Studies - Bridges.
He has to design on.

ACC. 976

Jan. 23, 1877.

There is some talk of the rate of postage in France being reduced to 15c, in which case the new 20c stamps will have no raison d'être. If this is decided I will try to get hold of a supply before they cease to be had. The colour of the 10c has also been changed; so the green ones should be preserved. Please communicate the above to Rankine.

My dear George,

I am much obliged for the Indian ink saucer which will be very useful to me. I have not yet had occasion to use it, but whenever I saw it, it occurred to me at once that it would be much better than a china saucer for rubbing down ink. It is quite a curiosity too, and it is a souvenir which I hope to keep for a long time to come.

I went yesterday after five, to see whether I could find for you the tables you speak of in your letter. I was referred almost at once to the

right place, as almost every publisher here has a specialty. It was a queer poky place up two flights of narrow stairs. I had not your letter with me, but was shown a set of tables which on returning I found to be the very ones you had mentioned. The work of Labrosse is in several volumes of which this is the first, but it can be had separately for F 6.50 or say $ 1.30 of course in paper covers. The size is large octavo. The tables refer to each degree of latitude from 61° N to 61° S. and give the time of day corresponding to the suns true azimuth. On turning to the part of the book which refers to the latitude in question, the suns N.P.D is found running down the left hand side of the page & is given (I think) to each degree. Along the top of the page the azimuths are marked (to each two degrees) and the central part of the page

is taken up with the hours of the day corresponding. Although there are intervals of several minutes between the hours given, it would be easy by a proportion, I should think, to find the difference corresponding to any other time which might fall between those indicated. I did not purchase it, as you do not speak of having any observations of this kind at present to reduce; but I should think it would be just what you want for the kind of work you speak of. If you would like it bound it would be cheaper to have it done here.

In regard to a work describing the kind of surveying you speak of, I am afraid I am not likely to hear of anything of the kind here; but if I do I shall certainly let you know.

We have given in our "Concours" in Hydraulics on Monday. It consisted of

in the calculation of the diameters of a system of water-pipes of about 1½ miles in length — a main with three branches. The amount volume of water required to flow from the extremity of each brand was given, as well as the level of the water in supplying reservoir. Of course the problem could be answered by giving the pipes any diameter you please, provided it is only large enough; as the flow can always be regulated by valves. But we were required to solve the problem ~~for~~ so that the cost of the pipes should be the least possible, the cost being supposed proportional to the size of the pipe. The first part of the calculation consisted in the solution of a set of equations involving 10 unknown quantities. This however could not be done by ordinary algebra, as the unknown quantities were mostly of the form $x^{5/2}$ or $\sqrt{x^5}$, so that the equations had to be solved by a series of trials.

We have now an arched masonry bridge to design, which is to take a railway across a river about 170 yds wide. We are given simply the section of the bed of the river

and the summer, & ~~had~~ flood [illegible] of the water, so that the spans and foundations are left entirely to our own discretion. It has to be a masonry bridge however; I should prefer to try my hand at an iron one, but it would be useless to give us that at present, as we have not yet got to iron bridges in our course of lectures. We will have an iron bridge next year.

Our examination on Bridges comes off next Tuesday. We are not expected to commence our design till after it is over, so that we have this week to study. I am finding out by degrees the amount of information contained in the Treatise on Bridges which Father has presented to me. I find in it a very fair description of the foundations of the St. Louis bridge over the Mississippi, as well as of the Brooklyn bridge over the East River; and these [illegible] descriptions are illustrated by two of the plates.

We have just received a first instalment of the course of Interior Navigation, consisting of lithographed text like our other courses, together with a quantity of plates. The number runs above 50, but there are still many maps as the affair is under publication. The plates are about 20" × 18" and are very neatly got up. There are half a dozen maps among them, including river basins, and the works, dykes constructed at the mouths of the Nile, Rhone, Danube & Mississippi. The rest of the plates represent apparatus (dredges &c) and locks, canal-gates and such like. The Professor (Malézieux) is one of those rare Frenchmen who have left their "patrie" for a time, having been in America; and he sets a good deal of store by what he saw there. Several of the plates ~~represent American~~ are taken from structures on American canals, or represent American appliances. There is even one which gives the details of a Canadian lock-gate.

We have had a good deal of fog this week, interspersed with fine days. The weather has been colder.

Your affectionate brother, William.