PAPER

IN

CHEMISTRY.

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The Thanks of the Society were given to Mr. WILLIAM PITT, of Pendeford, near Wolverhampton, for the following Paper, on converting the Smoke ariſing from Steam-Engines, &c. into Tar, thereby preventing annoyance to the neighbourhood, and obtaining a quantity of a very uſeful material.

SIR,

HAVING had occaſion to ſpend a good deal of time upon buſineſs, in the coal and iron works of this country; my ſituation amidſt the ſmoke of thoſe great works put me upon the idea hinted at in the 153d premium of the Eighth Volume of the Society's Tranſactions; namely, that of deſtroying ſmoke, in order to prevent annoyance to the neighbourhood.

That the object is not only attainable, will be demonſtrated in the following nar-

rative; but alſo that valuable articles of commerce may be produced in large quantities, whenever the proprietors of ſuch works ſhall adopt the mode of conſtructing their buildings proper for ſuch production.

The articles of commerce I allude to, are mineral Tar, Pitch, and Varniſh: there are already three conſiderable works erected on the banks of the canal in this county, for the purpoſe of converting the ſmoke of pit-coal into the above articles; the one at Mr. Wilkinſon's great works at Bradley, another at Tipton, and a third at the Level Colliery and iron works upon Dudley Wood: they were erected by Lord Dundonald and Co. and the buſineſs is carried on with ſucceſs.

Theſe Tar-works are erected in the vicinity of large iron and coal works: the iron maſters furniſh the Tar-works with raw coal, *gratis*, and receive in return the cokes produced by ſuch coal; and the proprietors of

of the Tar-works have the ſmoke only for their labour, and intereſt of capital.

The proceſs is conducted in the following manner: a range of eighteen or twenty ſtoves is erected, and ſupplied with coal kept burning at the bottom; the ſmoke is conducted, by proper horizontal tunnels, into a capacious and cloſe funnel, of one hundred yards or more in length; this funnel is built with brick, ſupported by brick arches, and covered on the top by a ſhallow pond of water, which pond is ſupplied with water, when wanted, by a ſteam-engine belonging to the coal or iron works; the chill of the water gradually condenſing the ſmoke, it falls upon the floor of the funnel in the form of Tar, and is conveyed by proper pipes into a receiver, from whence it is pumped into a large boiler, and boiled to a proper conſiſtence, or otherwiſe inſpiſſated into pitch: when the latter is the caſe, the volatile particles which ariſe during the in-

ſpiſſation are again condenſed into an oil uſed for varniſh.

In this proceſs the ſmoke is decompoſed and deſtroyed, nothing ariſing from the work but a white vapour from ſome ſmall funnels (kept open to give draught to the fires), and a ſmall evaporation of water from the pond, occaſioned by the warmth of the ſmoke within the funnel.

The proceſs requires but little attendance, the principal labour being that of ſupplying the fuel. In any one of the tar works the quantity of coal uſed is about twenty tons per day; three labourers, with a foreman, are ſufficient for the whole buſineſs: the quantity of tar produced will be about twenty-eight barrels, of two hundred weight and an half, in ſix days, worth ten ſhillings per hundred, or twenty-one barrels of pitch, of the ſame weight, worth fifteen ſhillings per hundred; though I was aſſured, upon the ſpot, by a very intelligent perſon,

perſon, that ſome coal is of ſo bituminous a quality, as to give one eighth its weight of tar: but the quantity above ſtated is about the average produce.

In order to bring the above practice within the Society's intentions, an alteration in the erection of ſteam-engines, furnaces, &c. muſt take place; the alteration will be no more than that of erecting them below ground, inſtead of above: and when raiſing water is the main object, an adoption of the forcing or lifting pump inſtead of the ſucking pump, or the ſucking pump may be ſtill employed, wherever the fall of ground gives an opportunity of letting off the water raiſed, by an aqueduct; in which caſe, the lift being ſhortened, and leſs power neceſſary, ample amends will be thereby made for the expence of ſuch aqueduct.

Such kind of buildings, from a low ſituation, within the earth's ſurface, will certainly acquire additional ſtability: and to thoſe who are acquainted with the trifling expence of

removing ſoil to only ſmall diſtances, the additional charge will appear trifling, and will be more than recompenſed by ſuch acquired ſtability. In ſome local ſituations, in hilly countries, the ſmoking works being erected at the foot, and the tar-funnel higher up the hill, a communication may be effected without ſuch alteration. Perhaps it may be right for the Society to offer a premium to the firſt perſon who ſhall erect a ſteam-engine, or other ſimilar work, upon this plan.

To prove the above idea is not ill-founded, I beg leave to report, that about three weeks ago, I particularly examined the Tar-work on Dudley Wood; and found the foreman of the work intelligent and communicative; and walking with him on the top of the Tar-funnel, obſerved a prodigious ſmoke ariſe from a ſteam-engine, about thirty yards diſtant, freſh fuel having juſt been added. When I put this queſtion, Would that ſmoke make Tar, if it paſſed into your funnel? he anſwered, Moſt certainly.

Would

Would your confining it there, prevent the fire burning below, ſufficient to do its office of working the ſteam-engines? Anſwer, Certainly not; as our ſmall funnels allow ſufficient draught to keep the fire burning, which draught we can increaſe or diminiſh at pleaſure.

I find by reports from other quarters, that ſucceſsful attempts have been made to make cokes of the coal employed in working ſteam-engines: the additional improvement of making Tar from the ſmoke, would not only prevent annoyance to the neighbourhood, but alſo apply to the beſt advantage every particle of that valuable and comfortable article, coal; prodigious quantities of which are at preſent waſted by being burned in one place for heat only, in another for cokes only; when, by due attention, both purpoſes may in many caſes be effected at the ſame time.

I was informed upon the ſpot, from undoubted authority, that the conſumption of coal

coal in Mr. Wilkinſon's great works, at Bradley, is one hundred tons per day: about one fifth of the ſmoke is actually employed in making of Tar; and the remainder, or the ſmoke of eighty tons per day, flies away. This, if collected, would yield upwards of eighteen barrels of Tar, of two hundred and an half each: and if the ſmoke of the great works of the kingdom was in general collected for the ſame uſe, what a prodigious addition would it be, to the production of a commercial and neceſſary article, which always finds a ready market, and will in many inſtances ſupply the place of the vegetable tar, at preſent imported from abroad!

That ſome idea may be formed of the conſumption of coal in ſteam-engines for raiſing water, I beg leave to report the following, of which I had certain information upon the ſpot; namely, that ſome ſuch engines individually conſume one hundred tons per week of coal; that others, though powerful,

powerful, with the improvements of Meſſrs. Boulton and Watt, are kept on with about twenty-five tons per week; and that the weekly conſumption varies between thoſe two quantities, viz. from twenty-five to one hundred tons.

The Tar works at preſent erected, are in an oblong form: it is probable, if the idea above deſcribed is adopted, a circular plan would be moſt ſuitable, ſomewhat ſimilar to the drawing annexed.

Explanation of the Plan.

A is the Steam-Engine, the baſe of which ſuppoſe thirty feet below the earth's ſurface.

B, B, the Tar-funnel, ſupported by arches, and covered with water; ſuppoſe the water fifteen feet above the earth's ſurface.

C, C, C, C, C, Area ſunk nearly as deep as the baſe of the building A.

D, Gang-way, level with the earth's ſurface.

1. 2. 3. 4. Funnels communicating from the main chimney to the Tar-funnel.

I am, SIR,

Your very humble ſervant,

WILLIAM PITT.

Pendeford,
Dec. 15*th*, 1790.

Mr. MORE.