

Kings Bromley

Historians 2015

The Electric Turbines at Kings Bromley Manor

The following information comes from SRO D6584/A/ 79.

Gilbert Gilkes & Co. Ltd

September 5th 1905

H. Lane Esq
Kings Bromley Manor
Lichfield

Dear Sir,

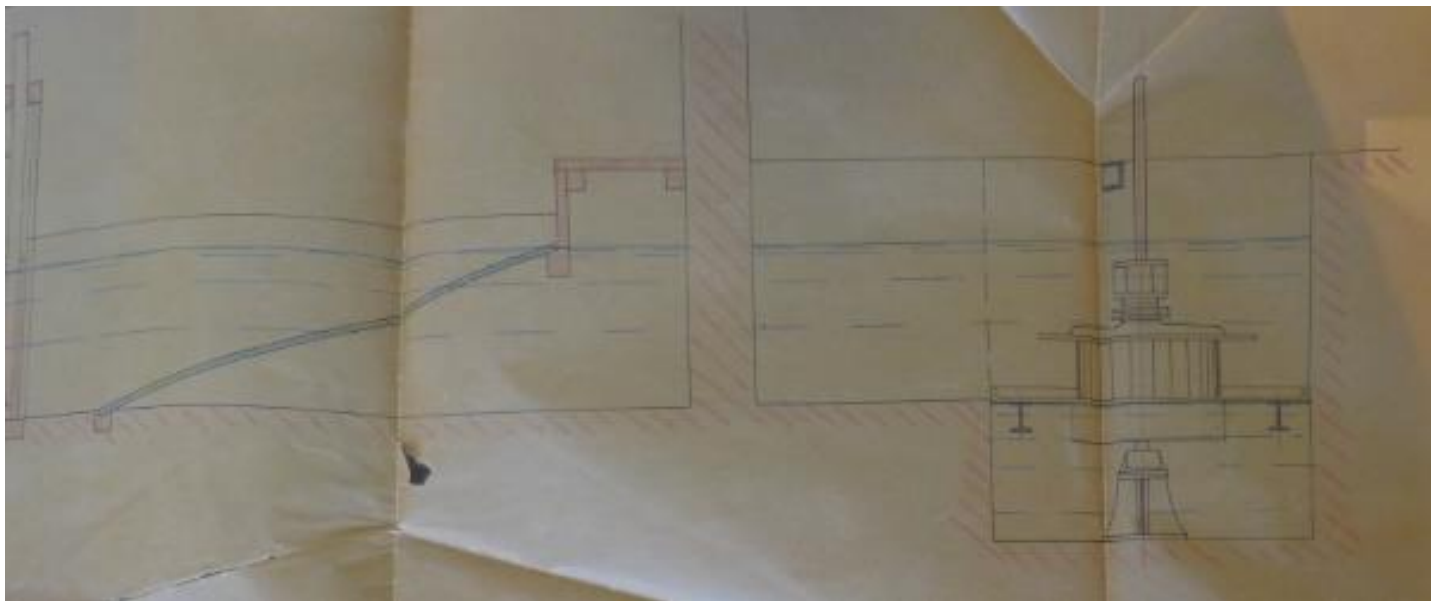
With this we have pleasure in sending you drawing and estimate for a new turbine (Trent type) to give you a maximum of 10 H.P. under the fall available. This turbine is as large as can reasonably be adapted to your present water approaches, and should give you good results with your saw if the drive is properly arranged, and of course it would do your pumping with ease. It would hardly be large enough for lighting your house by electricity, though it would be very useful help to an installation; or if you thought of lighting the principal rooms and passages, it might do this with a large battery.

We think it just well to point out that another £100 or so spent on the turbine now, would give you 20 HP; whilst a turbine to give you 15 or 16 HP would cost say £75 more. To put in such wheels you would need to enlarge the turbine pit, and an additional expenditure of perhaps £20 Or £30 would be incurred in this, but you need not alter the headrace or tailrace until you wanted extra power. We think the electric lighting could be done with 15HP, but we should prefer to have rather more than this. ...

We take this opportunity of putting on record that the present outward flow turbine, which has been in for 52 years, is in our opinion quite unfit for use ... (*while the work was being done*) You would have to make arrangements for a portable engine for from two to three weeks. As you are away from home the water used could doubtless be economised so that the pump did not have to run very long hours.

Yours Faithfully
Norman F Wilson, director

Part of the attached drawing:



Gilkes and Co. reckoned that the existing turbine has been in for 52 years in 1905, i.e. installed in 1853. In fact it was installed in Dec 1873/1874 (D6584/A/70) "Estimate for proposed Saw Mill, Turbine House, and Carpenter's Shop £615 - Wall & Hooly" -this estimate was not taken up.

A further estimate by Easton & Andersons in Sept 1874 for a 12HP motor, saw mill, pipes to manor etc £1864 17/4, was taken up and paid for in 1874:

The delivery from the pumps 3 inches in diameter, provided with an air vessel at the pumps, will be carried in a main as shown on the plan to the corner of the Manor House near the large drawing room - The 3 inch main will enlarge into a four inch, opposite the entrance hall door, and will be kept at that size through the door from the pleasure ground, by the kitchen court, and up the proposed new tower to the tank, which will be placed there.

Branches in cast iron pipes 3 inches diameter will be taken from this main to 7 hydrants situated near the drawing room, entrance hall door, kitchen door, the tower, the steps by your private room, opposite the garden front of the house, and in the stable yard, and branches will also be taken to 2 firecocks in the ground and first floors in the front staircase well, 1. in the passage opposite your private room door, 2 on the first and second floors where the new tower will meet the long passages, and one near Captain Lane's room over the coach house in all 6 firecocks. - The hydrants will be of cast iron, with gun metal valves and neat boxes over them, finished off level with the gravel walks, pavements etc. - The firecocks will be of gun metal with screwed valves, and gun metal covers attached by chain.

The branch pipes referred to, will be ? attaching other branches to for fountains or extensions at a future time to the farm, Village or Kitchen garden.

A tank constructed of strong cast iron flanged plates will be placed in the new tower. It will be 9 feet square by 10 feet deep, or other size of equal superficial area. - It will be supported on 3 strong rivetted girders which will be built into the main walls of the tower. - The tank plates will be placed and accurately fitted at the edges and painted with autocorrosive paint. An "appold" overflow pipe 4 inches diameter will be fitted to the tank.

....

A large rack circular saw bench, capable of working saws up to 48" in diameter, with 30 feet of wrought iron travelling bed, rollers etc. and complete in all respects with driving pulleys countershaft, leather belts, 2 saws 42 inches diameter, foundation bolts, and belt shifting gear. - This saw mill will be suitable for cutting up all sorts of log timber grown on your estate and rendering it suitable for building and estate purposes.

....

The other machine is called an "Estate Carpenter" and is expressly designed for general estate work such as sawing out, boring, crosscutting, morticing and pointing posts and rails, ripping out fences, cutting firewood, paving blocks etc.

Lane
Lily Hill
Bracknell
Berkshire

Plan of hydrants and firecocks:



Plan of Mills and Turbine:



1927 Winterton's Sale Catalogue

Lot 7, 'The County Seat of King's Bromley Manor'

LIGHTING

The Mansion, etc. is fitted for Electric Light, and has been lighted by electricity from the plant, which is included with Lot 14. No obligation is placed under the Purchaser of Lot 14 to supply current, but arrangements could possibly be made.

Lot 14, 'The Estate Workshops and Grist Mill, Kings Bromley'

The SAW MILL is constructed of Brick, with Tiled Roof, and is divided into Carpenter's Shop, Saw Shed, Paint Shop, Battery House, containing 56 cells, Dynamo House, fitted with 10 h.p. electric motor, switch board etc.. Pump House, with water turbine.

The Water Supply and Plant, which serves the Manor House (Lot 7), Lot 35 (The Gardener's House, now Crittendens) and "The Nest", Kings Bromley (reserved from sale) is on this lot.

The supply is derived from a well, which is piped to the Mill, and by pressure from a water turbine, is driven through underground pipes, through lot 35, and hence to the Tower on lot 7, and, by gravitation, serves the various supplies. The purchaser of this Lot shall covenant not to disturb the existing water arrangements.

The purchaser of Lots 7 and 35 and the Owner of "The Nest" shall have a right in perpetuity to use the existing pipes and works affecting them, to inspect, repair, maintain, and, where necessary, renew all such pipes and works of all sort, with all necessary rights of entry.

The electric light cable, which has, in the past, applied current to Lot 7, pursues a similar course to the Water Main. No liability is placed on the Purchaser of this Lot to supply electric light to Lot 7, and such works as exist on this Lot shall be included in the Sale.

How Much is 10 HP?

1 HP is 746 watts. A 10 HP motor can therefore provide 7.5 kW instantaneous DC. Assuming 240 volt supply, which is a big assumption for a DC system, the cable would need to carry up to 31 amps, similar to a domestic supply today.

We can assume that, given an even flow on the river, this could be provided 24*7 i.e. 815 kWh per day. Assuming 60W lightbulbs, this could light 125 lightbulbs.

The battery house would not be there to smooth out supply, but also to smooth out demand, so that more than 31 amps could be used in the hours of darkness. The other demands on the supply, the sawmill and the water pump would be used during the day.

There were 56 accumulator cells which filled up a building (see below). We need an estimate of the capacity of such a system.

According to the 1911 census, the Manor had 51 rooms, so the instantaneous supply (i.e. that not augmented by the batteries) would be able to supply 147 watts per room. Alternatively, with nine family members and ten servants, this works out at approximately 375 watts per person - enough for each person, or room, to be very well lit- even without the use of the batteries.

Current prices per Kwh are approximately 15p. If all of the electricity generated were used this comes to £122 a day or £44,500 a year. A typical dual fuel single house bill today is approx. £1200 per year of which maybe half is electricity. This corresponds to 4000 Kwh per year, or 11 Kwh per day - or 1/74 th of what the generator could produce. But then, with 51 rooms, the Manor was five to ten times the size of a modern house.

Conclusion. The 10HP motor, plus the accumulator system, was more than enough to light up the Manor like a Christmas tree.

Contemporary Accounts of the Electricity and Water System

Grace Lane, Second Visit, 1980

David: I remember your Dad talking about the manor, Ivy. One thing was the fire hydrants that used to be on the landings in case there was fire.

Grace: The water, of course, came from the tower, so it dropped a long way and was very powerful. There was never a telephone, just the one in the estate office, never the house itself. Of course, it was the first place in the village to have electric lights. I remember the excitement over that. You hardly dared touch a switch, you were scared what would happen. It came from the mill itself, the generator. It was a huge great machine. Will Osborne charged it was in charge of it.

David: Was it harnessed to the river?

The weir, I think it was,

The flour mill

a lot of water used to come out of that weir in those days, it was pretty powerful.

And before that, it was oil, paraffin lamps.

He was known as the Hall boy, the poor boy had to do a hundred paraffin lamps every day, fill them to the wick. That was his job.

(Grace was born in 1904 and she remembers the coming of electricity and the previous oil lamps. The generator was put in in 1905. For Grace to remember it, she must have been at least three, so it must have taken a while to put in the lights and cabling)

Fred Johnson. 14/10/1982.

Fred Johnson. 14/10/1982.

One job that he gave me to do was to make all the duckboards to go round the top of the manor and I always had the job of pumping the water into the tower and then I'd have to go to see the tell-tale to see when it was full.

David Butcher: And how was that pumped, would it be electric...?

It was with the pumps from the mill, it was pumped from the mill with the same power. I was under the old carpenter who also was carpenter and electrician because the manor in those days was lit with electric light from accumulators that were housed down at the sawmill and the old carpenter had to look after them .

..., we had a large circular saw with a table that carried trees on it to be cut up and a smaller circular saw that we cut the cord wood up on.

D: And did you use electricity for the saw?

Oh yes

D: They were pretty big accumulators then?

Oh there was quite a number of them, twenty or thirty, huge accumulators. And of course what I didn't understand was the condition of them which the old carpenter had to keep watching their condition all the time

Ern Rock 6/12/79

Now, the Manor, of course the Manor was always lit up by electric light which was produced through the river Trent all for nothing. The river Trent was diverted to come to drive the mills up towards Nethertown, and that's why they call that one the old Trent and they diverted it and brought it down and it drove the flour mill and the saw mill. And they could use it twenty four hours a day without spending a copper on it and this one to the mill drove all the circular saws and there was a big moving table with a circular saw for cutting trees up and a bit lower down there was a great big room full of batteries which it charged which lit the Manor up and the estate agent Mr. Bennett lit his house as well and eventually Cliffe's. But this room with the batteries in it was as big as a hall perhaps about thirty foot long. (David Butcher - it was a job to look after it). Well it was Mr. Hodge? used to keep an eye on it then, that's it there was one in charge and course this water wheel didn't cost a cent to run.

(The 56 accumulator batteries in a room thirty foot long may have been two banks of 28, each one foot wide)



An aerial photo of the flourmill and sawmill taken in the 20th c. Both mills have now been covered into houses.