July 9th 39

Wednesday

My dear Osborne,

We have a few friends dining here on Tuesday next at 1/2 past 3. I trust they will be agreeable.

Your cousin I believe among the number. If you are not engaged, you also.

Yours sincerely,

William...
Brookfield Place
Caling w.
July 21, 1873

Dear Colonel,

Should nothing occur in the mean time to change my plans I hope to pay you a visit on
Wednesday next, but I think not before one o'clock as I have an engagement here in the morning. I think that then I may be able to dislodge the enemy finally.

In haste most truly yours,

Denis Browne, A. Murphy
July 22, 1873

Colonel Richards
begs to inform
Colonel the O'Gorma
Mahon that it is a week since
he went the ports
from his brother
as addressed
to The O.G.M.'s
Club. The Civil
Military in
Respect of
A Special Mission

22 July 1873
July 27, 1813

Dear Colonel,

Miss Graham & Mr. Delaney are going to Greenwich to have a little Plain dinner on Thursday next. If you colonel should have nothing better to do, I would be glad if you would join us. It is at Hungerford Boat Pier.
London
July 29, 1853

My dear Colonel,

On enquiring I find that the War Office do take the opinion of C.O. of militia officers as to appointing officers on which account I can very much rely sense you

[Signature]
I will ask for a commission for him from which he can if he pleases get back into the army.

I must also know his exact age and anything else that I can learn. His height for instance.
To the Chairman & Directors
of the Agricultural & General Fusing Co. Limited

Gentlemen

I have the honour to report to you the results of the experiments made with the Fusing Cylinders at Messrs. Schiedel's Crown Works Victoria Works from the 16th of June to the 19th July, 1873.

Interpretations
No 1. Shall be understood to refer to the Old Cylinder belonging to Mr. Alfred Boswell.
No 2. Shall be understood to refer to the Cylinder belonging to Mr. H. W. Gibbons.

Description of Machines
No 1. Consists of a cast iron cylinder about 36 feet long, revolving in a stationary wrought iron casing leaving a space of about 2 inches between the casing and cylinder. The fire grate is underneath the casing. The hot air passes through a 18 inch pipe to the air duct which is made to revolve the opposite way to the cylinder, is thus distributed inside the cylinder, and is drawn off at the far end by the chimney.

No 2. This machine consists of a cast iron revolving cylinder about 24 feet long, having a stationary air duct passing thru the centre. The fire grate is detached from the cylinder. A large flue is placed over the top with its suction pipe communicating with the furnace, which draws the hot air from the fire and passes it directly thru the air duct into the cylinder. This is also drawn off into a chimney, at the opposite end.

(1)
It is to some extent useless for me to describe to you the machines with which you are as well acquainted, I have however done so that you may be better able to follow me in the results and remarks on each machine.

Remarks on each machine

No. 1 This machine was quite unfit for accurate trials, but I was of opinion that it would run long enough to prove some data as to the quantity it would dry & its consumption of fuel. It was faulty in every part, and when I strengthened it in one place, it gave way in another, and at last so buckled & twisted that it became useless, one great fault in its construction is the narrow space between the cylinder & casing being only 3 inches the draught it almost killed, the consequence is the fires will not burn in the small space would soon become choked without the required particulars were just obtained when the cylinder positively broke down altogether.

I have given you a table of results if you will see by that, we ran 1 ½ hours the day before it collapsed.

No. 2 The results obtained by this machine were very satisfactory & exceeded my utmost expectations, and when the larger pulleys were placed on ran very steadily, and turned out the grain dry, and with the exception of the wet temp & did not work well, this machine was not constructed to dry such materials and could be modified to dry the average quality of grain that has been run this year.

The fan bearings became very hot, necessary to keep free use of oil. See Table for results these were taken by my assistant, which no doubt Mr. Swell will verify.

(2)
Other matters beyond actual production and consumption have to be considered viz. the power to drive the machinery. Consumption of fuel in furnace, labor & cost of construction.

It may be interesting to compare these points.

1st. Horse power required. The two cylinders took about the same power to drive them, one from 2 to 3 actual horse power, but No 2 has a fan to drive it, which takes only less than 1/2 actual horse power to drive it, thus I consider a great hindrance to the economical working of the principle; this extra horse power represents in fuel, oil, stoves, water to not less than $10/- per day of 12 hours for each machine.

2nd. Consumption of fuel. For this I must again refer you to the Table of results, it shows that No 1 requires 100 lbs. of coal per ton dried t for No 2. 132 lbs. of coke, but both might be constructed to consume much less.

With regard to No 2, part of the principle is to draw the hot air from the Boiler flues with a view to the utilization of the waste heat. I considered this matter very carefully making the experiments shown in the Table.

On applying the pyrometer to the top part of the furnace it immediately sent the indicator to its full height viz. 1500° so that I cannot tell how much it was above this, on placing the instrument in the fan suction just before entering the fan, it registered from 100° to 150° (see Table) and at the bottom, discharge from same between 500° to 800°, the chimney bottom indicating from 350° to 250°.
These results show a serious loss of heat in passing through the flue. The loss of heat from a direct fire being so great, it would be of no practical use to attempt to utilise the heat from a chimney.

I think I can explain this more fully. The heat at the bottom of a chimney should not be more than 50%, and in the proportions above, this would be 50% on passing thru the flue, this is only the heat shown in the bottom of the cylinder chimney, and if you draw the boiler fires it will give the extra consumption of fuel by the stronger draught.

As the results of my investigations & experiments, I should propose to construct a machine as follows. A cast iron cylinder 4 feet in diameter and about 16 feet long, on the principle of No. 1, to revolve over the fire, but with a stationary air duct as in No. 2, and an arrangement for spreading out the lump; if the gum is to be the same as the samples we have been drying up to Friday, but if they intend to dry such Gum as was dried on Friday, it will require a revolving air duct with spreaders & scrapers, for the gum was so soft that it was well enough for the men could throw it off the shovels, and we were obliged to run a considerable quantity three or second times. I should propose the cylinders to be set in brickwork on the plan of those at Leeds.

I estimate the quantity (the same as we have dried up to Friday, the 16th July) each machine would turn out would be 22 cwt of dried gum with the consumption of 1 cwt of coal at most per hour, and that the cost would be about (4)
$400 per pair including brickwork, or the portable cost of a pair of well constructed No. 2 cylinders.

I have endeavoured to give an independent report confirming myself to the actual facts taken from daily working, and I shall have great pleasure in attending your Board to make any explanations or answer any questions.

I feel confident that Messrs. Schröders will not meet with any machines to do their work more thoroughly or economically.

Believe me, Gentlemen,

To remain,

Yours very Faithfully,

Thos. H. Wilson B.Sc. M.R.C.S.
<table>
<thead>
<tr>
<th>Date</th>
<th>Item</th>
<th>Quantity</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/23/2023</td>
<td>Item A</td>
<td>10</td>
<td>$8.75</td>
</tr>
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<td>1/25/2023</td>
<td>Item C</td>
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<td>1/26/2023</td>
<td>Item D</td>
<td>15</td>
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<td>1/27/2023</td>
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<td>$11.99</td>
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<td>1/28/2023</td>
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<td>$7.99</td>
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<td>1/29/2023</td>
<td>Item G</td>
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</tr>
<tr>
<td>1/30/2023</td>
<td>Item H</td>
<td>10</td>
<td>$10.99</td>
</tr>
</tbody>
</table>

Total: $288.65
Results of Trial of No. 1 Cylinder

Monday June 23rd 1873
Time working 6 hours
Weight of Quano Dried 66 cwt 48 lbs
Coals used 4 cwt 56 lbs
Quano Dried per hour 11 cwt 8 1/2 lbs
Coals used per Ton 1 cwt 41 lbs

N.B. This was before speeding
This time to dry

Tuesday June 24th 1873
Time working 5 1/4 hours
Weight of Quano Dried 101 cwt
Coals used 4 cwt 56 lbs
Quano Dried per hour 17 cwt 6 1/2 lbs
Coals used per Ton 9 1/2 lbs
N.B. The lighting the fires is included on the coal.

Wednesday June 25th 1873
Time working 5 1/2 hours
Weight of Quano Dried 70 cwt 90 lbs
Coals used 3 cwt
Quano Dried per hour 13 cwt
Coals used per Ton 96 lbs

Thursday June 26th 1873
Time working 8 1/4 hours
Weight of Quano Dried 142 cwt 92 lbs
Coals used 8 cwt
Quano Dried per hour 17 cwt
Coals used per Ton 13 lbs

Mean results after speeding
Time 5 3/4 hours Quano Dried 142 cwt 92 lbs
Coals used 9 cwt
Quano Dried per hour 17 cwt
Coals used per Ton 13 lbs

Total 19 3/4 314 90 187 56 47 63 3 12
Mean 6 4/2 10 4/95 8 19 18 96 7 14
Results of Trial of No. 2 Cylinder

Tuesday July 15th 1873

Time working
Coke used
Weight of Guano dried
Guano dried per hour
Coke used per Ton

5 hours
5 cent 86 lbs
119 cent 36 lbs
2.3 cent 96 lbs
103 lbs

Wednesday July 16th 1873

Time working
Coke used
Weight of Guano dried
Guano dried per hour
Coke used per Ton
Weight of Raw Guano

5 cent 83 lbs
104 cent 43 lbs
20 cent 93 lbs
1 cent 37 lbs
122 cent 69 lbs
NB. 18 cent of this came out as some balls hard on the outside but quite wet inside.

Thursday July 17th 1873

Time working
Coke used
Weight of Guano dried
Guano dried per hour
Coke used per Ton
Weight of Raw Guano

5½ hours
9 cent 88 lbs
147 cent 12 lbs
21 cent 2 lbs
1 cent 33 lbs
162 cent 10 lbs
First lump was not weighed

Friday July 18th 1873

Time working
Coke used
Weight of Guano dried
Guano dried per hour
Coke used per Ton
Weight of Raw Guano

5½ hours
5 cent 74 lbs
80 cent 35 lbs
9 cent 60 lbs
1 cent 29 lbs
92 cent 92 lbs
A large quantity of this sample was like thick mud, it sticks to the shovel and was difficult to feed. Stopped machine 2 hours, it
so takes from the time.

NB. 1 hour not taken, the last result was it was cut as fair samples

<table>
<thead>
<tr>
<th>Time</th>
<th>Guano dried</th>
<th>Coke used</th>
<th>Guano</th>
<th>Coke per Ton</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>119-45</td>
<td>5 c. 86</td>
<td>24</td>
<td>10.3</td>
</tr>
<tr>
<td>7</td>
<td>147-12</td>
<td>9 c. 88</td>
<td>21</td>
<td>1.31</td>
</tr>
<tr>
<td>Total</td>
<td>370.93</td>
<td>22.3</td>
<td>65</td>
<td>3.80</td>
</tr>
<tr>
<td>Average</td>
<td>5.75</td>
<td>123.68</td>
<td>7.56</td>
<td>21.105</td>
</tr>
<tr>
<td>Time in hours</td>
<td>Share Cooler Coke</td>
<td>Bricks in coke</td>
<td>Share per Hour</td>
<td>Coal or coke per Ton</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------------</td>
<td>---------------</td>
<td>--------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>6 1/2 hours</td>
<td>104.95</td>
<td>9 1/2</td>
<td>18.9%</td>
<td>104 lbs</td>
</tr>
<tr>
<td>5%</td>
<td>124.68</td>
<td>7 3/8</td>
<td>21.103</td>
<td>138 lbs</td>
</tr>
</tbody>
</table>

In No. 2, the coke consumed to light the fires is not included, would be about 36 lbs.

---

**Temperatures taken from Fire No. 2.**

<table>
<thead>
<tr>
<th>Location</th>
<th>Top of Furnace</th>
<th>Entrance into Fan</th>
<th>Breeches up fan</th>
<th>Bottom</th>
<th>Chimney</th>
<th>Bottom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over Fire Furnace</td>
<td>1150°</td>
<td>1100°</td>
<td>1500° Pyrometer</td>
<td>3.25%</td>
<td>3.25%</td>
<td>2.85%</td>
</tr>
<tr>
<td>Heat was above</td>
<td>1100°</td>
<td>1150°</td>
<td>1600°</td>
<td>2.50%</td>
<td>2.50%</td>
<td>2.50%</td>
</tr>
<tr>
<td>Does not indicate higher</td>
<td>1400°</td>
<td>1200°</td>
<td>1700°</td>
<td>3.00%</td>
<td>3.00%</td>
<td>3.00%</td>
</tr>
</tbody>
</table>

Mean: 1125°  Mean: 1500°  5744.75  2,85%  

Could not take more at entrance of the on account of shaking the pyrometer with the draught.
Colonel Th. J. Gorinrm [Barker]
37 Maida Vale
London Aug 5 1873

My dear Colonel

It is a pity
that you don't
tell me in which
of the 5 Regiments
of the M Militia
I can serve.

I had told you
that there were
5 and that
the vacant was
filled up by the
government on
my recommendation
of the C.O. as direct
as an expert
is made to the
office of the
lieutenancy. I
cannot possibly
know when vacancies
will occur.

If the Clerk of
the lieutenancy has
not yet come

communicated with
all the Lieutenants
you, nephew,
may wish these
vacancies, and
by my neglect.

I send you
my name
as Springarden
the Clerk of the
lieutenancy, and
I recommend
you to call there forth.
To the Agricultural & General Drying Co. Limited

Mr. Chairman,

Sr.

At your request I have made the following report on the performance of the present cylinders at Leeds, and will as far as I possibly can, answer your questions verbatim.

The undermentioned repairs are from daily reports which are signed by the manager and from these I will answer the vital questions as work done for coal consumed. The others I will answer, summarise, and am prepared to verify my statements to your satisfaction of all interested.

Question 1. Amount of water expelled per hour?
Answer 1st. 559 lbs.

2. 2nd Amount of fuel used per hour?
   A. 2nd. 86.9 lbs. of coal.

3. 3rd Amount of power used?
   A. 3rd. About 1/4 Horse Power (Actual).

4. 4th. How long have they been continuously at work?
   A. 4th. About 3 months started 30th April 1873.
2. 5th. Have any of the parts broken, yes which?
A. 5th. No. Defective came of the defective workmen.
ship, which was replaced, this is all the repairing that has been done to either.
Since commencement.

2. 6th. Have either of the cylinders or air ducts
Choked or stopped by reason of an overcharge?
A. 6th. No, not the least sign of choking, and
14 tons 13 cwt. has been packed this once in 22 hours.

2. 7th. Has the Guano accumulated on either
scraper or air ducts, or in any part of the cylinders?
A. No. We have sometimes to remove some
or woolen, of which there are large quan-
tities in the deere sewage, but no
manner the cylinders are examined
say about once in 9 months.

2. 7th. What is the temperature of air
going into the air ducts? and what at
the base of suction shaft?
A. 7th. This has never been tried

Having answered all queries,
I will now take the daily reports
for one month, and from the
average prove the above. I have
taken No. 2 cylinder through out.

All these figures are those of the managers
of the Leeds sewage works, and are signed by
them in the daily reports, which can be seen at the
office of the Manager, Guano & office.
Daily Reports
For June 1873 Leeds.

A. Date of Month
B. Quantity of Manure dried at 14% moisture
C. Quantity of Moisture in Manure before Drying
D. Time Drier was Running
E. Quantity of Coals used
F. Remarks

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>June</td>
<td>4</td>
<td>96.0</td>
<td>60.93</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>109.0</td>
<td>54.68</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>23.1</td>
<td>79.68</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>50.2</td>
<td>87.81</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>52.2</td>
<td>56.25</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>53.0</td>
<td>56.18</td>
<td>11.5</td>
</tr>
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<td></td>
<td>11</td>
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<td></td>
<td>12</td>
<td>49.3</td>
<td>54.81</td>
<td>12</td>
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<td></td>
<td>13</td>
<td>58.3</td>
<td>61.12</td>
<td>12</td>
</tr>
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<td></td>
<td>14</td>
<td>38.3</td>
<td>43.55</td>
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<td>17</td>
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<td>64.06</td>
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<td>21</td>
<td>26.0</td>
<td>48.43</td>
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<td>23</td>
<td>13.1</td>
<td>92.18</td>
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<tr>
<td></td>
<td>27</td>
<td>34.2</td>
<td>62.50</td>
<td>12</td>
</tr>
</tbody>
</table>

19 days: 869.1 | 1190.49 | 235.2 | 182.3 |

Average 1 day: 45.75 | 62.4 | 12.4 | 9.62 |
These figures show that about 6.5 lbs of water are evaporated by 1 lb of coal; this is a very good result when it is considered that the cylinder is exposed to the weather, and that it is generally stopped at night; the amount of coal includes the coal required to light and heat the cylinders of entire construction. From these facts I hoped that far better results would have been obtained by Mr. Borwick's cylinder at Mess. Schröder's, and they would have been obtained with a properly constructed machine.

It may be instructive to compare this report with the one from Schröder's. I was not able to ascertain the weight of coke burned only in the undermentioned case, before drying, but these will serve for a rough comparison.

<table>
<thead>
<tr>
<th>Date</th>
<th>Rainfall</th>
<th>Wind (mph)</th>
<th>Temperature</th>
<th>Water (lbs)</th>
<th>Coke used (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>July 16, 1873</td>
<td>122</td>
<td>63</td>
<td>104</td>
<td>97</td>
<td>18</td>
</tr>
<tr>
<td>17</td>
<td>162</td>
<td>10</td>
<td>147</td>
<td>92</td>
<td>14</td>
</tr>
<tr>
<td>18</td>
<td>92</td>
<td>92</td>
<td>60</td>
<td>35</td>
<td>12</td>
</tr>
</tbody>
</table>

| Total      | 45 | 75 | 21 | 66 |
|           | 112 |   | 112 |   |
|           | 2 1/2  |   | 2 1/2  |   |
|           | 24.18 |   | 24.18 |   |
|           | 30.2 |   | 30.2 |   |

Thus present cylinders at Leeds evaporate about 6.5 lbs of water, the those at Mess. Schröder's 2.11 lbs of water per 1 lb of coke.

I remain, Dearest,

F. W. B. in the Institute.

M. P. Nelson, M. S. M. E.
August 15, 1873

L. E. Cook

Scituate Bank

10th. 1873

My dear Friend,

I send a

Certificate that has been

made within

a year, to the

best evidence of

the preceding

[Signatur]
Walmer Castle,
Deal.

Aug 25/3

My dear Sir,

I send you further letters from the two Chancellors which I ought to have forwarded earlier.

Yours sincerely,

Gravelot.

The German Museum.