Screws for expressing the juice from the canes and pots to boil ditto	5.0.0	67 8 0
		227 8 0

3rd Plants and Seeds for the first Year.

" Five Begahs Sugar Canes, (about 35,000 plants)	10.0.0	
Arhur, 15 Seers to grow as a fence about the canes	0.4.6	
" Five Begahs gram or Pulse. (Vizt		
" Two Begahs mussour 12 Srs per Begah 24 Srs	0.8.0	
" Three Begahs pease 15 Seers at R.1.5 per Maund	0.11.3	
" Three Begahs Barley, 10 ditto ℘ Begah 30 Seers	0.9	
	12	

To Amount brought forward 12.0.9 Rs 227.8.0

" Paddy for these five Begahs at 15 Seer per Begah is 1 Maund 35 Seers	1.12.0	
" Five Begah mustard Seed at 4 seers per begah 20 Seers	1.4.0	
" Paddy for ditto, 15 Seer ℘ Begah	1.12.0	
" Five ditto greens & Subjee	1.0.0	
" Thirty five Begahs paddy, or dhan for the Aughunney crop, 15 Seers per Begah, 13 Maunds 5 Seers	13.2.0	
" Teel to sow in the same Ground at 4 Seers per Begah, is for 15 begahs 1 Maund 20 seers	1.8.0	
" Kissary for 15 Begahs at 15 Seers per Begah is 5 Maunds 25 seers	2.10.0	
Five do. Cotton at 4 seer ℘ Begah is 20 Seers	1.4.0	0.9
Paddy for ditto 15 Seer ℘ Begah	1.12.0	38 0 9

4th Wages of Labourers &c

" 6 Husbandmen at 2 rupees ℘ Month is ℘ Annum	144.0.0	
" Hiring additional Labourers to cut & grind the cane and boil the juice	15.0.0	
Straw & fodder to feed the cattle at 12 annas ℘ Month 4 bullocks	36.6.0	
An Overseer at 5 rupees ℘ Month	60.0.0	255 0 0
Expence for the first Year S. R		520 8 9

" The Exp measure Succeeding Year's Expences will

975 years 150 Sicca Rups ℘ An.

Produce

Quant. | Value on the Spot on a Medium of 5 years R. A. Sic. R. A. P. | Present value in Calcutta per Md. S.R. A.

"Sugar Cane, 5 Begahs, will yield in General Mds.
of gour or Jaggery .... 150 1 8 225 .. .. 3. 8 575
"Value of plants for next year for: .... 20 .. .. .. 20 -
"Arther planted round the edges of the canes
for a fence .... 10 12 7 8 1. 8 15 -
"Gram &c. 5 Do. from Octr. to Feby. will give
of mussour which is made into Doll or
split pease ----------
Pease ---------- 6 8 3 2:2 12
Barley ---------- 6 10 3 12 1.2 6 12
And during the months of May, June, July 6 12 4 8 1.4.4 7 4
& August, the same Grounds will a yield a
crop of Jaree, in quantity ----------
Or 300 Pallies, which is a measure weight } 30
4 seers, sold in the Market at 22 Pallies per
rupee or ----------
"Mustard Seed 5 ditto from Octr. to Feby. will
yield .... 13 10 2 10 to 1 plant 30
"An Ouse crop of Paddy .... Mds .. 15 1 8 22 8 2.8 37 8
"Subjee 5 ditto to Vegs. ---------- 30
Bagan or brinjalls 1 Begah worth ---------- 13 10 2 .. 30.
"And on the same grounds jungees .... worth 20 40
"Bettel, 1 Begah .... ditto 3 6
"Shooshow, or (cucumbers) 1 ditto .... ditto 20 40
"Tunmoongs (or melons) 1 ditto .... ditto 20 40
"Alloo (or potatoes or (yams) 1 ditto .... ditto 25 50
"Cotton 5 ditto from October to June .... 15 3 mns 45
And a late ouse Crop of Paddy 30 13 10
"Rice 35 ditto, 1 Aughunny crop planted in
June & cut in November sold in the husk 2
at 20 Palley or 2 Maunds per rupee produce 30
"During the months of Novr. Decr. & Jany. they 210 2 ½
sow the rice grounds from the dry part 45
gram made into Dolle .... 22 worth 32.8

8 17/40 8

	Quan	Value on the Spot on a Medium of 5 Years Sic. R. A. P.			Present Value in Calcutta per Md. S.R. A.	
Brought Over		612	10	"	Sicca 1407	12
"And from Febry. to May, a crop of Tille, from which oil is made.	Mds. 35	12	22	4	1.4. 43	12
"And Urcha, a kind of Greens	worth	20			worth 50	
"Straw about 50 cahouns each cont. 16 pons, of 80 Bundles to the pon		50			100	-
		704	14	6	S:R 1600	12

	R: A: P
"Total Amount produce of 6 Begahs as above, upon the Spot .... Sicca Rupees	704. 14 - 6
"Deduct expence	520 .. 8 - 9
First Years profit, Sicca Rupees.	184 - 5 - 9

"The expence of cultivation for every Succeeding year being only 450 Rs the profits would be increased to Rs 254.14.6 or 42 Rs 3 A: 16 Pice per Begah ...

"Amount produce of 5 Begah Sugar cane	R: A: P
150 Mds at 1 R: 8 A per Maund	225 .. 0 .. 0
Value of Plants	20 .. 0 .. 0
"Arhur Gram	7 - 8 - 0
	252 - 8 - 0
"Deduct annual expence, estimated @ 20 Rs. per Beg.	100 - 0 - 0
Annual profit	152 - 8 - 0
Or per Begah .. SRs	30 - 8 - 0

"The Begah at Renalty is a Square, the sides of which measure 44 yards 1 foot 4 inches, consequently it contains 975 yards 2 feet 9 inches. —

need

"Five Begahs are equal to 2 Acres 6 poles 15 Yards

" One Hundred & fifty maunds of goor supposed to produce 75 bazar maunds of Muscovado Sugar, or 2 tons 15 Cwt is 1 ton 7 Cwt 1qr 1lb ℔ Acre & would cost as follows—

Seventy-five Maunds of Muscovado Sugar costs	Rs 100-0-0
Deduct 75 Maunds of Molasses. @ 8 Annas	37-8-0
Cost Rs	62-8-0
Exchange 2 S. 4d per Sicca Rupee	£7-5-10

Equal to £3-12.5 3/4 d per acre, or 2s 7 3/4 d per Cwt.—

No. 3rd.

Average Expence and Produce of Land cultivated with Sugar Cane in the District of Burdwan; estimated from a great Number of Accounts taken on the Spot from Native Cultivators, in different Pergunnahs, by a Gentleman well acquainted with the District.—

No. 1.	Rent ℔ Begah 6400 Square Cubits	Average Expence of Cultivation & preparing the Produce	Average Receipts of 30 Seer weight to the Seer of Jaggery	Average Value of Produce ℔ Maund	Amount	Profit to the Cultivator
Sugar Cane	Sicca Rups. 3 – –	Sicca Rupees 15 – –	Mds – – 19 – –	Rs. A. – 1 – 12 –	Rs A. – 34 – 12 –	Rs. A 16 – 4 –

No. 2	Jaggery	Medium produce in Do. in Chinee, or clay'd Sugar	Residuum in Do. in Coutra or drott–	Value of Coutra	Quantity lost in the operation, being Scum & very thin Molasses of little or no Value—	
	Mds. – –	Mds S. C	Mds S. C	Rs A P	Mds S. C	
1 Process	19 – –	6-7 –	6 31.4	8-2-6	6-1-12	—
	Ditto of common Chinee					—
2 Process	19 – –	8. 0 –	4 30 –	5-15 –	6-7 –	—

No. 3	[illegible]	Mds 1 Seer S A P	Firewood Rs A P	Baskets & Earthen Ware Rs A P	Labour Rs A P	Total Expence Rs A P
	1 – –	— — 6	— 2 —	— — 6	— 2 6	— 5 6

Extract of the Letter which accompanied the above Statements.—

I have now the pleasure to send you No. 1 the average estimate &c of four or five pergunnahs, which may be considered as the Medium produce of the whole district in a tolerable Season. I have Limitted the Statement as applicable to the Cultivator. With respect to the conversion of the product (19 m[illegible]d a muster produced or finest Chinnee (or a muster

duced) I have Consulted many of the Huleways and Moy:
:ras, or Sugar Bakers and the average of the report fixes
the product at 5 Maunds & 20 Seers the product of medi:
:um Dobana at 6 Mds 7 Seers and of the Common at 6 Mds
3 Seers.

No. 2. exhibits the two last average Statements. With
respect to the expence attending the Boiling and preparing
the Chinnee it differs in every Pergunnah as the price of
wood, Labour, and other Materials are dear or otherwise
In the town of Burdwan for instance the average ex:
:pence for the preparing of a maund amounts to 5 an. 6 pice
(No. 3) But this is dearer by 20 per Cent than it is when
prepared in the Country where Wood and Labour is cheap:
:er and the preparation of a larger quantity will of course
render the expence less.

Sugar Grounds is only cultivated on a Medium in
this District, three years out of 5 and is most productive
on high Grounds on the banks of rivers and nullahs, where
water can be easily procured.

I cannot at present give you any tolerably
exact Statement of the quantity of the Jaggree, or Chinn:
:nee produced on this District of the last years cultiva:
:tion perhaps the custom-house will exhibit the quan:
:tity exported to Calcutta. I have reason to believe that
the present years produce (I mean the Cane that will
be cut in January) will considerably exceed that of
the last as great encouragement has been given, and I
conceive the excess will be about one fourth; but of this
you shall hereafter be more particularly acquainted

I have stated the average value of the Jaggree at 1 rupee
12 Annas reckoning from the 1st. of Jany. to the 1st. of July 1792
Since which last period as the Commodity has been
scarce from the great demands and the approaching
the Hindoo holidays, where much is consumed the
has been high and arbitrary. It is now 2 rupees
10 Annas in the markets and in Small Quanti:
:ties.

If we reckon two maunds
No. 3. made [illegible] Muscovado Sugar
[illegible]

:age produce of Lands in Burdwan cultivated with Su:
:gar Cane, will be as follows.

If 19 Maunds of Gour were made into Muscovado Sugar it would yield 9 Maunds 20 Seers cost	Rs. 13-0-0
Deduct 9 Maunds 20 Seers of Molasses worth 8 Annas per Maund	Rs. 4..12-0
Exch. at 2.4 ⅌ S: R is Sterling £	1-10-11

One Begah of Sugar Cane yields 9 maunds 20 Seers
of Muscovado Sugar equals to 6 Cwt 3 qrs. 24 lbs which
gives 1.0.7 ⅌ Acre and costs £ 4 - 13 4½ d or 4 6 5 ⅌
Cwt.

No. 4

Particulars of expence attending the Preparation of a Begah of Land for the Production of Jaggree.

Purgunnah, Khundghose

The Begah consists of 6400 Square Cubits - the Cubit
of 18 Inches.

" Cow dung 60 Bags	R: S: 1..12
" Procuring Mud, & distributing it in order to meliorate the Soil	1..0
" Cuttings for Seed to plant	2..0
" Ploughing	1..0
Eight Coolies to plant	0..8
Cleaning and turning the [illegible] 4 times, with 3 Men each time	1..2
[illegible], or the residuum of mustard & Linseed after the oil [illegible] the Mill [illegible], to distribute on [illegible]	1..0
[illegible] With [illegible] or [illegible] 6 [illegible]	8..6

(32)

Brought Forward	8..6
" Cutting water courses to carry off water 9 Men	0..9
" Supplying water at different times of the year	1..4
" Tying plants and putting mud beyond them	1..0
" Cutting the Sugar Cane 9 Men	0..9
" Squeezing the juice, boiling and preparing the jaggree. 30 Men	5..0
" Earthen pots &c	0..12
	17..8
" Deduct value of Cuttings, which can be sold or used Again	2..0
Sa Rups	15..8

The Sugar Cane lands of this Pergunnah pay 4 Rs 4 A. per Beegah to Government —

The above is nearly the average Amount of expence throughout the District. Bullocks are used in some of the Pergunnahs to express the juice and this makes a small difference in the expence

---

Extract of a Letter which accompanied the foregoing Statement.—

I received yours of the 11th Instant, an... ties
used every means both in Mofussil a...
...f ...nici
...ues
... gain to
... the aver:

(33)

Each 8 Drams Troy or 480 Grains Troy of Glauber Salts
5 1/2 Drams Troy or 330 Grains of Sal ammoniac
5 Drams Troy or 300 Grains of Salt Petre
Water by weight 16 Drams Troy or 2 ounces 960
Grains the Thermometer in the Air at 86 — the Water at
82 the Salts on the air mixed them all together
then nearly dissolved the mixture was at 62 —
Evaporated them to dryness — Residue 990 Grains
Loss 120 Grains or near 11 per cent Loss — whence
comes the Loss have any of the Particles of the Salts
been ~~converted into~~ decomposed & converted into
their original Gas—

"...
Ear...

" Kn...
Teel a...
is expr...
the Gover...

Cause...

My Dear Roebuck

I was late of returning last night from Dinner at Lord Hobarts, which obliged me to detain your man till this morning.—

The respect and esteem I have for Colˡ. Petrie at the same time that I regret the occasion for it gives me much pleasure in having it in my Power to contribute to his relief; which I have no doubt but the datura Tatula floribus Coeruleis the Botanical name of the Plant will effect almost immediately — In Tamal it is called Carpoo Umattee.—

You take the Stramonium with the blue Flowers from eight to twelve months old, so that the roots may have acquired a convenient size, cutting it off exactly where it rises above ground and throwing the upper part away as useless and even dangerous. The roots are suspended in a room where there is a current of Air, but where the Sun at this time cannot reach them, for Six Weeks or two Months: at the end of this time they are to be beat with a hammer and bruised in such a manner, as that you may be able to separate the fibres with your fingers like Straw. There is nothing further to be observed than to wrap a convenient number up in a leaf of common tobacco, in form of a Cheroot which the Colˡ. will smoke a few whiffs of, whenever the fit attacks him & has acquired a little strength; observing that he must swallow the smoke, every time he draws his Breath and not use the remedy but in cases of absolute necessity for fear of weakening its effect

I beg my best Compliments to Petrie when you write him and to insure every success I send you a Cheroot ready prepared and some of Stramonium that can be made up into three or four more to use untill he can procure the root himself, which I doubt not he will easily do, and in abundance upon the Island of Ceylon — If you think there is any risque of Disappointment I can give you some of the roots I have had hanging in my room for this month past which will be just in proper order for beating by the time he reaches him

I am my dear Roebuck
Your always
(Signed) Thoˢ. Geils

Mount 19 July 1796

It occurs to me; that it will not be a bad description of the plant, to say that it is the one, bearing a prickly apple with which they frequently rub the bottoms of Toddy pots so at to produce violent intoxication upon those who drink it &c commonly called the Dutry.

Benjn. Roebuck Esqr.

The following are the dimensions of the Vessels employed in making Spruce— One Tin Measure 4 Inches & 1/8 wide & 6 Inches & 1/4 deep and one Tin Measure 4 inches & 1/8 wide & 3 Inches & 1/2 deep. a Pot of Spruce (for 30 Gallons as directed in the printed directions) is to be mixed with two measures and a half of the largest Measure (called the Spruce measure) of water this then to be filtered through a clean cloth & bottled & corked up & kept for use.

The Syrup should be made of good Sugar in the proportion of Six Bottles of water to four Viss of Sugar.

A Measure of the Spruce— N.B. This is the large Measure and a measure of the Syrup which is the Small Measure are to be mixed together with eight Bottles of water and fermented by a bottle of Spruce and put into Stone Bottles and shook well......

	P: F: C
Coconut Oil Cake pr Candy	1:4:..
Oil Cake pr Candy	1:4:..

60 Gallon Pot of Spruce was mixed with
8 Measures strong enough
8 1/2 Bottles of Syrup

The particular of the Dealings @ Tinnevelly District who engages to pay the money to the Circar on the said District ought to put his attorney in the said District, the duty of the attorney is to be draw the Bills on him at Madras for every Kists of the Honble Company as follows.

In the 18 or 20 day of Augt. the said
attorney will draw the Bill for
Septr. Kist on him at 45 day after sight ... 3500.....
Amounting to P. N Pagodas .... 3500.....
Batta deducted at 20 p Cent p % S. Pags. 5834.....
Remainder .... S: P. 29166.....
Interest at 3 p Cent for 45 days .... do. 1312.....
deducted on account of his former debt ...... do. 2500.....
Remainder to be due to the Circar on acct. of the Honble Company Kists } ..... S.P. 25354.....

Interest at Madras
at 1312 p Cent p Kist p 6 Kists from 1 Septr. 96 to
Feby 1797 S: Pag. .... 7872.....
at 1962 ditto .... ditto 2 ditto from 1 March
to april at 3700 p Kist S.P. .... 3936.....
May Kist amountg Pagodas S: Pagodas
5000 is P.N.P 7000 is Intt. ditto ...... 2624.....
June Do. Do. .... ditto ..... 1962 16400.....

Benefit in Exchanging P.N P into Star at 2 p Cent p %
at 575 P.N.P each Kist p 6 Kists P.N.P 3450.....
at 862 1/2 ditto .... p 3 do. .. ditto 2587.....
may Kist .... ditto 1150 ... P.N.P 7187 ... S.P 6000.....
S.P 22500

At Country the Benefit to be recd. by means of the attorney
Drafts amountg P.N.P 35000.....
At 3 p Cent Hoondia varying premium } do. 1050 ... P.N.P 36050.....
Difference due by the Circar at 1/16 p Pagn. is Chuk 1464 p 7 is ditto } 1000.....
37050.....
Interest at 3 p Cent p 2 Months 2223
39273.....

Benefit in changing Gold Silver & Coins what was recd. from the different Villages which in making Difference at 2 Rs p % } 785.....
40058.....
Deduct p Batta .... 3500..... remainder

P. M. P.ᵒ 5058 ᵖ one Kist ᵖ 6 Kists — P. M. P. 30348 ---
3 Kists .... ditto 22761 ---
May Kist .... ditto 10116 ---
P. M. P. 63226 at 18 ᵖ C.ᵗ is 53580 --- S.P. 70080 ---
Deduct for sundry charges 1800 ---
Cooly ᵖ 500 Golaes at 13 S.ʳ this the year 1500 --- ditto 3300 ---
Remainder brought Pagodas 72780 ---
his former debts Pagodas 31250 ---
Star Pagodas 104030 ---

Estimate of the Cost and outfit of a Ship 500 Tons Burthen built at Philadelphia of Live Oak & Cedar. —

" Carpenters bill for the hull at 7 Dollars per ton for 500 Ton 3500
Masts, rigging, sails, boats anchor & Cables ——— 3000
" Sheathing & coppering 5000
" Provisions Small Stores &c. for the voyage & 2 Months im-
prest to the Ships Company ....
" Interest of money & premium of insurance on this Sum for the Voyage at 13 ᵖ Cent 2500
" Sailing charges for 10 Months at 300 Spanish Dollars per month 3185
" Port charges in India 5000
" Deduct Supposed value of the Ship on her return .... 2500 — 3.185
Total expences of the voyage Sp. Dollars 20000
16185

Which makes the freight of 500 tons from America to India and back on a new copper bottomed Ship

with large allowances amount only to $30\frac{37}{100}$ dollars ᵖ ton carpenters measurement or reckoning the dollars at 4 S. 4 d Sterling to £6-11-7. A merchantman will usually carry one half more than the carpenters measurement but we will allow this ship to carry one fourth more her real tonnage to the owners will then be £5-5-3 out & home or say one third out £1-15-1 and two thirds home £3-10-2 ᵖ ton

Facts Stated from which it will appear that the foregoing Estimate is a Medium of the cost of Tonnage to the owners of American vessels. —

1ˢᵗ The owner of an American vessel, from the port of Boston, now at Calcutta which will carry about 350 tons informed me, that her first outfit and cost amounted to .... Spanish Dol. 12000
and that her sailing charges did not exceed 200 dollars per month which allowing 12 Months for the voyage and deducting two months imprest included in the outfit, is — 2000 ------
Premium of insurance on the first cost and outfit at 13 ᵖ Cent 1.560
17,060

And say the vessel on her return is only worth 8000
The whole expence of the voyage is Sp. Dol. 9,060

which on 350 tons is dollars $25\frac{88}{100}$ ᵖ ton; or reckoning the dollar at 4 S. 4 d. Sterling is £5 . 12 . 1 for the voyage out and home. —

2ⁿᵈ A New Ship from Salem. of the following dimentions and Burthen cost to Sea with imprest and provisions £6000 Sterling and is Navigated with 35 Men at the expence of 300 Dollars per month. —

	feet	In
" Length of Keel Strait Rabit	102	0

"Breadth Extreme .... Feet Inch

"Depth of Hold 32. 6

"Height on Wallop deck 13. 0

"Ditto on Gun deck .... 5 - 8

5. 6

Burthen in tons, by carpenter's measurement 385, will carry 800 tons — The expence of navigating this Ship is as follows:

"Cost of the Ship, with two months impress £ 6000 .. — ..

"Interest of money and insurance on this Sum for the voyage at 13 p Cent. .... £ 780. —

"Wages for 16 Months which allowing one year for the voyage and deducting the impress at 300 dollars at 4 S. 4 .... 630. —

"Port Charges and expences in India the Commander states at .... 600. —

"Allow for wear and tear and diminished value of the Ship with impress and Outfit .... 1500. —

The expence of her Voyage is Sterling £ 3,530

2,470

If we allow this Ship to carry 700 tons the expence per ton out and home is .... £ 5 .. 0 - 10

"The Boston Ships Tonnage .... 5 - 12 .. 1

"The New coppered Ship .... 5 - 5 . 3

"Average of 3 Ships per Annum — £ 15 - 18 .. 2

"Ditto of ditto p Mensem .... 5 - 6 - 0 5/8

0 .. 8 - 10

8

In Bengal Accounts are kept in Curt. Rups. which is an imaginary coin the Standard Coin of Bengal is the Sicca Rupee there were formerly a Variety of Rupees which bear different relative Values determined either by their intrinsic Values or the distant period of their Coinage which in the Idea of the Natives lessen'd their Value or by the Caprice of the Shroffs whose System of acquiring money by raising one & depreciating another according to the demand set at defiance the intrinsic worth the Army in Bengal is paid in Sonaut Rupees like the Current Rupee an imaginary Coin or another £ Sterling — Here then is the diff.t fixed Value of Each. —

116 Current Rupees are equal to ...... 100 Sicca Rupees
111 .. d.o ..... d.o ...... d.o ...... d.o ...... 100 Sonaut Rups.
108 ... d.o .. d.o ...... d.o ...... d.o ..... 100 Arcot Rupees
108 . A.t Rupees d.o ... d.o ...... d.o ..... 100 S.a Rupees. —

But if you will carry from Madras New Ar. Rups. & sell them in the Calcutta market you will frequently receive for your A.t Rups. 100 S.a Rups. for 104 or 105 A.t Rups. & sometimes Rupee for Rupee the A.t Rups. in some Parts of Bengal being more in Demand than the S.a Rupee the Real intrinsic Value is 104 1/2 A.t Rups. to 100 S.a Rupees

The same circumstance in some degree happens on the Coast the Pondicherry Rupee & the A.t Rupee have the following diff.t intrinsic Values. —

101 3/4 A.R.s are equal to 100 Pondicherry Rupees. —

And yet thro' all the Western Countries the

diff:

Diffr. Relative Value between each is Generally estimated 102 1/8 103 Ar. Rupees to 100 Pondicherry Rupees

The following Table shews the Number of Pag: which a 1000 S. Rups. will produce at a Medium Course into Ar. Rups. all the expences of Coinage being deducted.—

1000 S. Rupees Wt. 30 .. 11 .. 10 better 52
Standard 32 .. 7 .. 12 at 23 1/4 p. Ct. Ar. Touch
Ar. .... 31 .. 8 .. 16 1/2 A. Rups.
Custom & Coinage at 2 1/2 p. Mill .... 1026 .. 4 .. —
.... 23 .. 6 .. —
Neat A. Rups. .... 1042 .. 14

Sa. Rs.	produce A.Rs.	Exchange	S. Pagodas
1000	1042 .. 14	at 320 p.c.	316 .. 22 .. —
do	do	at 325 do	311 .. 27 .. 37
do	do	at 330 do	306 .. 29 .. 11
do	do	at 335 do	302 .. 12 .. 58
do	do	at 340 do	297 .. 38 .. —
do	do	at 345 do	293 .. 24 .. 52
do	do	at 350 do	289 .. 16 .. 40
do	do	at 355 do	285 .. 13 .. 24

Sa. Rups.	p.Ct.	A.Rs.	
1000 at	108	1080 at 355 do	304 .. 9 .. 37

1000 Sa. Rupees @ 16 Rupees p. Gold Mohur is
62 Sa. Gold Mohur 24 .. 17 Touch 99 3/4
Alloy .... 6 .. 2 .. 13 1/2
Cont. fi. touch @ 30 .. 19 .. 16 1/2 A. p. C. .... 262 .. 35 .. —
Custom & Coinage at 1 1/2 p. Mill 3 .. 8 .. 10
Silver for Alloy 3 .. 1 .. 8 1/4 .... 2 .. 5 .. 25
Copper .... 3 .. 1 .. 8 1/4 .... 1 .. 30
3 .. 12 .. 65
Neat S. Pagodas 277 .. 30 .. 1

Gunpowder

Method of increasing the force of Gunpowder one third in proportion to its Goodness discovered by Dr. Francesco Physician of Pogano in Tuscany.

To every pound of powder add four ounces of Quick Lime fresh & well pulverised. Let the whole be Shaken till the Mixture is perfect & afterwards kept for use in a close Stopped Vessel.—

We leave the Chemists to decide upon what Principle the lime acts in Strengthening the Powder.— The experiment is certain. The game Keepers of the Field Several Game Keepers have tried it, with astonishment at the additional force given to their fowling piece. But it is necessary to notice that the powder used in priming must be unmixed with lime.—

Statement of what it Costs to feed one Bullock p. Day agreeable to Different Prices of Gram under the Materials.

Gram at 75 Bags at 2 Measures p. Bullock p. Day Comes to .... f. 1/2 .. —
Do: as Lately bought at 3 1/2 Pr. ct. 2 Measures p. Day } .... 1 .. —
Present Price of Gram — to mix with one Measure of Gram 3 Measures of day .... comes per } 1 fm. 60 c.

Paddy. One Measure Mixed with 3 Measure of Salt Comes p. Day . . . . falls 1 . 20.

(Signed) Balfour.

A Table for Manuring Land.

Gentlemen

It is some time since I sent you an account of a few experiments in agriculture. I now inclose for your approbation a table for manuring land which seems to me a proper and necessary ground-work for every husbandman; and I think it will be a useful appendage to all publications on the subject. If you entertain the same opinion of it, you are at liberty to insert it in the next volume of those useful papers which the publick may be favoured with from your Society.

I am

Your obedient humble servant,

Frimley, Sepr. 30. 1785.

H. J. Close.

A Table for Manuring Land.

Number of heaps to a Load	1	2	3	4	5	6	7	8
At 5 yards distance	193	96	64	48	38	32	27	24
At 5 1/2 yards	160	80	53	40	32	26	23	20
At 6 yards	134	67	44	33	26	22	19	16
At 6 1/2 yards	114	57	38	28	22	19	16	1[illegible]
At 7 yards	98	49	32	24	19	16	1[illegible]	12
At 7 1/2 yards	86	43	28	21	17	14	12	10
At 8 yards	75	37	25	18	15	12	10	9

Number of Loads to an Acre

Explanation of the first two Rows of Figures

The number of heaps of one load each, laid at five yards distance is 193 to cover an acre. Two heaps to a load 96. Three heaps 64; and so on to the end. Each of the succeeding rows of figures to be read in the same manner.

On the Nature & effects of Lime as a Manure.

Lime, like most other manures, has been used in different places and by different Persons with Various Success; Some have declared they never could reap any Benefit from its use; but a far greater Number have found its effects very beneficial, indeed more so than any other Manures.—

But the Great Error of those who disclaim the use of Lime has been that of using it on all Kinds of land without distinction; Vainly expecting the Effects would be equally advantageous in all Cases. But while it was proved a very useful good dressing to Some Lands it has rendered others less Fertile and in such cases the whole expence has been thrown away.—

In Some Parts of this Country a good manuring with Lime has cost the farmer near four Pounds an acre. It must be a better crop of wheat than they get in Common to answer that expence; their profit therefore must arise from the succeeding crops.—

Experience teaches that lime strongly attracts and absorbs Moisture, and is itself Soluble in the Soil Common with all absorbent Earths, it also attracts Oil and acids.—

The most Rational theory therefore is that its Virtue Consists not in itself, but in its action and powers of attraction. By attracting the Moisture of the Air and the Oils that are floating therein, and in the Earth also, and reducing the buried roots, Vegetables, moss &c. which it happens to be mixed with, into a saponaceous mucilage which is of a Very nutritive Quality; it Combines those Substances which of themselves would never unite such as Oil and Water, which it forms into a Smooth Consistent fluid.—

Hence it appears, that lime ought not to be used alone, except where there is plenty of Vegitable or animal Substances for it to act upon. When these is Wanting, mix it up with Rotten dung for without these it Will, in many Cases exhaust the Soil of its most fertile juices and spirits & leave it in a barren state. Where there plenty of Vegitable or animal Substances for it to act

upon, lime may be used to Considerable advantage; and also on land overrun with Weeds as it kills and Converts them into good manure. But on Exhausted, or very poor land, the expence of liming will never be repaid.—

The learned & ingenious Dr. Alston observes of lime that if long exposed to the Air it soon loses its Medicinal Virtue its Virtue as a Manure and as a Cement in building; but that if Slaked with Water it retains these Virtues a long time.— The practice of the Devonshire farmers Corresponds with this doctrine.—

After their lime is laid in small Heaps on the Land they cover it with Earth till the Coat is thick enough to Secure it from air & rain; and in Order to prevent those from entering they beat the Outside of the Heaps smooth with their Shovels.— The Moisture of the Earth gently Slakes this lime and the heaps remain in this State until the Land is Ready for its spreading.—

Another Method of mixing up their lime is used by the best farmers which adds greatly to the fertility of the lands dressed with it. This Method is to form heaps of Earth & lime as above described and when these are well incorporated to open the Heaps & bury in each as much good farm Yard dung as it will Cover.—

The dung being thus Covered up will soon ferment &c. dissolve & after laying a proper time the Mass being chopped together with the Spade forms a Soapy mucilaginous manure of the most fertilizing Nature.— Used in this Manner, time will always be exceedingly profitable. But the Reason of its being Reprobated in some other Countries is that they know not how to (or will not) apply it at large. Their Method is to spread it on the land as they do Chalk and let it lie there till rain or the Moisture of the air Slakes and occasions it to fall in pieces. But by being thus exposed to the air, its Virtues which should promote Vegetation is all evaporated and of Course its use As a fertilizing is totally lost.

I am Yours &c &ca

Signed OH

A Description of Wm Winlaws Patent Mill made upon a Plan entirely new, for Seperating the Ears of Grain from the Ears of Corn in place of threshing.—

This Mill was tried in June 1785 in the presence of many Gentlemen, and gave the greatest Satisfaction and since shown to a great Number of

persons at sundry times who all expressed great pleasure at Seeing a performance so Compleat and the Machine constructed upon a plan entirely new.—

Upon Trial there was passed thro' the Mill one bushel of the Heads of wheat in one Minute with very Moderate Labour to the Man that turned it; & by Experament, it is found that 4 Bushels of the ears will yield one Bushel of Clean Grain.— This being allowed, the difference will clearly appear betwixt the expedition of the Mill and the Labour of a thresher, allowing that a Man will thresh 6 Bushels in a day, of eight Hours Work, the Mill will clear that Quantity in twenty four Minutes and to an incomparably greater degree of perfection than can possibly be done by the flail For it Seperates every grain from the Ears which must be allowed to be a very great Saving whereas much Corn flies off by the flail and a great deal is lost by foul threshing, either when performed by task or day-Work; and by using the Mill all fraudulent practices will be prevented and the Straw preserved in its Original Reed which must answer the essential public purposes of thatching &ca much better than when bruised under the flail and every other Purpose equally Well.—

The Improved Comb for Stripping the ears from the Straw has been tried and a Lad without having practised Combed out a Bushel of ears in twenty Minutes which is at the rate of Six Bushels of Clean Corn for one days Work.

£ . S . D

If Women, children &c.a are em bloyed for this Purpose at Nine pence ℔ Day the expence of clearing a Bushel of ears from the straw is .... 0 . 0 . 1½

The Mill clears fifteen Bushels of clean wheat in one hour but allowing at an average of only twelve Bushels, which amounts to Ninety Six Bushels ℔ Day if the Man that works the Mill is paid 16d a day the expence of the Mill for one Bushel is 0 . 0 . 0⅙

Total expence ℔ Bushel .... 0 . 0 . 1⅔

But a Thresher is paid for every bushel he threshes .... } ...... 0 . 0 . 2⅓

Which for Ninety Six Bushels or one days Work amounts to .... } 0 . 18 . 8

Besides the Mill produces one Bushel in ten of Clean corn more than what is done by the Flail & Valuing a Bushel of wheat at five Sh. The advantages gained on the Ninety Six Bushels Will be .... 2 . 8 . 0

The Mill will therefore gain in a days Wor 5 in £3 . 6 . 8

greater

The Saving of grain by the Mill is, the Quantity flying of from the flail, and what is left in the straw by foul threshing.—

If two lads are employed to Strip the ears from the straw they should clear Seventy two Bushels of Wheat and the Mill will separate the Grain from the ears of Corn in Six Hours.—

The Saving of Corn by using the Mill in preference to Common threshing, being proved the straw also is in a preferrable State after it is cleared of the Ears it needs not be handled a Second time to prepare it for the Market, as it is all Combed Cleaned & fit for use without any further time bestowed in preparing it.— The expence of Repairing or Relaying the barn floor Should also be a Consideration of the Farmer which the use of the Mill entirely removes, besides Saving the expence of threshing instruments &c.a—

The Argument of Some farmers in Vindication of the Old Methods of threshing, is that the Corn which flies off from the flail and what is left in the straw is not lost, as the Cattle, hogs & fowls, eat it but that kind of Argument must fail when the Consumption of the London Market for straw is Considered and other large Cities and Towns within the Kingdom such straw being used for litter and other Purposes.— Therefore corn is equally lost in all those uses of which Straw is put to, as the hogs, fowls &c. cannot be benefited by it as in the Country; and it is reasonable to suppose that every industrious intelligent farmer would wish to know as near as possible the neat produce of his farm, by having his crop clean threshed so that there be little or none remain on the Straw when measured out to his stock of Beasts, poultry &c. &c. By so doing he will come at the expences he ought to know and his Straw be equally serviceable for the various purposes it is made use of in London or any where else.——

I have tried the experiment of threshing the corn clean out from several trusses or bundles of Straw and found that a truss which weighed thirty Six Pounds contained in it two Pounds four ounces of wheat when measured (after thoroughly cleaned) two pints and a half.— Thirty Six Trusses are a load & according to the experiment in one load are Ninety Pints or five pecks and two Pints consequently in the thousands of loads consumed in this Metropolis there is a very great loss to the Community but the Number is beyond my power to Ascertain.——

Yrs. Truly

(Signed) W W

3. 6. 8

Description of the Mill.

It requires very little practice to enable any person to manage the Mill.— The dart painted on the fly directs which way to turn the Handle it being painted as it should be turned.— The hopper which serves to feed the Mill is regulated by the two round pins to which the Cords are fixed. The Screw at the bottom of the frame is to adjust the distance of the inner nut from the Outward Cone for if it be screwed upwards too much it will bruise the grain if lowered down too far it will admit the ears to pass without Effect.— The cross bars that support the axis on which the fly and pinion are fixed are moveable upwards and downward — as occasion requires. When the Screw at bottom is turned to the Right it moves the Nut upwards and gives less Space.— The Wedges must be slackened above to admit the axle to rise upward or downward as may be found Necessary.

These Wedges may be explained or tightened with great ease and without any danger of injuring the Mill.—

References to

References to the Annexed Plate

A, A A.A the Frame of the Mill
B the Outward Cone
C The large Iron Wheel
D The Regulating Screw
E the Pinion
F The hopper to receive the Ears

G The top Comb surrounding the [illegible]
M The Fly.—
Fig. 1st. The Mill
2 Combing the Sheaf
3d. The Comb for Stripping the [illegible]
4th. the Hand Comb.—

Directions for Combing the bottom of the Sheaves and Stripping the Ears from the Straw.—

The Frame of the Comb is made in the form of a Cross with a Comb fixed to every limb that four Persons may work at once if requisite according to the Figures in the annexed Plate. The Teeth or prongs are made of Steel and of an Angular Form set at Convenient distances so as to Strip the Ears clean, if set too wide apart they will pass through without Effect & if too near together will not admit the Straw to go between.—

The Mill upon a Smaller Scale answers equally well for Clover Seed the Flowers being first threshed off from the Stems, it will clear as much Stop put to all Mechanical improvements whatever for Surely man would be at the expence of time Labour & M[illegible] als in improving or inventing Machines which [illegible] Satisi. Satisfy the ingenious inquiring heart of Man 3 would [illegible] Stood only when by the fallacious arguing of others they are sure

tobe opposed & find only disappointment in their Labour and expence for the pains taken in endeavouring to Serve the Public.— But it frequently happens that the more Utility a new Invention is of to the Public the more numerous are its opposers & the Propriety meets with almost insurmountable difficulties before those for whose Benefit it is intended will condescend to make fair Trial of the experiment the Common Methods having been so long followed renders many useful attempts of improvement abortive.—

The Method I would recommend to Gentlemen for a proper trial of the Comb is to employ some tractable, active person either Man or Woman void of prejudice to practise for a Month or two together & in that time they well by Practice have gained Considerable experience and be more active and capable of instructing others.— I would have put this in practice myself but have not an opportunity wanting Materials.—

The farmers in Devonshire and Several other parts of the Country after Combing the Sheaves with the hand Comb cut the Ears off with a Common Knife and find it answer their purpose both in Respect to saving Corn and having their Straw at once prepared for the various uses intended.— This practice having been long established among them they find no difficulty in performing the Work & it only requires the resolution of Gentlemen in other Countries to oblige their Servants to conform to the Same Rule & Obey their Commands in this & every useful improvement in Husbandry.—

The improved Comb will clear three times the Quantity in a given time as can be done by the Method practised in Devonshire which Ought tobe Considered as Sufficient encouragement to make trial of the experiment

On Rearing Calves without Milk.—

Sir

The following is as near a calculation of the expence of Rearing my Calves without Milk as I can at present aſsert.— In the Year 1787 I weaned Seventeen Calves, in 1788 twenty three and in 1789 fifteen ditto.— I bought in 1787 three Sacks of Linseed I put one quart of the Seed to six Quarts of Water, which by boiling ten minutes, became a good Jelly; this Jelly is mixed with a Small Quantity of the tea of the best Hay steeped in boiling Water.—

Having my Calves drop at diff.t times I did not make an exact calculation of the expence of this Hay tea, but of my three Sacks of Seed I better than two Bushels left at last I gave them the Jelly and hay tea three times a day; to the Boy who look'd after them 6d ꝑ Day the price of the Linseed was 4S 6 D ꝑ Bushel; the whole three Years Seed 2£ 5 S.—

My Calves are kept in a good growing State and are much better at this time than my Neighbours that are reared by Milk; they do not fall off so much when they come to Graſs.—

I am
Sir Your Obed.t Servant
(Sd) T. Crooke.

Cultivations on the Game of Life & Death

The Number of the Inhabitants of a Country or City is most renewed every 30 Years & in a Century the human race is renewed three times and one third.—

If we allow three Generations for a Century and suppose the Word to be only 5700 Years Old there appears to have been 571 Generations since the Creation of the World to the present time 124 since the deluge and 53 since the Christian Era and as there is not a family that can prove its Origin even so far Back as Charlemagne, it consequently follows that the most ancient families are unable to trace their Origin further back than thirty Generations; Very few Indeed can trace so far without diving into fiction.—

Of 1000 Infants nursed by the Mother about 300 die of the same Number Committed to the Care of Strange Nurses it is calculated that 500 perish.—

Among 115 Deaths may be reckoned one woman in Childbirth but only one of 400 dies in Labour.—

The ſmall Pox in the Natural Way carries off about 8 out of 100.—

By inoculation one dies of about 300 P.s it is Remarked, however that more Girls than boys die of the ſmall Pox in the Natural Way.—

From the Calculations, founded on the Bills of Mortality only one of 3126 reaches the Age of 100.—

More People live to a great age in elevated Situations than in those which are lower.—

The Probability is, that a New born Child will live to the Age of 34 Years and Six Months.—

That one of	1 Year will live	41 Y. 9 M
	3	45:7
	5	46:4
A Person of	10	44:9
	15	41:6
	20	38:3
	25	35:3
	30	32:3
	35	29:8
A Person of	40	26:6
	45	23:0
	50	20:11
	55	17:0
	60	14:2
	65	11:5
	70	8:11
	75	6:8
	80	4:10
	85	3:3
	90	2:0

The Proportion of the deaths of Women to those of Men is 100 to 108 the probable duration of a Mans life is 60 Years.— Married Women will live longer than those who are unmarried.—

By observations made in the Course of Fifty Years it has been found that the greatest Number of Deaths has been in the Month of March and next to that the Months of Augt. & September in November and December and February are the fewest Deaths

Out of a 1000 deaths 249 take plac and
289 in spring 225 in summer and 237 in autumn in Winter
it appears that more die in spring than any oth Hence
but in large Cities like London and Paris ther Season;
winter is the

most fatal Season probably because more persons are in the Town in Winter than in the Summer.—

Half of all that are born die before they arrive at the Age of Seventeen.—

The Number of Old Persons who die during Cold Weather are to those who die during the Warm Season as 7 to 4.—

The first Month and especially the first day after birth are marked for the greatest Number of deaths of 2735 infants who die Young 1292 die on the first day and the Remainder during the first Month.—

Boerhave assures us that the healthiest Children are born during the Months of January February and March Married Women are to all the female Inhabitants of a Country as 1 to 3 and Married Women to all the Males as 3 to 5

The greatest Number of Births are in February and March which answer to May and June.—

The Number of Twins is to that of the whole Number of Single Births is 1 to 65

In Country places there is, on an average four Children born of each Marriage in Cities the Proportion is about three and an half.—

The Number of Widows is to that of Widowers as 3 to 1 but that of Widowers as 4 to 5

Upon an equal Space of ground there exists.—

In Iceland	1 Man
Norway	5
Sweden	14
Turkey	36
Poland	52
Spain	63
Ireland	99
Switzerland	114
Great Britain	119

In Germany	127 Men
England	132
France	153
Italy	172
Naples	192
Venice	196
Holland	224
Malta	1103

What an astonishing difference! Iceland is the most thinly inhabited and Malta is the most Populous. One fourth of the Inhabitants of a Country are Supposed to live in Cities and three fourths in Villages.– Of 1000 Deaths might Yea be Expected.–

An infallible Receipt to prevent Water and Dampness from penetrating Boots

For the use and Convenience of those who are fond of the Sport of Shooting water fowl, we shall here insert an infallible receipt to prevent water and Dampness from penetrating their Boots. For the Purpose the Boots should be made of Soft Cow Leather, well Seasoned and rendered as much Water proof as they can be, by the D lity of their Leather, and the closeness of the Sewing.–

Take of Tallow, half a Pound; hogs Lard four ounc turpentine, two Ounces; new bees Wax, two Ounces; Olive Oil ounces.–

Melt the whole together in an Earthen pipkin on a [illegible] fire and Stir it while it is Melting.–

for the

The Night before it is proposed to go to Shoot Wat

Water Fowl care must be taken that the Boots have no Dampness; they must then be warmed Gradually at a Clear Fire and when well heated, liberally anointed with the preceding Composition, which should be previously melted to such a degree of heat that the Hand can but just bear it; So much of this Composition should be applied as the Leather will suck up, in repeated rubbings.– On the next morning, the boots will feel a little Stiff in putting on, but by the warmth of the Leg, they will Soon become Supple.– New Boots should be worn two or three times before they are anointed in order to take away the Oily dressing which all new Leather has.–

With Boots thus Prepared, the Sportsman may wade Whole days and Nights in bogs, and Swamps without fear either of wet or damp being certain of returning home with legs and feet perfectly dry.–

Estimate

Charges for 1000 Star Pagodas Sf Recoined into New Coins in 95 Touch

	Pr.
The Honble Companys Custom	5 ⅌ Mille
The Mint Contractor	3 3/16
The Gold Smith	2 7/16
Charcoal	1/2
Refine Charges	2 1/2
Weight Loss 1/2 ⅌ Cent	5
Charges for Iron & Smiths Work Clay Pure Silver, Charcoal for Assay Furnace and Furnace People Coolies &ca. &ca. &ca.	1/8
Chepuetters Coolies	1/16
Muster for Assaying the Pagt. & Powder	1/2
Allce. to Mint dubash and Furnace People Concceply &c. Drs. 3/4	1/4
Charity allowed by the Merchants to Diffr. Churches	1/4
	Pagodas 21 11/16

To Plough the Fields of Poolodhee — a sett of Good Bull
will Plough during the day three quarter Cannies of Ground —
must untie this Sett of Bullocks at 12 Oclock of the Day for
freshment — having done this, you are again to tie them as form
and to Plough until late in the Evening — Should it this
be continued daily — You will reap five Cannies of Ground
ly, to be ploughed four times each Cannie during the M

To wet the Grounds for Ploughing the Fields of Cha
a Sett of Good Bullocks (if tied in the Morning) can
Plough during the Course of the Day 3/8 Cannies
Grounds — in this manner if continued, 3½ Cannies
Grounds can be Ploughed during the Month.—

To Thrash the heaps of Grain — there must b
Eight Good Northwards Bullocks for this purpose, an
four Sound Men as Drivers — and if they should
diligently Execute their Duties in thrashing the
— they will thrash from Morning to two Oclock in
Afternoon, 100 Marcauls of Grains.—

Repertory of Arts and Manufactures

Specification of the Patent granted to Robert Murray of
ower Grosvenor Place, in the Parish of Saint George, Hanover Square
Esq. for his Discovery for refining Sugar, and making Sugar from
Cane Juice.—

Dated August 20th 1784

To all to whom these presents shall come, &c. Now know ye
at, in compliance with the said proviso, I the said Robert
Murray do hereby declare, that my said discovery for the refining
of Sugar, & the making of Sugar from the Cane juice, and by means
of which Muscavado or brown Sugar may be made to yield a consider-
ably greater proportion of refined Sugar and better in Quality than
can be obtained by the method usually practised, is described in the
manner following; that is to say,

The improved process of making Sugar from the cane juice.
The juice from the Mills is immediately run thro linen, into two or three
copper caldrons hereafter described, and care is taken that the quan-
tity in each caldron is such as fills it to twelve or thirteen inches
only above the bottom; in which situation is quickly brought to a state
of ebullition, for the purpose of evaporating a part of the water, and
condensing & contracting the Mass. While it is boiling, a refuse
matter presents itself on the Surface, as a black scum which must
be removed with a Skimmer. When it is contracted till the liquor
is become thick, and when by introducing the Skimmer, the latter
drops which fall therefrom form small Sheets, you must empty
your Caldrons, previously putting out, or suppressing, the fires
which were under them.— The liquor in this State, is taken from
the two or three caldrons, and poured through a Strainer, here-
after described, into one or more Caldrons, called Boilers, which
are filled about nine Inches deep, there it is again brought
to a State of ebullition, and the evaporation is continued until
talize by ready to crystalize in large distinct grains. When the
for the care in this State, you take it from the boiler, having
is totally and extinguished the fire; and put into a cooler, hereafter
in the same.

described, in which it is frequently stirred by a Wooden Spatula, to accu-
tate crystalization, which will be completed by this means in more or le
time according as the Mass is [illegible]. When the Crystalization
complete, you take the mass and place it in a draining trough, her
described which is supported by two trestles; under the trough
placed a cooler, Similar to the abovementioned, and which serve
as a recipient, for the Syrup; which, oozing from the Sugar, an
filtering itself through the apertures at the bottom of the
trough, falls into this recipient, leaving in the trough the Crystal-
ized mass, which must be left to drain well. You then put it in
hogsheads, in which it is to be brought to Europe, when you mean to d
-patch it as raw Sugar, If you mean to clay it, then follow the
process for purification, or claying, of raw Sugar, as described in
process of refining. The Syrup which has fallen into the recipien
is again put into a Caldron, called the evaporating caldron, where
is evaporated afresh, and brought to the same degree of consistence
with the cane juice: when brought to this State, it is placed in a
Cooler, Such as has been already mentioned until it shall become crys-
talized it is then put into a trough to drain, as has been already mentio
The Syrup then Separates and precipitates itself as in the f
process and the Sugar, well drained, is removed into hogsheads
The Syrup which has oozed from this Second process is ag
evaporated, and treated in every respect as the former, until th
Mass is entirely exhausted of crystaline particles. N.B.
any animal Lymph can be procured (and whites of Egg
are preferable to any other) an admixture thereof in the cal-
dron, will assist in getting rid of the extraneous part, and
render the Raw Sugar most beautiful.—

The Caldrons. They are all of Copper and of the s
form; the bottom which is flat, is from Sixty to Sixty
Six inches diameter within. The bottom ought to w
from four Hundred & eighty to five hundred pounds
they must be hammered cold, and well Smoot
greatest thickness to be in the Middle, the

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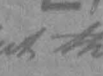
y one Sixth part of an Inch.— The Circumference is from Caldron
be made of three Sheets of Copper, nailed to the Bottom, brazed togeth
or Soldered with Strong Solder; the height of the first Circumference is
om Sixteen to Seventeen Inches, and each Sheet ought to weigh from
ty five to Sixty Pounds; of course to one hundred & eighty Pounds. At
teen inches from the bottom of the Caldron, the Sheets of Copper are
n down horizontally about two inches, and raised again perpendicular
ke this form , on the border a Second elevation of Sixteen Inches is
ined, but this last is discontinued or wanting at the front of the
, where an aperture is left, of four feet Six Inches to admit of a
; the Caldron is encircled with an Iron hoop at the top.— Each
on Should be built on a Separate furnace, and have its proper fire
ther its fuel is to be of trash, Wood or coals; the whole Circumference
the Caldron ought to be built up, as well as Six Inches of bottom all
p the Edge of it, to the end that the fire may be reduced to forty eight
fifty four Inches, according to the diameter of the Caldron, and that
r flame nor heat shall circulate round the Sides of the Cal-
as the fire must only operate on its bottom.— The front
e furnace, and all that Surrounds the Caldron, should be covered
with Lead.

The Coolers.— These are made of Wood, five feet Square with
elevation of eight Inches, and must be lined with Sheets of a
re white Metal, which is, or ought to be, Similar to Smith's pa-
t Metal; these Sheets are Soldered together, or folded into grooves
d turned down over the edges of the Wooden case.—

The draining troughs. A trough of Wood, four feet
ng, three feet Wide, and one foot high; at the bottom of which
gthways, are three traverse pieces of Wood, exactly fitted to
e trough; these ought to be of the form of the osier rail in the
ide of the trough, round which, on a level with the traverses i
aced in abutment projecting about an Inch. On the traverse
placed an osier rail on the inside of the trough and is suppor
at the extremities by the abatment; this bottom is not fixed
e may be removed at pleasure.—

The Strainer. The Strainers are of Woolen, fixed on the Sur-
face by a wicker work basket, in the form of an oblong Square, by
for the car Iron hooks through which the Liquor is to be poured.
is totally The improved process for refining Raw Sugar. The
the Same.

basis of this proceſs, and what eſsentially distinguishes it from th
pursued, is the preliminary of washing the Raw Sugar. — The
present diſsolve it in the State in which it arrives from the
by this new proceſs it never diſsolved without being previously
of the Substance which discolours it; this Substance is an oily m
which oppoſes the crystilization of a considerable portion of Sugar,
as robs it of its whiteneſs. To Separate this matter, the Raw Sug
is put into cases or boxes, hereafter described, to the height of abou
eighteen Inches; there, after having been well levelled, without any
manner of compreſsion, it is covered with a white Clay, strongly
triturated with water, & brought to the consistence of a thick pap; t
which is the first coat or covering, should be laid on about three qu
of an Inch thick; when the water contained in this coat is suffi
into the Maſs of Sugar. the dry clay is removed from the Sug
and a Second coat or covering of the Same Clay, about an Inch
thick, is applied. As Soon as the white clay begins to retreat
and crack upon the Surface, from one hundred to one hundred a
Six degrees of heat, by Farenheit's thermometer, are introduced i
the Warehouse; this heat gives a fluidity to the diſsolution (caus
by the Water) of that Substance which colours the Sugar; this
Solution infiltrates itself through the Maſs, and precipitates
itself, through the apertures at the bottom of the case, into a
cipient placed below it; which recipient is exactly the same as t
Coolers already described in the proceſs for boiling the cane juice o
that the Coolers for refining are two Inches longer in the Square. The
Clay which remains on the Sugar is taken away when dry, and the
is continued till the draining ceases; then the purified, or bleached S
is taken from the case, of which a greater or leſs quantity will be obta
according to the Quality of the raw Sugar; if it was good in Quality
will remain only four or five Inches not purified. There remains
collected to fill the cases afresh, of which near four fifths remain
by the removal of the purged Sugar; when they are filled again, the
proceſs of claying is performed precisely as above described. The dra
which are produced by this purification furnish an Abundant c
lization in the recipient; this crystallization is Spontaneous. Wh
repeated purifications, the recipient becomes three Quarters full
tied into draining troughs; already described in the proceſs of
gar,) all that which is crystalized remains in the trou
which is not precipitates itself through the hurdle; th
thick, and bitter Melaſses, & is no longer Susceptible

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er we may extract, by means of Fermentation, a quantity of Spirit
by one ing, but which is disagreeable to the Palate if drunk. The raw Sugar
be m, or purified, by this Proceſs, is then in proper State to be
For this end it must be clarified: this operation nearly resembles
which is commonly practised by the refiners it differs only in not
the use of lime water to diſsolve the Sugar, according to the usual proceſs
common pond or River Water; and in clarifying with whites of
in place of using Bullock's blood, which is the practice of the pre-
refiners. The Caldrons to clarify resemble those which are descri-
the proceſs of working up the cane juice; only adding a Copper
which shuts up the aperture left in the front of the Caldrons, at the
levation, & enables the Sugar Boiler to fill up the Caldrons
uppermost brim. The Clarification effected, the Sugar is deprived
heterogeneous particles which Soiled it, we therefore proceed to the e-
vaporation of the fluid; to effect this, the clarified or pure Maſs is put
boilers (vide the boilers described for the Cane juice) not above eight
Inches deep, till it arrives at that degree of contraction which
the Maſs to Crystalize as it cools & to become a Solid Body
the form of those Moulds into which it is cast, and separating
as an entire body when completely cold; the State of Contraction
Ch to be Such as Suffices for that purpose, but Should never be
beyond it. The Sugar, being put into Moulds, is treated in
Same manner as in the common refineries, viz. it is thrice di-
and moved while cooling; and when cold, the Mould is placed
pot or recipient, into which the first oozing runs; afterwards
clayed till the Loaf becomes universally of an equal degree of w
neſs. There remains then to work up the Sugar which has been ac-
cidentally carried away with the Scum, the unclouded Syrup, (or that
oozes Spontaneously,) and the Cloudy Syrup, (or that which
by the effect of claying.) The Sugar carried away & mixed with
Scum is recovered, as in the common refineries, by diluting the
skimmings with hot water, the Sugar dissolves in the Water, and
separated from the indiſsoluable particles by means of a cloth, which
as a filter: the indiſsoluable particles remains on the Surface
which are Soluble paſs through it, the former is of no use
to burn; the latter as well as the cloudy & clear Syrups, crys-
tallize by the Same proceſs, & in the Same utensils which are used
for the cane juice. This crystilization being pursued till the Maſs
is totally exhausted, the Sugar obtained therefrom is purified
in the Same manner as raw Sugar; the operation is precisely the
Same

Remarks on the Refining of Sugar at [illegible] about

The process of refining Jaggery Sugar is briefly the following; a quant[illegible] of Jaggery say 24 lbs are put into an earthen pot that would contain 3 Gallons at the same time Some water is added of about 2 Seers or to the [illegible] sufficient to Dissolve the Jaggery with the aid of a brisk fire; [illegible] use it the Water, as it is entirely again evaporated which point [illegible] is determined by the touch. One part of Milk diluted with [illegible] water is then added in Small quantities, from time to time; to do which the Man always makes use of a clean piece of Cloth dipped into the Milk and Squeezed upon the liquid Sugar in different directions, especially in Circumference towards the Sides of the pot: that portion of Milk being altogether [illegible] by this manoeuvre, the pot is entirely removed from the fire and Sprinkled in the same manner Served out upon the Sugar liquid especially [illegible] that in Boiling there up a Yellow [illegible] Froth which Continues [illegible] the whole Surface of the liquid exhibits a black impure Scum [illegible] parts a blackish Colour to the fresh Water Squeezed upon it — the liquid is then strained through a Cloth and the remaining [illegible] this directed of the refined Sugary particles by clean Water allowed to pass through the Scum Collected on the Straining Cloth — the [illegible] Same liquor so much diluted with Water is then put again over the [illegible] when it arrives, nearly to the point in which it ought to be remov[illegible] crystallization, a fresh Quantity of diluted milk equal to the former is [illegible] & the impure black Scum that from time to time rises on the Surface is [illegible] moved by a Spoon perforated with Small holes, intended to save all unnecessary Wastage of Sugar during this occupation it is [illegible] then when poured into Conical pots that have been previously [illegible] and Settled on the [illegible] with white dry Sugar — it crystallizes with[illegible] a Short time. —

Instead of claying the Sugar its Surface is cove[illegible] the [illegible] with the [illegible] plant, [illegible] by them [illegible] Stellaris L. which on the Same principles as Clay carries all [illegible] remaining in the Sugar to the bottom of the cone from whence [illegible] off by a hole made to it on purpose. —

Tinevelly — Produce —	Chuckrams
Neat that to Nabob	914000
Nazam	100.000
Sebjindy Sadlavar & Zemindars allowed by the Nabob out of the Rent about one Lack of Chuckrams	100,000
Interest discount &ca	200,000
Nazam … Total	1300,000

Chuckrams 4 3/4 for each Star Pagodas. —
In Tinevelly, Madura & dindigul there are about 15 Lack of Chuckrams. —

Ready Money Collection in dry Grain Ground Custom & c.	300000
Paddy Produce per year that of Cotahs 400,000 — each Cotah at present sells for 12 1/2 Cullyfanam & 2 3/4 Collum one Cotah each colum twelve Tinevelly Marcal fifty Colum one Madras Gars	
Ready money Collection year 96/97	230000
Paddy Cotahs 430,000 — at 12 1/2 for Colly	
Tinnevelly Net	364,000
Deduct Salivans	20000
	344.000
Paupiah has received Chuckrams	400,000
	250,000
Balance	100,000
Creditors party	00,000
Paupiah	100,000
Remains Grain	100,000 — The account is stated by Paupiah

If the Price of Paddy is 20 fanams a Cotah Collection will be 1300,000 Chuckrams. 16 fanams a Cotah Average price of Grain. —

Neat produce in the Mint

For 100 Pag.s at 15 ℔ 10 P.s is 150 Dollars ... 324: Sup.t

d.o ... at 15½ ℔ 10 P.s is 155 ... d.o ... 335 7/16 d.o

d.o at 16 ... d.o ... 160 ... d.o ... 342 7/8 d.o

Sugar boild at the Redhills March 1798

10397 Canes Measures of Liquor ... 1009
Sugar ... ℔ 526
Jagary ... ℔ 155

100. New Sicca Gold Mohurs
Oz. dw. Gr.
Were ... 2-15: —
Alloy ... 9:11:9
P.r Touch 49:6:9 C Pag.s 450:14:30
Custom and Coinage ... 5:6:35
Silver Alloy 4:15:16½ ... 3:14:35
Copper ... d.o ... 4:15:16½ ... :2:15
8:23:5
Neat C Pag.s 441:27:25.

100 New Portnova Pag.s Oz. dw. Gr. 10:17:17 Touch 83½
Deduct Worse ... 2:4:21 3/16
C.t Touch 8:12:19⅞ C P.s 78:32:16
Coinage ... :32:43
Neat C Pag.s 77:35:73
Batta ... :9: —
Pag.s 78. —

For 6000 Portnova Pag.s Produce in the Mint Star P.s 4680. —

Tinnevally Produce	Chuckrams	S.P.s
Neat to the Nabob	914,000	
Nater	100000	
Sebundy Sadlawar Almanum Agomadians allowed by the Nabob out of the Kist	100000	
Interest discount &c.a	200000	
Total Produce of Tinnevally Chuckrams	1314,000	@ 1¾ ℔ P.s Ch.s 750,857.6:

After this I enquired from whence this Sum of 1314,000 Chuckrams or Pagodas 750,857.6. was realized & received the following. –

Ready Money Collections. –
Grain, Ground Customs ... Chuckrams 300,000 or S.P.s 171,428.24: –
Paddy & Grain Produce. Circar Share
500,000 Cotahs Average Price 18 fan.s
Cully a Cotah ... " 500,000: 1: —
Star Pag.s 671,428: 24: —

1¾ Collums make a Cotah
50 Collums make a Madras Garce
500000 Cottah make 17,500 Madr.s Garce @ 28:24 P. F.
are Star Pag.s 500,000. —

From the above detail it appears that the Tinnevally Country in the Average does not produce about 1147500 Chuckrams or Star Pagodas 671428:24: – instead of 1314000 Chuckrams as originally stated. – I Questioned him again Respecting his General Statement of the & he said it proved Upwards of 750,000 Pagodas when the Grain sold at 20 Colly fan.s a Cotah at which rate it was sold many Years. —

B. Roebuck Esqre

Calcutta 11th March 1793.

My dear Sir,

On the 7th Inst. I had the pleasure of re-
lying in part to yr Queries you there in proposed as soon as I could & I
I shall now endeavour to Satisfy you on those heads —

1st. As to what quantity of Sugar a Begah of Ground will
produce". — This depending entirely on the State and Quality of the
Soil where the Cane is Cultivated it is not easy to answer with precision
The best Soil in the west Indies is expected to yield 3 Hhds or 48 Cwt
of Sugar ⅌ acre, which would be about 20 Maunds ⅌ Begah, but in
Bengal they reckon it very fortunate if they can gather from 10 to 12 mds
⅌ Begah, but this difference is perhaps in a great degree Owing to the great
Wastage which must happen in the uncouth & Slovenly process the
Natives of this Country adopt in Squeezing the juice from the Cane
whereas with the regular Machines in the W. I. nothing is lost.—

2dly Three Bengal Begahs are equal to a trifle more than one
English acre.—

3dly As to the mode of Cultivation, Water Soil &ca In the months
of Frebuary & March when the last of the Cane is gathered They reserve
a Quantity for the following plantation & this is the process Each
joint of the Cane forms a plant, so that it must be cut just above &
below so as to leave the Knot in the middle without wounding it;
You then appropriate a Small piece of Ground prepared with a
muddy Soil & rich Manure where you plant each joint & have
it watered every Evening; in about 15 days you will perceive them
shoot above the Surface & there they must Continue till they are about
12 or 15 Inches high. They are then translated to another field lea-
ving a Space of 2 feet between each plant; when they get to be about
24 or 28 Inches tall (as each joint will produce Several Shoots ac-
cording to the Number of Knots round it) all the branches of each
root must be brought together & ty'd in the Middle to prevent
their Spreading & falling but the tops must be left at lib
to grow & not be cramped; The Old leifs from the Middle d
wards ought to be plucked from time to time in order to afford great a
to the Cane itself, in this State it must be suffered to grow taking care
the ground as it gets parched, according to the situation of the plot the
& if well manured the better — In about 8 Months from the first
Transplanting, the Cane will be ripe for Cutting for early fresh
Jaggery, they begin together in Bengal in December first distillation
is

For 6000

the Cane cut in January the Cutting may be postponed till February, but if the
Season is a dry one it would be dangerous, as the juices are apt to be exhausted. altho'
I have said that Sugar Cane requires a Strong & moist soil; it must not by
any Means be a Swampy low one, Such as the rice fields here is otherwise
the Cane will rot in the Grounds, & you will also please to observe that one field
ought not to be planted two Seasons running, but only every other Year — I
have thus endeavoured to be as explicit in answering your Questions as the
Knowledge and information I have been able to gather admit of it & it
will afford me happiness if this or any other Subject I write upon can
be of any use to you.—

Reaumur made a series of very interesting experiment on this Subject which confirm those of Boyle. Farenheit caused the thermometer to descend to forty degrees by Melting Ice by strong nitrous acid. But the most astonishing experiments are those made by Messrs Thomas Beddoes Physician, and Walker apothecary at Oxford, and inserted in the Philosophical Transactions for the year 1787.— The mixtures which produced the greatest degrees of cold are,

1st Eleven parts of muriate of ammoniac or common Sal ammoniac; ten parts of Nitrate of pot ash or common nitre; — Sixteen Parts of Sulphate of Soda or Glauber's Salt; with thirty two parts by weight of water. the two first Salts should be dry and in powder.—

2d. The nitric acid, muriate of ammoniac, and Sulphate of Soda, lowered the thermometer to eight degrees under 0. Mr Walker has frozen Mercury without using either ice or Snow.—

[illegible] of Copper Weighing 500 ℔ [illegible] Tiny Weight 600 ℔ at 60 Dubbs ⅌

⅌ ℔	36000
Coinage at 13 7/8 Dubbs ⅌ ℔	8325
Featmadras Dubbs	27675
at 8 Dubbs ⅌ fanam	3459. 30
at 44½ ⅌ Pagoda	P. 77. 32. 70

Saving by [illegible] of Copper Dubbs Pag. 777. 17. 20

Process of Making the Arrack in Ceylon

The lower ranks of the Casts called Sjandos, are originally the Toddy drawers, though many of the lower Casts also earn their livelihood by this Trade. When they proceed to draw the Toddy of the Cocoanut Tree they first pitch upon a tree of a less difficult ascent. This Tree they bind about from the Root to the Top of the Summit with a kind of Weed, at the distance of about three forming a kind of Steps, on which the Sjandos Climb with ease. — They then couple together so many CocoaNut trees, as are at proper distance from one Another, but rarely above Sixty or Seventy, at the Top, a little above the lower branches with the same sort of Weed which is of Considerable length, twisted together or with Coir Rope of Sufficient strength, on which they walk from one tree to another, having a Conductor of the above Weed or Coir attached near the uppermost branches — Sometimes, when it can be practised, they make use of the uppermost branches instead of the Coir — Their Tools consist in a large broad Knife, very Sharp, and of a Pumpkin Shell, a small wooden Beater and a fine rope something longer than the Cocoanut Tree — The Toddy is drawn from the Flower, which is nicely cut at the Top being bound with a band to prevent its spreading, softly beat and its upper end presents a small Earthen pot attached thereon into which the Toddy then falls by drops — Every Morning and Evening the Sjando Climbs up in the trees to take away the Toddy & Cut the Flower anew which if neglected during three days, the flower will be damaged & produce no Toddy more — As there is but a small Quantity of Toddy in each earthen Pot there being sometimes three or four in one Tree, he pours into his Pumpkin Shell which when full is let down with the Rope where other persons attend underneath to receive the Toddy which they pour into pails or large Earthen Pots & bring to the distilling house, where it is collected in large Tubs or Casks and kept two or three days in order to ferment After three days having undergone a thorough fermentation it is put into the Stills without any other Mixture, & distill in the Same manner as other liquors in Europe — The St are all made of Copper and of diff. Sizes 600 Cans / a measure of nearly two Bottles / from 80 to or The princ things to be observed during the distillation are that the fire be kept Moderate & the Water in the Cooler constantly fresh & as Cold as possible. — The proceeds of the distillation is

called the Kolwager, which many people make use of, but is a most Unhealthy and ill tasted liquor — This Kolwager distilled again, & brought to a proportioned degree of Strength equal to Brandy, is the true Arrack, which, Made in the manner aforesaid, is as little Noxious as any other liquor and perhaps preferable to many — But as every trade has its abuses, so the distillers very often Contrive to mix the Stronger parts of the Kolwager with the Arrack, by which shameful practice they gain in the Quantity, whilst the Merchants can perceive no alteration in the Quality — As the Toddy varies in its Qualities in the different Seasons of the Year being weaker in proportion as the Weather is Rainy, and there being also a difference between the Cocoa Nuttrees themselves some giving Toddy, of a Much Stronger Body than others a nett Calculation of the proceeds can hardly be made. But, upon an Average, Ten Cans of Toddy give one Cann of Arrack of the first Quality — The Columbo and Matura Arrack, with that of Bentotte and Amblangodde, is of a far Superior Quality to that of Galle owing to the Toddy only being distilled once by the Galle distillers, who only take the Stronger parts of the Kolwager, which they sell under the denomination of Arrack. And the true Genuine Columbo Arrack is very little inferior to that of Batavia —

Present Mode

One 18 Pdr.

Gun and Carriage .. Bullocks	50
Platform 5 Buffalo Carts @ 4 ea.	20
1200 Shots @ 6 each Bullock	200
	270
Spare 1 to 6	45
Total for 1. 18 Pr. & its Shot	315

Mode proposed by Mr. Roebuck

Gun Carriage and platform	26
As no Shot can be lost, 1000 is taken on Two Waggons 500 on each with	72
	98
Spare 1 to 6	16
	114
Saving by Mr. Roebuck's mode	201 Bullocks
	30 Guns
	6030

Benjamin Roebuck Esqr.

Sir

The Number of Native artificers required, to make a Pair of Wheels in one day – 4½ Feet high is as follows –

Viz.	Smiths	4	Total Artificers 27.
	Carpenters	12	
	Sawyers	3	
	Hammermen	4	
	Bellows Boy	4	

15th December 1798

I am Sir Your Obedt. Servt.
(signed) Daniel Kei

1st. Rt. Cavalry Native

	No.	Weight
		lb
Tents Fields Officers	1	544
Officers	10	3940
Private	26	4472
Necessary	4	396
	lb	9352

1st. Regt. European Cavalry

Tent Field Officers	2	1632
Officers	17	6698
Private	56	9632
Necessary	6	594
		18,556

1st. Regt. European, Infantry

Tents Field Officers	5	2720
Officers	28	11,032
Private	98	16,856
Boll	22	1 298
Necessary	19	990
		32,896

1st. Regt. Nat. Cavalry

Tents Field Officers	5	2720
Officers	29	11,526
Private	82	14,104
Boll	44	2596
Necessary	11	1,0
		32

TABLE *ſhewing the preſent* AMOUNT *of the* ASSESSED DUTIES *under-mentioned, and the* RATES *as propoſed in the Committee of the Houſe of Commons on Monday laſt.*

HOUSES containing	No. of Houſes	AMOUNT of Duties on Houſes of 6. 24. and 37. George III. with 20 per Cent. in each Claſs.	Preſent Scale per Houſe of the before mentioned Duties.	SCALE for conſolidating the before-mentioned Duties with an increaſe of about 180,000l. at per Houſe,	RATIO of propoſed SCALE.	DIFFERENCE between preſent and propoſed SCALE. Increaſe per Houſe.	DIFFERENCE between preſent and propoſed SCALE. Decreaſe.	AMOUNT of propoſed SCALE in each CLASS.
		£.	£. s. d.	£. s. d.		£. s. d.	£. s. d.	£.
6 Windows	314,663	56,377	0 3 7¼	0 4 6	1-3d Increaſe.	0 0 11	- - -	70,799
Ditto	45,101	10,805	0 4 9½	0 6 0		0 1 2½	- - -	13,530
7 - - -	52,657	38,395	0 14 7	0 10 0	- -	- - -	0 4 7	26,328
8 - - -	36,028	37,829	1 1 0	0 15 0	1-half Ditto	- - -	0 6 0	27,021
9 - - -	33,940	45,819	1 7 0	1 2 6		- - -	0 4 6	38,182
10 - - -	28,069	47,717	1 14 0	1 12 0	- -	- - -	0 2 0	44,909
11 - - -	24,704	50,385	2 0 9½	2 4 0	- -	0 3 2½	- - -	51,348
12 - - -	21,091	51,233	2 8 7¼	2 16 0	- -	0 7 5	- - -	59,053
13 - - -	16,234	46,588	2 17 4¼	3 8 0	- -	0 10 7½	- - -	55,194
14 - - -	15,066	51,067	3 7 9¾	4 0 0	- -	0 12 2¼	- - -	60,264
15 - - -	11,631	45,009	3 17 4¾	4 12 0	- -	0 14 7¼	- - -	53,502
16 - - -	10,697	46,209	4 6 4¾	5 4 0	- -	0 17 7¼	- - -	55,510
17 - - -	9,183	44,078	4 16 0	5 16 0	- -	1 1 0	- - -	53,200
18 - - -	8,797	45,964	5 4 6	6 8 0	12s. Do. per Houſe	1 3 6	- - -	56,309
19 - - -	8,173	46,586	5 14 0	7 0 0	- -	1 6 0	- - -	57,211
20 - - -	6,198	38,918	6 5 7¼	7 12 0	- -	1 6 5	- - -	47,104
21 - - -	4,618	32,047	6 18 9½	8 4 0	- -	1 5 2½	- - -	37,867
22 - - -	3,942	29,207	7 8 2¼	8 16 0	- -	1 7 9¾	- - -	34,689
23 - - -	3,771	30,242	8 0 4¾	9 8 0	- -	1 7 7¼	- - -	35,447
24 - - -	3,260	28,362	8 14 0	10 0 0	- -	1 6 0	- - -	32,600
25 - -	- -	- - -	- - -	10 12 0	- -	1 4 9¾		
26 - -	- -	- - -	- - -	11 2 0	- -	1 12 5		
27 - -	12,577	120,739	9 12 0	11 12 0	- -	2 0 0	- - -	145,892
28 - -	- -	- - -	- - -	12 2 0	- -	2 7 7¼		
29 - -	- -	- - -	- - -	12 12 0	- -	2 15 2½		
30 - -	- -	- - -	- - -	13 2 0	10s. Ditto.	2 6 7½		
31 - -	- -	- - -	- - -	13 12 0	- -	2 14 2½		
32 - -	6,731	74,104	11 9 2½	14 2 0	- -	3 1 9¾	- - -	94,907
33 - -	- -	- - -	- - -	14 12 0	- -	3 9 5		
34 - -	- -	- - -	- - -	15 2 0	- -	3 17 0		
35 - -	- -	- - -	- - -	15 12 0	- -	3 7 9½		
36 - -	- -	- - -	- - -	16 0 0	- -	3 13 5		
37 - -	4,003	49,837	12 6 0	16 8 0	- -	3 19 0	- - -	65,648
38 - -	- -	- - -	- - -	16 16 0	8s. Ditto	4 4 7½		
39 - -	- -	- - -	- - -	17 2 0		4 8 2½		
40 to 44 -	2,561	35,648	13 18 4¼	17 10 0	- -	3 11 7¼	- - -	44,817
45 — 49 -	1,713	26,413	15 8 4¼	19 0 0	- -	ditto	- - -	32,547
50 — 54 -	1,269	21,471	16 18 4¼	20 10 0	- -	ditto	- - -	26,014
55 — 59 -	826	15,214	18 8 4¼	22 0 0	- -	ditto	- - -	18,172
60 — 64 -	659	13,127	19 18 4¼	23 10 0	- -	ditto	- - -	15,486
65 — 69 -	493	10,559	21 8 4¼	25 0 0	- -	ditto	- - -	12,325
70 — 74 -	405	9,282	22 18 4¼	26 10 0	- -	ditto	- - -	10,772
75 — 79 -	264	6,446	24 8 4¼	28 0 0	- -	ditto	- - -	7,392
80 — 84 -	240	6,220	25 18 4¼	29 10 0	- -	ditto	- - -	7,080
85 — 89 -	172	4,716	27 8 4¼	31 0 0	- -	ditto	- - -	5,332
90 — 94 -	195	5,638	28 18 4¼	32 10 0	5s. Average Increaſe p. Window	ditto	- - -	6,337
95 — 99 -	128	3,893	30 8 4¼	34 0 0		ditto	- - -	4,352
100 — 109 -	207	6,843	33 1 2¼	37 0 0		3 18 9¾	- - -	7,659
110 — 119 -	131	4,723	36 1 2¼	40 0 0	- -	ditto	- - -	5,240
120 — 129 -	85	3,320	39 1 2¼	43 0 0	- -	ditto	- - -	3,655
130 — 139 -	67	2,818	42 1 2¼	46 0 0	- -	ditto	- - -	3,082
140 — 149 -	51	2,298	45 1 2¼	49 0 0	- -	ditto	- - -	2,499
150 — 159 -	53	2,547	48 1 2¼	52 0 0	- -	ditto	- - -	2,756
160 — 169 -	27	1,386	51 7 2¼	55 0 0	- -	3 12 9¾	- - -	1,485
170 — 179 -	22	1,202	54 13 2¼	58 0 0	- -	3 6 9¾	- - -	1,276
180 & upwards	135	7,800	57 15 7	61 0 0	- -	3 4 5	- - -	8,235
		1,259,081						1,446,038
								1,259,081
								186,957

and for every Window above 180 an additional Duty of 2s. 6d. per Window.

Inhabited Houſes	12,893
Servants	988
Horſes	1,456
Dogs	3,000
Carriages	13
	£. 205,353

IMPROMPTU

ON HEARING THE REV. MR. D—— PREACH LAST SUNDAY AT —— CHAPEL.

By our Paſtor perplext,
How ſhall we determine?
"Watch and pray," ſays the text—
"Go to ſleep," ſays the ſermon.

Th ON's Friday Lectures at
by the

SHIP NEWS.

PORTSMOUTH, MARCH 19.

Arrived his Majeſty's ſhip *Calcutta*, of 44 guns, Capt. POULDEN, from Guernſey.

Came into harbour the *Sophia* French privateer, taken by the *Telemachus* cutter.

1st. Battn. Artillery

Field Officers	8	1632
Tents Officers	28	11,032
Private	54	9,288
Boll	11	649
Necessary	15	1485
		24,086

Memorandum taken from the Sugar Boiling peoples A Mau

Q. What time is best for planting the Sugar Cane

A. In April and May, the plant being planted in those months, the Cane will be fit for Cutting some time in Janu & the Juice will be of a proper Quantity manufacturing Sugar of it.—

Q. Why could not the Cane be planted in February and March.—

A. If the Canes are planted in February March it will get ripe in about October Cane Undoubtedly will grow to a very la Height, but the juice will be of a [illegible] nature, not fit for sugar when they boil it, it will turn into a kind of Paste.

Q.— In what manner is the land prepared and how many peoples does it take for Preparing and Planting one Cawney of Canes ....

A. That they are unacquainted with the Cultivation of the Cane, that they are only Brought up in the Boiling Business

Q. How many people will require to cut one Cawney of Canes, or how many Canes will one Man cut in a day.—

A. They do not Know, one man will cut as much as he can.—

Q. How much Sugar will it yield from one Marcal of Juice.—

A. They do not Know.

Q. How many men will it require from first of Planting one Cawney of Canes & attend it during its Growth till fit for Cutting.—

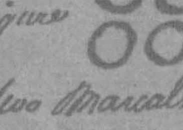
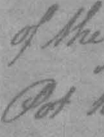
A. From its first of planting & attending it till ripe it will require 3 Men for 1 Cawney allowing 10 Months for its Growth.—

Q. What People will it require for the pressing out the juice of a certain Quantity of Canes & what People & other Expences will be required during the Boiling for making with the Sugar.

~~A.~~ They cannot tell but [illegible] must keep our own B; what it will take in Mr. Brownelies of the Business.

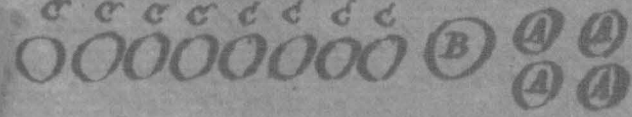
Q. What is the process or what is your method of making white Sugar after the Canes are Cutt.

A. The Cane Brought to the Sugar Mill just pressed out there is by the Cylinder or

or by a common Oil Mill such as what they make use of here for Extracting of Oil, they that carry the juice to the boiling Place, they fill the Potts at the rate of 2 Marcalls for each pot so that Each pot is filled to about half full the boiling place is made with foure Potts as the following figure  the shape of the pots is this  two Marcals fill each Pot to about half full, they then make the fire the fuel, what is used is the dry leaves of the Canes, and the dry Canes after pressed out, with a small Quantity of them.—

The annexed after Proper Enquiring is the Proper Figures of the Boiling place —

this is the End where they put the Fire.



After the juice is pressed out they fill all the Potts, that is the four Potts **A** which holds about four Marcals, when full are filled only a quarter full, then they fill the Pott **B** about half full, this pot holds about 3 Marcalls when full, they then fill the Eight small Potts **C** about half full, those pots holds about 2 Marcals when full (all these potts it seems should be proportionate to one another, whatever size they are made) the Fire is then made & boiled to about half the Consistence they then Empty they small Potts **C** one after another into the Big pot **B** at the same time the small pots **C** are filled again with juice and let them boil with one-[illegible], the Big Pot **B** is Boiled to a certain degree of Stronger Consistence after which they take it out by small Quantitys and supply the four pots **A** from time to time while at the same time the pot **B** is alternately supplyed from the small Potts **C** as one of those small Pots becomes Empty, they supply it again with Juice the four Potts **A** are then boiled to still Stronger Consistence till when at last, it comes to a proper degree of strength, they takes it out by small Quantitys at a Time & puts it into one Pot **A** this Pot after it has received part of the other potts **A** is Boiled till it Comes to a proper Consistence, which they know by a certain Touch between the Fingers, they then takes this pot out & replace it by another Pott, which is again supplied from the other 3 potts **A** & those again are supply alternately from the Pot **B**. The Pot what they took out

(90)

is kept for to Cold. Lid is then in a State of Jaggery the process is Continued
that is the Pots are supplyed from one to another &c at proper times when on
A is boiled to a proper height. It is taken out and another replaced in it's Ro
the small pots &c are supplyed from time to time with juice as long as th
all this depends on practice of the people who have the Proper hand and th
Business.—

Memorandum for making white Loaf Sugar

After the juice has been brought to the State of Jaggery
pot is taken out from the fire placed & kept it separately for cooling aft
Cold properly; they take a Stick & make a hole through the Jaggery
Stick make the bottom of the pot. The pot with Jaggery is then turn
a certain Inclination and by this means, all the Moisture what
in the Jaggery or Raw sugar, will run off through the hole what wa
with the Stick, the pot remains in this Position for about 24 Hours by
time, all the Moisture is drained off and fit for to arrange the Process
making White Sugar. They then put the Jaggery out of the Pot which
has been boiled into another Pot and mix with Equal Quantity of water
then put it on the fire at the same time, they then mix a certain
quantity, 2 or 3 measures of Water with good Cow Milk, or Goat Milk.

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(91)

Benj. Roebuck Esqr.
Sir

I have taken of the wheels of the Waggon & the Dimensions is as follows.—
The fore wheels height is 3 ft. 11 Inch. The hine Wheels height is 4 ft. 9 Inch. The Diameter of the Knaves of the fore Wheels is 11 3/8 Inch. The Diameter of the Boxes is 3/4 Inch. The length of the Knaves is 1 ft. 1 Inch The Diameter of the Knaves is the same as the fore Wheels. I am Sr. Yr. Sam. Bartholomew

The length of the Cylinder is 4.9
& in Diameter 9
The Stroke of the Air Pump 3.5
the Diameter 11 3
the Length . . . . . 4.—

Massaul

1 Areet Pice weight of Mustard Seed well dried by the fire.
1 of Pattan Nimmacke or Rock Salt
1/2 of Waushum or Calumas
Aromaticus

The above to be pounded fine and made into a Ball with water n one Dose – and to be given for four Mornings, discontinued for a like manner, and thus repeated three times successively.—

The length of the Cylinder from top to the Joint where the Condensing Valve Works 4 foot 3 Inches.

The Diameter of the Air Pump is 4 foot to where the Clack Works
The Diameter of the Air Pump is 3 Inches.
The Length of the Pump is 6 foot 2 Inches from flinch to flinch
the thickness of the flanch is 1 Inch & in Diameter is 1 foot.—

An Acct. of the Expence for Cultivating Sugar Canes & boiling the

	Pr. F. C.	P. F.
Cultivating 5 Cawnies		
150 Men for Bedding & Planting the Canes at 30 Men p each Cawney at 3 f. pr. Men	10..	
120 Boys for Spreading Ashes 3 times @ 1/2 f. each	4..	
400 Men pr. Cutting Grass 4 times @ 2 f. 20 C. @	20..	
1 Man for Watering the Sugar Canes @ 1 3/4 p. pr. Mo. for 10 Months	17..22.40	
1 Man for Watching & assisting Watering @ 1 1/4 Pa. pr. for 10 Months	12..22.40	64..
Boiling 5 Cawnies of Canes		
6 Men for Cutting & bringing to the Mill for 3 months @ 1 1/2 pr. Month	27..	
1 Carpenter for Making a Mills & for attending it for 3 Months	12..	
2 Men for Squeezing 2 Mills @ 1 1/2 P. pr. Mo. for 3 Mo.	9..	
2 Boys for driving the two Mill Bullocks @ 1 Pa. pr. Mo.	6..	
2 Men for Cutting the Canes to pieces for the Mill & assisting the Mills Squeezers at Dinner @ 1/2 Paga p month	9..	
1 Man for the Fugong Place for making Fire when boiling Jaggery	4..22.40	
1 Man for bringing Sugar Cane leaves & squeezed Canes to Fugong	4..22.40	
1 Man Cutting Thorns at the Wood @ 1 1/2 P. p Mo. for 3 Months	4..22.40	
1 Cart Man for Bringing thorns upon a bandy at [illegible]	[illegible]..22.40	
4 Sugar Boilers @ 17 3/4 P. pr. Month for 6 Months	106..22.40	
Brush Wood for Boiling Sugar	3..11.20	
Planks, Wood, Pitols, Cloth, Oil, & Milk &ca.	20..11.20	211..
Expence for Cultivating & Boiling the 5 Cawnies P.		275..

Memorandum.

1 Cawney Grows 32,500 Canes; for 5 Cawnies 1,62,500. 8125 Canes is a Quarter Cawney; — 16 pots of Juice for every 1000 Canes — or makes 128 Potts Juice for 16 Potts Jagery @ 8 Potts Juice p each Jagery Pott a Pott of Juice is equal to 4 1/3 Gallons — @ 2 1/2 each Gallon. —

I have taken 16 Potts of Jaggery to know how much Jaggery & how much Jaggery gives, the Weight of the above 16 Potts with Jaggery Cwt. Wt. ... lb 944

Deduct Tare @ 6 lb pr. Pott for 16 Ps. ... 96

848 for 16 Potts Jaga

es 226 lb or 26 Lumps of White Sugar @ 2 f. @ lb is Fand. 552

396 lb Jagery in 8 Potts @ 1 fanam pr. lb ... 396

128 lb Dirty Jagery for Chunam Work @ 40 Cash pr. lb ... 64.

F. 1012 @

5 Fanams each Pagoda is P. 22 1/2 for a Quarter of a Cawney and s for one Cawney makes P. 90 — So that 5 Cawnies will produce (@ 90 P. p Cawney) P. 450 — N.B. Ploughing is not charged

Expence for Cultivating & Boiling 5 Cawnies ... P. 275

Produce of 5 Cawnies makes ... P. 450

The Profit is 175 Pagodas or @ 35 P. p each Cawney. —

A Scale of Heat

The first part of this Table is taken from Mr Wedgwoods Scale, according to his clay pyrometer.—

	Fahr	Wedg
Extremity of the Scale of Mr. Wedgwoods thermometer	32277°	240
Greatest heat of his Small air furnace	21877	160
Cast Iron Melts	17977	130
Greatest heat of a Common Smiths Forge	17327	125
Welding heat of Iron greatest	13427	95
least	12777	90
Fine Gold Melts	52[illegible]	32
Fine Silver Melts	47[illegible]	28
Swedish Copper melts	4587	27
Brass melts	3807	21
Heat by which his enamel colours are burnt	185[illegible]	6

	Fahr
Iron with a white Sparkling heat	
Iron with a heat almost white	2780
The heat of live coals without blowing perhaps about	2030
Iron with a glowing red by day Light	1650
Iron just red hot by day light	1400
Iron just red hot in the Dark	1420
Greatest heat of lead in fusion	1000
Colours of Iron are burned off	820
Mercury boils, by some placed at 600	708
Polished iron takes a full Blue	700
Polished iron takes a Purple	708
Linseed Oil boils, by some at 600	660
Lead Melts	620
Polished Iron takes a Straw colour	610
Oil of Vitriol boils	605
Brass takes a Blue Colour	546
Bismuth Melts	500
Tin foil & Bismuth melt	460
Tin Melts	4[illegible]
Equal Parts of tin & Bismuth melt	[illegible]
Equal Parts of Tin, lead & Bismuth melt	[illegible]
Water boils	[illegible]
Brandy Boils	[illegible]
Rectified Spirit of Wine boils	[illegible]

	Fahr
Serum of Blood & white of Eggs coagulate	156
Bees Wax Melts	142
Greatest heat of Water which the hand can well bear	114
Heat of the Sirocco wind at Palmero, in Sicily	112
Violent feverish heat	108
Heat of the Skin of ducks, geese & pidgeons	106
Heat of the Skin of cats, dogs, Sheeps &a	103
Heat of the human body in Health	98
Heat of a hive of Bees	97
Sultry Weather	75
Ordinary Summer Heat	65
Water just freezing, or ice just melting	32
Milk freezes	30
Vinegar of Ordinary strength froze at	20
A Mixture of Snow & Salt sinks the thermometer to	0
Weak Spirit of Wine froze	33
Mercury freezes about	39.—

As Mercury contracts irregularly on freezing, no cold below this can be observed by the thermometer now in use.—

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The Boiler which is rectangular, is ten feet long eight feet wide, & four feet deep, Bava-rian measure, and contains 8176 Bavarian Mass, or measures, equal to 1960 Gallons Wine Measure. On examining this Boiler, I found its fire place was constructed on very bad principles: and on enquiry respecting the Quantity of Firewood consumed in it I found the waste of fuel to be very great.

This Brewery is used for making, small white Beer, (as from its pale Colour it is called,) from malt made of Wheat and as it is worked all the Year round, the Expence of Fuel was very great and the economy of it an object of Considerable Importance.

The Quantity of Firewood (pine) that had at an average being consumed daily in this Brew-ery was rather more than four Bavarian Clafters. or cords.

On altering the fire place of this Brewery, and putting a (wooden) cover to the Boiler I reduced this expence to less than 1 1/2 Clafters.

In the new fire place which I caused to be constructed for this Boiler, the Cavity under the Boiler is * divided into 3 Flues, by thin Brick Walls which run in the direction of the length of the Boiler.

*NB 100 Bavarian Inches are equal to 99 1/2 Inches E measure

The middle Flue, which is twice as wide as one of the said Flues is occupied by the burning Fuel and is furnished with a grate 20 Inches wide and 30 Inches long. & the opening by which the Fuel is introduced into the fire place is closed by two Iron doors, placed one behind the other, at the distance of eight Inches. The grate which is placed at the hither end of the fire place, is horizontal, and it is situated about twenty Inches below the Bot-tom of the Boiler. The Air which serves to feed the Fire is let in un-der the Grate through a Register in the Ashpit door.

When the double doors which close the entrance into the fire place are shut, the Flame of the burning Fuel first rises perpendicularly against the Bottom of the Boiler; it then passes along to the farther end of the (middle) Flue, which constitutes the fire place, where it separates, & [illegible] in the two side Flues; it then rises up into two horizontal Flues (one situated over the other) which go all round the Boiler & having made the Circuit of the Boiler, it goes off into sep[illegible] (furnished with Dampers into the Chimney.

Though the fig[illegible] Plate II &c. are not drawings from the fire place [illegible] into which I shall soon have occasion to describe [illegible] work the figures will be found in [illegible]

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fire place in Question was constructed & on that Account I shall occasionally to them.

The burning Fuel being confined within a narrow compass, being pplied with fresh air, and being surrounded on all sides by thin walls ick, (which are non conductors) the heat of the fire is most intense, & the stion of the Fuel of Course very complete. The flame which is clear in the highest degree, & perfectly unmixed with Smoke runs rapidly along the n of the Boiler (which forms the top of the Flues) & from the resistance ts within its passage, from friction, & from the number of turns it is to make, it is thrown into innumerable eddies & whirlpools & really affords st entertaining Spectacle.

The most satisfactory Acct. I have been able procure respecting the matter in Question, is one for which I am indebted my friend Mr Kirwan. By this Acct. which he tells me is founded on iments made by Mr Lavoisier, it appears that equal Quantities of ater under equal surfaces, may be evaporated & consequently equal heats oduced

By 403 lb of Coaks
600 of Pitcoal
600 of Charcoal
1089 of Oak

in wine measure

By 17 of Coaks
10 of Pitcoal
40 of Charcoal
33 of Oak

I wish I were at liberty to transcribe the curious & interesting bservations which accompanied this Estimate; but as they make part of a Work which I understand is preparing for the press, I dare not anticipate t Mr Kirwan will himself soon lay before the public.

According to this Estimate pears that 1089 lb of Oak produces as much heat in its Combustion as 600 of pit coal. Now if we suppose that the pinewood used in my Experiments is easy to ascertain how much Coal would have been necessary to produce the Quantity of heat; for the weight of the Coal which would be req.d is the weight of the wood actually consumed, as 600 to 1089. In one of my Experim.ts o. 31 — 11,398 lbs of water at the temperature of 53½° were made to boil Botts of Pinewood. As when the Experiment was made the mercury ometer stood about 28 English Inches the temperature of the Water oiled was only 208½° consequently its temperature was raised (209½° that the Water been boiled in London, or in any other place with the surface of the Sea, it must have been heated to made to boil consequently its temperature must have been have done this, instead of 6 Botts of Wood 661½ lbs would to 146⅓ is as 150 lb to 661½ lbs.

If Pitcoal were used of that kind of Fuel would have been sufficient

For the Quantities of diff.t Kinds of Fuel required to perform the same … being inversely as the Quantities of Heat which equal weights of the given … of Fuel are capable of generating, or directly as the Quantities of the kind of … in Question which are req.d to produce the same Heat, it is 1089 to 600, … lbs of Wood to 368½ lbs of Coal supposing the foregoing Estimate to be accur…

Whether it would be possible to cause to … a Quantity of Water (1081 wine Gallons) at the given Temperature, (103½ …) to boil, with this small Quantity of Coal, I leave to those who are conversant in Experiments of this Kind to determine. From the results of my 20th Experiment it appeared that 20 1/10 lbs of ice cold water might be heated 180 Degrees or … to boil under the mean pressure of the atmosphere at the level of the surface of the Ocean with the Heat generated in the Combustion of 1 lb of pinewood. Computing from the results of this Experiment & from the relative Quantities of d.o Heat, producible from pinewood, & from pitcoal, it appears that the Heat generated in the Combustion of 1 lb of Pitcoal, would make 36 2/3 lbs of Ice Cold water boil.

Hence it appears that pitcoal should heat 36 times its weight of Water, from the freezing point to that of Boiling; — and as it has been found by Experiments made with great Care by Mr Watt, that nearly 5½ times as much Heat as is sufficient to heat any given Quantity of Ice Cold Water to the boiling point is req.d to reduce that same Quantity of Water, already boiling hot to steam; according to this Estimation, the Heat generated in the Combustion of 1 lb of Coal should be sufficient to reduce very nearly 7 lbs of boiling hot water to Steam:

The Fuel made use of in this Kitchen was dry beech Wood; a cord of which, (or Klafter, as it is called,) 5 English feet 8 9/10 inches long, 5 feet 9 2/10 high, & 3 feet 1 1/3 inches wide, & which weighs at an average about 2200 Bavarian Pounds, (= 2724 lbs Avoirdupois,) cost at an average about 5¼ florins (= 9s 6½d Sterlg) in the Market.—

Of this Wood the daily consumption, when soup was provided for 1000 persons, was about 300 lbs Bavarian Weight, or about 1/7 or more exactly 3/22 of a cord or klafter, which cost 43 creutzers (60 creutzers make a florin) or about 1s 3½d; And this gives 1/23 of a … or 1/20 of a farthing, for the daily Exp.e for Fuel in Cooking for each p…

The Boiler at the Redhills Fire Engine contains [illegible] arched part 93 Cubic feet of Water which multiplied into … number of Pounds to each Cubic foot gives 585 to work …

The

figures will be found useful in a

which the Boiler contains Count Rumford has proved that 651 lbs of Pine Wood is sufficient to make 11368 lbs of Water of the Temperature of 65½ deg.s boil & according to this Calculation where the Temperature of the Air may be called 80 - 335 lbs of Wood will certainly be sufficient to produce that effect, & as he has also shown by experiment made by Mr Watt that nearly 5¼ times as much heat as is sufficient to heat any given Quantity of Ice cold Water to the Boiling point is Required to reduce that same Quantity of Water already boiling hot to steam it will not take more than 1758 3/4 lbs of Wood to reduce this water to steam.—

Weighed by Mr Roebuck the 8th Septemr 1799.

	lb	oz	d
A Measure of Rice weighs 42¾ Ounces Troy W.t & Avoirdupois Weight	2	14	5
A Measure of Coffee weighs 34¼ Oz Troy W.t & d.o d.o	2	5	9

A Garce of Rice is Reckoned to weigh 9256 lbs & at 164 lbs a Bag makes Bags 56 72/164

A Garce of rice measures 231½ Cubic Feet.

40 Cubic feet of Coffee Weighs 1725..8..—

40 .. d.o of Rice weighs 2127..7..11.—

A Madras Garce of Rice according to the Madras Almanack weighs 9256 lbs & an ½ & measures 300,000 Cubic Inches, therefore at this rate, 40 Cubic feet will contain 2132½ lbs, or 13 Bags, of 164 lb to a Ton.—

The Generous Friends carrys 5500 Bags of Rice of 164 lbs; of Course she will carry 423 Tons of 40 feet Measurement & at 1725½ lbs to the 40 feet will carry 7,30,537½ lbs of Coffee.

A Measure of Rice weighs pressed 43½ Oz. Troy

	lb	oz	d
A Measure of Sugar pressed weighs 58 Oz Troy & Avoirdupoise W.t	3	8	—

A Garce of Sugar contain 300,000 Cubic Inches will weigh 11200 lb Therefore at this rate 40 Cubic feet will contain 2580 lb & a Ton Weight of Sugar will occupy 34 2/3 C feet

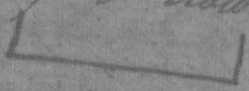
Expences of Building at Madras from Expt. by Mr. Stringer

	Bric Layer	Coolies men	Women	boys	
Plain Brick Work 550 Bricks laid by	1	1	2	2	
pay ꝑ diem in fans	4	2	3	3	12/
Perpendicular Walls 450 laid by	1	1	2	1	
pay ꝑ diem in fs	4	2	3	1½	10½
Arched Brick Work 300 laid by	1	1	2	1	
pay ꝑ day in fs	4	2	3	1½	Do

Chunaming of %/0 feet

1st Coat { Painting & Washing Joints
pay ꝑ day
Coarse Chunam
pay ꝑ day

The Small Engine

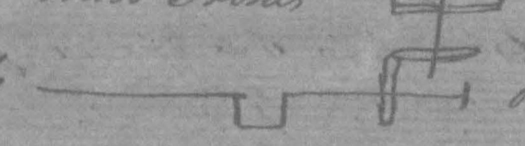
When the Small Engine arrives at Madras & you are going to set it to Work; pour some Oil on the Piston, & also a little into the Air Pump, work the Beam up & down by turning the Fly which will work the Piston of the Cylinder & air Pump observe if the Cylinder Piston, retains the Oil (if it should not screw it harder. — Then fill the Tub with Water as high as the Cylinder Bottom work the Air Pump by turning round the Beam & observe if the Pump raises Water when the Injection is kept open with the finger. put some Oil on the Stuffing Boxes & observe if the little Weight shut the Valves properly, when the Beam is worked up & down by turning the Fly. N.B. The Iron of this Shape  which I now send is of the proper Length & when put in the Holes marked with Ink will open & shut the Valves at the proper time. —

The Steam being up & ready for Work, ind
of the Blowing through work the Fly two turns with the
when the Engine will continue to Work for half an hour
or as long as you think proper to keep up the Fire.
Engine will not work the Present Pump it would work Pump
of Double the size if the Weight of the Water only then into
account but as the Engine must go 80 Strokes ꝑ to work
the

Amot. Cooly for the Work or for %/0 Bricks
11½ fans. ꝑ %/0 Bricks

fans. 26 Cash & 3/- ꝑ %/0 do.

fans. 40 Cash ꝑ %/0 Do.

the Churning of the Water is more than the Engine can overcome much more the Weight of the Water which is only Calculated on an Engine work because the Friction of the Water passing through the Buckets is nothing when the Pump is twenty fathoms long in Comparison to the Weight of the Water; in place of the present pump you might put a Small one a little larger than the Cylinder or any other Machinery as two small Brass wheels & a pair of small Stones 6 Inches Diameter like Mill Stones  observe that the Blow back is shut or the Engine will not work —

The Valve of the Condensers was loose in its Shank so that the Shank lifted up without lifting the Valve. The Steam Valve was loose in its seat & the hanging Valve of the Air Pump had lost the Cloth or Wood you had talked on it I put on three ply of Canvas which may possibly soon come off.

Gram ꝑ day 4 Meas. is	4.40
Straw @ the rate of 6 Bull. to a bundle	1.60
@ 2 Meas. ꝑ day is	1.40
	F. 6.40

Preparation of Blue Verditer

This Colour is made by the refiners from the Nitric Acid which they have used in the Operation of Eau. The Silver which is dissolved by the Acid & seperated by it from the Eau is precipitated by thin sheets of pure Copper & the solution of this Copper

An Enumeration of some of the principles of Gunnery & an attempt to employ them to the Improvement of the British Navy.

1st The firing of Gun Powder produces a fluid which while it occupies a space only equal to the magnitude of the Powder possess an elasticity nearly one thousand times greater than common Air.

2d Steam of the Elasticity of common Air rushes into Vacuum at the Velocity of 1600 Feet in a Second therefore if heated so as to acquire double the elasticity of the atmosphere it would also rush into the atmosphere with the Velocity of 3200 Feet in a Second Consequently that fluid whose elasticity is one thousand times greater must expand itself with such Immense Velocity as will produce the most violent Effects such as in fact we see produced by Gun Powder –

3d The Quantity of elastic fluid generated by the firing of Gun Powder is in proportion to the Quantity fired & at the Instant of firing the elasticity is the same whether the Quantity fired is greater or small. The impulse however is in proportion to its Quantity but as it is impossible to employ the whole of this Impulse to the projection of the Ball the effects are not Correspondent.

The elastic fluid acts with equal force on the Ball & the Gun & their Momenta would be the same if the ball exactly fitted the Calibre so as to admit of no assignable Windage. And supposing the Carriage & the Plan it rests on perfectly smooth their initial Velocities that is the Velocities they move with till they are retarded by the continued resistance of the air is in the encreased ratio of their Weights.

But tho this Elastic fluid acts with equal force to project the ball & make the Gun recoil yet the Velocity with which the Ball is projected would ~~differ~~ differ very little whether the breach of the Gun was fixed on a rock of Adamant or was suffered freely to recoil on a plain perfectly smooth for the Variation would only be in proportion to the Weights of the Gun & of the Ball. For if the dimensions of the elastic fluid generated by the firing of Powder in a certain time be called 200 it is evident that if the Ball be 200 times lighter than the Gun that 199 Parts of this elastic fluid will occupy the space made void by the projection of the Ball while the remaining one part of the 200 occupies the space made void by the recoiling of the Gun. Wherefore if the Gun was not suffered to recoil in the least there would be only one part more added to the 199 to forward the projection of the Ball – Hence Cannon require not to be made heavy to increase the projectile Force of the ball for the difference of the force of a Ball shot from a Canon 2400 Weight & from one 4800 would be only one in a hundred altho the Carriage & plain were void of friction.

6th As the elastic fluid of fired Powder continues to expand itself with much greater Velocity than the Ball has acquired even at the Muzzle of the Gun it was imagined that by lengthening the Gun the projectile force of the Ball would be encreased, experiments however have not confirmed this opinion – For by a Number of Experiments made at Woolich in the Year 1736 from six pieces of Cannon of twenty four Pounders cast on purpose of the same Weight but of different lengths it was found that with the same Elevation & the same weight of Powder the Cannon of eight & a half feet long projected the Ball as far as the Cannon of ten and a half long.

This Paradox will be solved by attending to the diminution of the force which the elastic fluid must undergo by the time the Ball departs from the Cannon – And to the

Quantity of the Fluid that must escape through the Windage - When t
Ball is projected only four feet within the Barrell of the Gun supposing it
to have occupied one Sixth of that Space it is evident that the Elastic Fluid
have lost five Sixths of its Elasticity or repulsive property even tho none of
Elastic fluid had escaped by the Windage - but the Quantity that escapes ev
in such a very small part of time is immense - For admitting that the av
:rage velocity of the Ball in the first four feet is at the rate of sixteen hun
:dred feet in a Second it will require the four hundredth part of a Second to
pass that Space, yet as the first Velocity of the expansive fluid is nearly one
thousand times greater a great part of this Fluid must escape by the Ball d
:ring this short space of time even though the Windage should be very sm
Add to this that the Fluid which still remains behind the Ball to impe
it forward acts only by the Excess of its Velocity that of the Ball - the Ba
is also retarded by its friction on the sides of the Gun.

7th. If Balls of different Magnitudes are shot from Guns of the Same
Length with equal Quantities of Powder the greatest Ball will acqui
the greatest momentum at its departure from the Gun - For as the same Impuls
will move the less Ball with a greater Velocity than the large one
the elastic force of the fluid must continue its action longer & con
:sequently impart more of its power to the Large than the Sm
Ball - This is Confirmed by Experiments for balls whose Qua
:tities of matter are nearly as three to two with the same Quan
tities of Powder acquired momenta nearly as four to three but if lar
Balls have the advantage of small ones before their Departure
from the Gun by having the force of the Powder more effectually
Communicated to them they have still a greater advantage after
their Departure by having their Momenta proportionally less
diminished by the resistance of the Air than the Small Ones -
For the resistance of the air must be as the Surfaces of the Balls
& the surface of balls of different Magnitudes are as the Squar
of their diameters: Whereas their Momenta or Quantities of ma
:ter are as the Cubes of their diameters Consequently if the r

retar

tardation of a ball of one Inch be estimated at one tenth of its momentum in a
given time the retardation of a ball of ten Inches diameter will only be the one
hundredth part of its Momentum in the same time. Further if balls of
different Magnitudes move with the same Momenta the small balls must
move with a proportionally greater Velocity than the large ones & will con-
sequently suffer more diminution of their force from the resistance of the
Air than large Ones - For the resistance of the Air to the Ball increases not only
as the Velocity of the Ball increases but in
the duplicate Ratio of that Velocity - For a ball that moves with twice the
Velocity of another not only strikes with twice the force & consequently receives
twice the resistance but it also strikes twice ~~the~~ Quantity of Air in the
same time & therefore receives four times the resistance.

These Principles are in favour of Large Calibers.

8th. Light Guns will recoil more rapidly than large heavy ones though the
m of their recoil will be the same - Long Guns will recoil more
ones for though the Impetus on the Breach of the Gun
- yet the elastic fluid continues longer to impel the breach
g Gun than the short one but with a diminished force For
reason Guns charged with heavy Balls recoil more &c.
than when charged with Light ones & the greater the Quan
owder fired the greater will be the recoil.

Long Guns heat more

the time the heated fluid remains in the Long Gun is
in proportion to its length -

9th. Guns should be formed of sufficient Strength to prevent their
bursting of that length which is requisite to project the Ball
against Ships or Batteries with force to do effectual execution
and of such Weight & form as may not too much subject them
to the Inconveniences of a rapid recoil or excessive heating &c.

If these purposes are obtained the lighter the Guns & con-
:sequently the fewer hands requisite to manage them the more
perfect the Machine.

If these Principles are true it may be doubt-
:ed whether the British Artillery especially that of the British
Navy are of the most proper Construction. If indeed the perfection
of Gunnery consisted in projecting a ball of a certain Magni-

tude with the greatest Momentum then the present Artillery, & the Qu :tity of Powder would approach nearly to that perfection. Thirdly the per :on of Gunnery Consists in enabling a Certain Number of hands to perform means of it the greatest effects against Ships or Batteries the present Gu are not formed of that Construction.

Though a 24 lb a Ball shot from a Gun of 4900 lb Weight should do execution in Comparison of one from a Gun 2400 lb Weight in the ratio of five to four yet if the lig Gun can be fired five times while the other is fired four & can be :ved with half the number of hands it is evident that a given N :ber of hands would do double the Execution with light Guns tha same Number can with Large Ones.

7th And if the Quantity of Po is one fourth the Weight of the Ball exceeds the Quantity which found to be the most proper for Execution in Naval Engage It is probable that the Light Short Guns charged with Powder to one fourth their Weight of the Ball will at a distance no than five hundred yards come the nearest to that exact force does the greatest Execution.

10th But that no doubt may remain on a Subject of such national Importance it may be adviseable to make the following :ments.

Let five Guns of diff.t lengths & of the Calibe twenty four Pounders be procured Let them be accurately bore cast on purpose for them exactly round to fit the Caliber as as possible.

Let one of the Guns be eight feet long & forty hundred Weight the second seven feet long & thirty six hund the third six feet long & thirty hundred hundred Weight the f five feet long & twenty five hundred Weight the fifth four & half long & twenty two hundred Weight.

Let these Guns be tried twenty four Pounders which are nine & a half feet long & fifty hu Weight nearly.

Let the short Guns be successively charged with o which is one third one fourth one fifth & one sixth the weight of

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And let the Government Guns be charged as usual let their powers be estima :d by their ranges but more particularly by their Effects upon a Bulk to be erected on purpose of a strength equal to a first rate Ship of War & placed at five hundred Yards distance from the Guns Let the recoil & heat :ing of the Guns be accurately noticed.

By these Experiments the proper Length & Consequently weight of Guns may be noticed.

Proposals to Improve the British Navy

Let ten or more Ships such as the five lately built by the East India Company be purchased & armed with Sixty four Guns of twenty four

8th & eighteen pounders. The Cannon of twenty four to be five feet long & twenty five hundred Weight & those of Eighteen to be four feet long & eleven the hundred Weight, the Guns must be accurately bored & shot cast on pur :pose for them exactly round & of the size of the Caliber of the Guns so as to leave the least possible Windage.

These Guns must be placed on Carriages which are firmly fixed to the side of the Ship by Bolts with a groove to admit the Gun & the Bed it rests on to recoil within the Ship so as to be easily discharged & returned to its Post.

The twenty four Pounders are to be charged with six pound of Powder & the eighteen Pounders with four & a half, that is with one fourth the weight of the Ball.

9th Five Men can easily manage a Gun of Construction therefore the Compliment of these Sixty four Gun Ships need not exceed two hundred & fifty to which it will be proper to add Fifty Marines.

These Ships should sail in Company with the Grand Fleet to prevent the Necessity of their Engaging at a disadvantageous distance and as these Ships do not Carry their full Compliment of men & Consequently only a proportional Quantity of Provisions they can be loaded exactly to that Extent which is most advantageous to Quick Sailing.

In Engagements not exceeding the distance of five hundred Yards Ships thus armed would have the ad :vantage of Sixty four Gun Ships armed in the usual Manner

though with double the number of Men for each Shot from these Guns
would do nearly equal Execution to Shot from Guns of the usual form
In Consequence of the Lightness & Shortness & Structure of the Carriage
ty, if it can be fired nearly twice as fast, which would fully Compensate the
: on of Gunnery con…
means of it the great arising from the Inferior Strength of the Timbers of
where not formed of that Comparison of Sixty four Gun Ships of the usual Size
disadvantages

these Ships in Co… Weight these Guns are Intended to prevent the Enemy from
: ture. … to Weight … are not required for the Service of
The Man times while … employ their Small Arms to

Boarding and as they … of hands it is evident
they could in close engagement the Execution with … Ship …
advantage especially if trained to marks.

… sity of Re…
be advantageously employed in Expeditions where Batteries … be attacked their light Guns could readily be put on Gun Boats …
Floating rafters and as these Ships do not carry the usual Number
of Sailors they could carry a considerable Number of Soldiers …

The prin…
advantage of this Plan is that proper Ships could speedily …
procured & as the Complement of Sailors required is less than
the usual Number they can be speedily manned — The …
so well founded on Experiments & the first Principles of G…
that it is highly probable whatever Power shall first adopt
will obtain by it a decisive Superiority over its adversaries

Marking Ink.

Lunar Caustic	100 Grains
Gum Arabic	2 Drachms
Rain Water by measure	1℥ —

Sap Green sufficient to colour it pretty strongly —
Shake the Bottle previous to using the Ink

Preparatory to marking with it, wet the Cloth with the following Liquor, and dry by heat … be perfectly dry before the Ink is used.

Salt Soda: 1℥: Wt. — Rain Water 2℥: measure —

… y charged with …

… Both the weight …

1000 Cubic feet of Masonry takes 16000 Bricks at 6000 Bricks p Pagoda	P. 2.30. —
Chunam 164 Parahs at 20 Parahs p Pagoda	7.9. —
River Sand 144 Parahs at	1.3. —
Jelly 20 Carts	1. —
Bricklayers Work 20 fanams p thousand Bricks	
Jaggery	1. —
	P. 12.42. —

In Common building 8 Parrahs of Chunam is a full & large Proportion to 1000 Bricks in general 7 Parrahs are only used but strong Chunam is made by 8 Parrahs & the proportion of Sand 12 Parrahs to the Eight. —

A Madras Garce of Shells is 69 Parrahs. — The Chunam Parrah being 3750 and the Grain Parrah 3750. — Cubic Inches

2 Oz Ivory Black
1 Pint Vinegar
1 Tea Spoonful Sallad Oil
1/2 Oz Gum Arabick
2 Oz Sugar Candy

Boil them all together & when quite Cold put in it 2 Tea Spoonful Spirit of Vitriol.