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bridge ever built or thought of. The bridge-building operations at the Falls were peculiarly unfortunate, the first one, a chain bridge, broke down in 1811, with a drove of cattle on it; the second fell from the weight of snow accumulated on it in a snow storm in 1818; the third floated off the piers in a very high freshet, February 21, 1822, and the fourth was recently destroyed by fire. * *

The wire-making business, which had been very profitable during the war, when none could be imported, was the very reverse after it, and like most manufacturing businesses, came to a dead stand. Under this state of things, of course it became a matter of consequence and anxiety to White & Gillingham how they should realize returns for their heavy investments at the Falls. The course they pursued was ingenious, and finally resulted in giving to the citizens of Philadelphia one of the greatest blessings that ever fell to their lot. They procured, to be published anonymously, in the papers of the day, a series of essays on the subject of supplying the city with water, recommending that the city should purchase the water-power at the Falls, erect water-works there, making a basin on the Hill, then owned by my father, and the adjoining property, now Laurel Hill Cemetery, and convey the water through an aqueduct down to the city. There was much opposition to this, and a newspaper

war on the subject, but finally the City Councils took the subject into consideration, and appointed a committee of inquiry to view the ground, &c. This committee reported that it was altogether impracticable to bring the water so great a distance through an aqueduct, and so far the matter ended; but Mr. White began "De Novo," and started in the same way, through the papers, the idea of purchasing the water-power at the Falls, and erecting the dam at Fairmount, which, through much opposition, finally prevailed, and I have always considered Josiah White the originator of the Fairmount Dam and Water-Works. There had been used previously, two antiquated steam-engines for raising the water, using wood for fuel.

White & Gillingham received from the city for their water power and improvements, at the Falls, some one hundred and sixty thousand dollars; and now Josiah White, smarting under his treatment by the Schuylkill Navigation Company, in company with Mr. Hazard and a German gentleman, Mr. G. F. A. Haute, procured from the Legislature, March 20th, 1818, "An act to improve the river Lehigh," out of which grew the present Lehigh Navigation Company, of which he was one of the active managers until his death, November 14th, 1850.

Now I ask, if I have not shown good reasons for saying that I knew of no man to whom the citizens of Philadelphia are so much indebted as they are to Josiah White for substantial benefits they have long enjoyed. First, we see him, in company with Mr. Hazard, making experiments with the anthracite coal, and succeeding in bringing it into practical use in the rolling mill; next, in successfully contriving grates to make it applicable for domestic use; then starting the Schuylkill Navigation Company, to bring down a supply; originating the idea of the Fairmount Water-works, resulting in giving to the citizens of Philadelphia such a cheap and plentiful supply of water as they never dreamed of before; and finally, originating the Lehigh Works. The warrior who slays thousands of his fellow creatures is lauded and glorified; high monuments are erected to his memory, on which are emblazoned his deeds of blood; but the modest, plain, unassuming citizen, who does so much good for his fellow men, and who neither seeks or covets notoriety, sleeps his last sleep comparatively unnoticed and unknown; but the day will come when all now living shall have passed off the stage of existence; when the future historian who shall look into the facts that I have imperfectly detailed to you, here, and comparing them with the results, in his own age, will place the name of Josiah White where it justly belongs, alongside of other benefactors of his race.

As an evidence of how far the coal operations have transcended the wildest anticipations of those days, when White, Hazard and Haute procured their act for improving the Lehigh, they had previously procured a lease for twenty-one years on all the coal lands in the neighborhood of Mauch Chunk, an immense tract of country, for which they agreed to pay annually a rent, if demanded, of one ear of corn, and obliged themselves, after a certain time, to bring down to the city, for their own benefit, 40,000 bushels of coal, less than 1500 tons. In the year 1854, according to the report of the Lehigh Company for that year, a copy of which I happen to have, there came through the Lehigh

White & Hazard were using, in their rolling mill bituminous coal; they knew of the large body of anthracite at the head of the Schuylkill, and early commenced making experiments with it. They had some brought down in wagons, at an expense of one dollar per bushel, twenty-eight dollars per ton, expended a considerable sum of money in experimenting, but could not succeed in making it burn. The hands working in the mill got heartily sick and tired of it, and it was about being abandoned, but on a certain occasion, after they had been trying for a long time to make it burn, without success, they became exasperated, threw a large quantity of the "black stones," as they called them, into the furnace, shut the doors, and left the mill. It so happened that one of them had left his jacket in the mill, and in going there for it, some time afterwards, he discovered a tremendous fire in the furnace, the doors red with heat. He immediately called all hands, and they run through the rolls three separate heats of iron with that one fire. 89-3

Here was an important discovery, and it was, in my opinion, the first practically successful use of our anthracite coal, now so common. This important discovery was the simple fact that all that was wanted to ignite it was time, and to be "let alone." All this may appear strange, now, but the men employed in that mill, and every one else who used the bituminous coal, were accustomed to see it blaze up the moment they threw it on the fire; and because the anthracite would not do so, they could not understand it, and the more they scratched and poked at it, (an operation necessary with the bituminous coal, the worse it was with the anthracite.

Upon making this discovery, Josiah White immediately began to make experiments in contriving various kinds of grates, to make the anthracite applicable for domestic use, in which he finally succeeded to admiration.

With the knowledge thus obtained, it became a very great desideratum with White & Hazard to obtain a sufficient supply of this coal for their use; for they discovered, also, that it was much better for their purpose than the bituminous coal in its effects on the iron for making wire. They thought of various plans, one of which was curious: it was to build a number of sheet-iron boats, not to draw, when loaded, more than ten inches of water. These boats were to be made in nests, one within the other, like pill boxes, and carted up to the coal regions. They built a small one, and Mr. Hazard taking two men with him, (one of whom, William Young, is, I believe, still a resident of Manayunk,) and started in it for the mountains. The object Mr. Hazard had in view, was to explore the river and make some estimate of the expense at which, by some simple contrivance, they could insure at all times ten inches of water. He arrived at the coal regions, built a kind of ark, and loaded it with coal; other arks were subsequently built, and came down in the freshets. The iron boat plan was abandoned, principally for the reason that Josiah White, about the same time, started and originated the Schuylkill Navigation Company, which was chartered March 8th, 1815. This was another of the beneficial acts of Josiah White, but mark how shabbily he was treated. He was the father of the whole concern—one of the Commissioners named in the Act of Incorporation; and if they had hunted Pennsylvania through, they could not at that time have found a better man for their purpose; yet, notwithstanding all this, at the first election held at Norristown, they refused to elect him one of the managers, on the ridiculous and flimsy ground that he was interested at the Falls of Schuylkill; but we shall see the consequence of this directly.

As an evidence of the utilitarian character of Mr. White in everything he undertook, at the time he was starting the Navigation Company, he drew with chalk, on one of the large beams or girders of his mill, a plan of his proposed works along the Schuylkill, and under it wrote, "Ten dollars in every man's pocket;" meaning, I suppose, that that sum would be saved to every one in cost of fuel, when we could get coal down the river. At that time wood was the universal fuel, and was annually getting scarcer and higher in price.

Mr. Erskine Hazard was the partner of Josiah White in the iron and wire business. In the erection of the locks and mill seats, at the Falls, he had another partner, Mr. Joseph Gillingham. They furnished the canal and locks on the western side of the river; and two mills were erected there, one a saw mill, the other for manufacturing white lead. On one of the occasions of the breaking down of the Falls bridge, White & Hazard erected a curious temporary bridge across the Schuylkill, by suspending wires from the top windows of their mill to a tree on the western side, which wires hung in a curve, and from which were suspended other wires, supporting a floor of boards eighteen inches wide. The length of the floor of this bridge was four hundred feet, without any intermediate support. I am not certain of the fact, but my impression is, that this was the first wire

Ans. About sixty days every year on an average. 89-1

Ques. Suppose the Canal Commissioners or General Government would rent water from the canal for power to drive machinery, let the quantity be ever so small, would it not sometimes happen from the contingency of extreme low water, repairs and cleaning out the canal or from sinking vessels in the same become necessary to draw off the water, and that power could not be furnished for any purpose whatever?

Ans. Yes, this often is the case; this last reason the water was shut off from the canal nearly three months.

Ques. Do you consider it possible, by any mechanical device or water motor, to maintain a constant power and supply of water for the city of Louisville from the Falls, without the aid of a steam engine as a substitute for water power during high stages of the river?

Ans. I do not. I know it cannot be done. I have no confidence in the resources of the Falls to obtain a constant and reliable power for any purpose.

Ques. Could you state any practical difficulties not mentioned likely to occur in taking a supply of water near the foot of the Falls for distribution through the city?

Ans. Yes. Speaking from my own experience with the canal, I apprehend there would be great difficulty encountered from the deposit of mud made by the eddy below the Falls, which is such, that the lower lock of the canal is filled with mud to the depth of ten and twelve feet after high water.

For the Press.] 89-2
THE ORIGIN AND EARLY HISTORY OF
FAIRMOUNT WATER WORKS, SCHUYLKILL AND LEHIGH NAVIGATIONS,
And the Introduction of Anthracite Coal.

BY CHARLES V. HAGNER.

* * * * * On the 9th of April, 1807, Mr. Robert Kenedy, an enterprising gentleman then owning and occupying the Falls Hotel, obtained from the Legislature of Pennsylvania an act vesting in him the right of the water power at the Falls of Schuylkill, on the condition of building locks for the accommodation of the boats then plying on the river. These boats were long and narrow, sharp at both ends, and carried from sixty to one hundred barrels of flour; they were generally manned with five men, and were only used in freshets or high water; most of them coming from Reading, they were called Reading or long boats. They required five men, not for bringing them down—but they drifted down rapidly with the current—but to take them back, which was done by the use of poles, shod with iron, and was very hard work; of course they could take no return cargoes. * *

* * * The act procured by Mr. Kenedy was altogether a speculation on his part, not intending to erect mills himself, and the right he had obtained was offered for sale; but, in consequence of the risk and danger from ice, no one would venture to build mills there. The ice freshets of those days were altogether different from now. The winters, it seems to me, were longer and colder, and before the present succession of dams were made on the river, the ice came down in immense large fields, with great momentum, and sometimes as much as three feet thick. It seemed to me that nothing could resist its force. I have seen a stone wall three to four feet thick against a bank, the earth behind being level with the top, torn to pieces like so many pipe stems. In consequence of this, Mr. Kenedy's speculation seemed likely to be a failure; but, not to be foiled, the following year, 2d of April, 1808, in company with Conrad Carpenter, of Germantown, he obtained an act of the Legislature incorporating a company to build a bridge over the Schuylkill, and so contrived its location that the eastern abutment should effectually protect his mill-seat, and he finally sold his right to Josiah White.

Here let me turn aside a moment to say something in reference to this Josiah White. I knew him well, and ever looked upon him as an extraordinary man—one of the most persevering, energetic, far-seeing men I ever knew, always pushing out ahead of the age in which he lived; not highly educated, but possessing a large amount of sound, practical common sense and enlarged views. I know of no man to whom the citizens of Philadelphia are so much indebted for certain substantial benefits they have long enjoyed. You will hear more of him as I progress in my remarks. * *

Shortly after Mr. White had purchased Kenedy's privilege, he proceeded to build a mill for rolling iron and making wrought nails, and subsequently took into partnership with him Mr. Erskine Hazard, and added to their other operations that of making wire. Their business was very profitable, and they soon discovered that their mill was too small, when they built another much larger and higher alongside of it, where they were doing a very profitable business, until both caught fire by accident and were destroyed; they were subsequently rebuilt. * * * * *