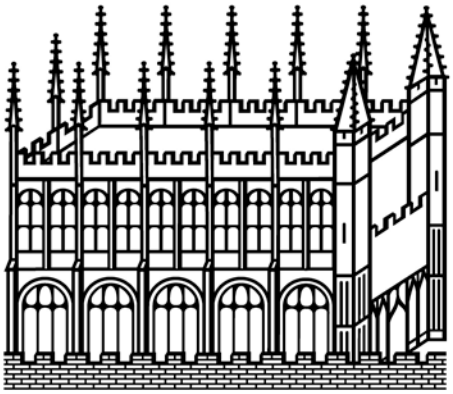

THE

"IRON QUESTION"

VINDICATED;

AND THE

REVIEWERS REVIEWED.

BY

AN OBSERVER.

"AUTHORSHIP, is according to the spirit in which it is pursued, an infamy, a pastime, a day labour, a handicraft, an art, a science, a virtue."—SCHLEGEL.

LONDON:
PUBLISHED BY HAMILTON, ADAMS, AND CO.
1857.


BIBLIOTHECA·BODLEIANA·

TO THE READER.

THE voice of BACON may be listened to with advantage on the importance of the *Arts*. "The introduction of noble inventions seems to hold by far the most excellent place among human actions. And this was the judgment of antiquity, which attributed divine honours to inventors, but conferred only heroical honours upon those who deserved well in civil affairs, such as the founders of empires, legislators, and deliverers of their country. And whoever rightly considers it will find this a judicious custom in former ages, since the benefits of invention may extend to all mankind, but civil benefits only to particular countries, or seats of men; and these civil benefits seldom descend to more than a few ages, whereas inventions are perpetuated through the course of time. Besides, a state is seldom amended in its civil affairs, without force and perturbation, whilst inventions spread their advantage, without doing injury, or causing disturbance." This is one apology which the writer has to offer, for intermeddling on the present occasion,—regarding inventions as a boon.

Another voice, on the subject of *Prejudice*—the voice of MONTAGU, proceeding from his inmost "Thoughts," may be attended to with profit. "Of prejudice it has been truly said, that it has the singular ability of accommodating itself to all

the possible varieties of the human mind. Some passions and vices are but thinly scattered among mankind, and find only here and there a fitness of reception; but prejudice, like the spider, makes everywhere its home. It has neither taste nor choice of place, and all that it requires is room. There is scarcely a situation, except fire and water, in which a spider will not live. So let the mind be as naked as the walls of an empty and forsaken tenement, gloomy as a dungeon, or ornamented with the richest abilities of thinking; let it be hot, cold, dark or light, lonely or inhabited, still prejudice, if undisturbed, will fill it with cobwebs, and live like the spider, where there seems nothing to live on. If the one prepares her food by poisoning it to her palate and her use, the other does the same; and, as several of our passions are strongly characterized by the animal world, prejudice may be denominated the spider of the mind." Having perceived prejudice strongly at work on the "Iron Question," the writer presents it as a second apology for his appearance. Should one cloud be dissipated from the face of the subject, his labour will not be lost.

THE

"IRON QUESTION" VINDICATED,

&c.

A RECENT publication by Mr. Joseph Hall, entitled "The IRON QUESTION," has been advertised and animadverted upon in several puplic journals; and owing to the conflicting character of the statements made, and opinions entertained, the present writer has been induced to enter the arena, with a view to break a lance on the occasion with one or two of his opponents, who seem disposed to proclaim themselves masters of the field. Though the "ENGINEER," the "MINING JOURNAL," the "MECHANICS' MAGAZINE," &c., will be repeatedly referred to, the opinion is far from being entertained, that the *conductors* of the several journals thus specified sympathize, in every instance, with the opinions expressed in their various columns; hence the necessity, under which they are frequently laid, of reminding their readers, by a note to that effect, viz., that they are not responsible for the opinions of their "correspondents;" taking care, for the sake of personal character and security, to add the cautionary remark—"Whatever is intended for insertion must be authenticated by the name and address of the writer, not necessarily for publication, but as a guarantee of his good faith." Generally speaking, that for which the conductors of public journals are responsible, is the leading article; to which may be appended, reviews of published works, in which, occasion is taken to direct public opinion. In any remarks, therefore, which may be made, no war is to be considered as waged with the journals referred to, but with the opinions occasionally expressed in their columns, by way of extract, or otherwise, by whomsoever asserted

or advocated. To the credit of the periodical press, its pages and its columns are thrown open to both sides of a question,—the Editor, as prudence may dictate, stepping in occasionally to strike the balance, and thus show in which scale the weight of argument preponderates. And it is only by an administration of this character, that error can be corrected, public morals improved, art and science advanced, commerce enlarged, &c., in which the masses find their elevation and protection, and therefore, their interest.

It is amusing, at the same time, to contemplate, in consequence of the latitude thus given to thought and expression, the several interests at work,—the motives, the promptings, the shufflings, the reasonings pro and con, the clashings of testimony, the force, the weakness, the sarcasms, the laudations, the affirmations, the denials, and opposite influences jostling their way through the whole;—the first review, or what else, occasionally, like a key note, directing the more timid and less discriminate how to pursue their strain: and it is not a little extraordinary to find a solitary opinion or review, exercising an influence over a mass of readers to which it is very often unentitled. Oliver Cromwell, after the lapse of a couple of centuries, is just coming to his proper *status* in public opinion, through the instrumentality of Carlyle and others.

The following remarks, which may be characterised as "jottings by the way," are the result of a perusal of the periodicals in which the "IRON *Question*," by Joseph Hall, has been noticed, and may be taken—as all other things are taken—for their worth. There is nothing, except truth and "fair play," at stake.

One writer twits Mr. Hall on "the comprehensive title" he has given his work—that of "THE IRON QUESTION."* In what is the absurdity, or where the ground of objection? Mr. Hall does not profess to furnish a HISTORY, but to take up a *question:* and the same subject may involve a thousand questions, while one question may determine a particular subject. But even on the ground of history, the subject may either be local or general,—being equally appropriate, whether applied to a town, a county, a nation, or the

* Quoted in the Engineer; the periodicals are generally for Feb. and Mar. 1857.

world: and as to the less extended application of the term, Mr. Hall —notwithstanding the sneer conveyed in the "fifty-three large size pages of bold type"—has given a narrative, nay, a history of the entire process of making the best malleable iron by "pig-boiling" —commencing with the mineral brought to the surface of the earth, and terminating with the properly manufactured article, after describing its several processes, by finally placing it in the hand of a mechanic to be applied to the various purposes for which it may be required. Mr. Scrivenor, in his professed and valuable "HISTORY of the IRON TRADE, from the *Earliest Records*," had, from its recent issue, rendered any attempt of the same kind unnecessary, whether by Mr. Hall, or any other person, however competent to the task; but as Mr. Scrivenor had not dwelt upon the "pig-boiling process," with any particularity or special reference to its inventor, it became, as a desideratum, the more necessary for Mr. Hall to supply the lack, by furnishing a detailed account of it, in order to fill up a niche in the work of the general historian. Had some verbose writers taken the subject in hand, "fifty-three" pages might possibly have comprized too small a space on which to expand the gold-beater's leaf, or, say, the sheet-iron.

"The Iron Question," is a sentence certainly sufficiently comprehensive; but it is no less simple in its construction, and intelligible in its meaning. It is yet a *question*, and open to discussion. Having read the work animadverted upon, and formed an opinion on the subject, some anxiety was felt, as to the opinions of others, to see how far they quadrated with my own. Dr. Johnson's test, as to the value of his own works, is not to be slighted; having intimated, that they rose in his estimation in proportion to the outcry made against them, in so far, as the reviews and critics, in proportion to their number and intensity, went to establish the fact, that, as an author, he was of sufficient importance to attract attention. The Doctor is correct in the main. The man who leaves no trace of his footsteps on the sand, gives no proof that he has been there—if even of his existence; and it is no less true, on the imprint being perceptible, and others being seen in the act of

tracking him, that he is considered game, and so far worthy of pursuit, whether for good or ill.

It operates somewhat against a man, when he suffers himself to get out of temper, as seems to be the case with one of Mr. Hall's opponents, who states, that "the Bessemer process is evidently a thorn in his [Mr. Hall's] side—that weary gnat which is depriving him of all his peaceful enjoyment."* How so? In dealing with "Mr. Bessemer's process," as the title of his work shews, which is quoted by the writer himself, Mr. Hall is not found wandering from his subject. What has he, it may be asked, advanced beyond stating, that "Bessemer's process," has proved a failure? And what has he stated in this, which he has not established by his own experience, and various tests made by others, as to its real merits? He has not, in this, exceeded the reviewer himself, whose language is,—"Mr. Bessemer may have been premature; we believe he was; and if we are rightly informed, he believes so himself." More than enough, as a justification of Mr. Hall. But why should Mr. Bessemer be deemed a "*thorn* in the side" of Mr. Hall, more than in the sides of others, who, at some expense, have tested his "process" and found it valueless? Mr. Bessemer is no competitor of Mr. Hall. Mr. Bessemer is out of the market; his process is useless. Mr. Hall has as little to expect, as to fear from him. Whence, then, the *animus* of the writer, who professes to *review* the work,—coming forward with majesterial parade, ecclesiastical dignity, the editorial authority of "We?" "It is just possible," says he, giving a significant hint to commence the onslaught—"It is just possible our contemporary, the Examiner, (who *suffers* with us,) will answer for himself; but if so great a man [referring to Sir Isaac Newton] as he believed in the occult science, surely we are not very blameable for placing a little faith in poor Mr. Bessemer." From hence, it should seem, that he (or say "we") has been taken to task for permitting himself to be led off by Mr. Bessemer, and placing "faith" in a process from which he now wishes to slink away; and allowing something like

* Engineer.

affinity, if not identity, to ooze out, between himself and the writer referred to, in a former number of the same work, he evidently feels himself aggrieved, and so, as a *sufferer*, makes an attempt to balance an old account. It is easy to perceive, that Mr. Hall has proved a "*thorn*" in his own side, and that Mr. Hall is the "*weary gnat*," which, like a horse-fly, has teazed him, by dipping into the sores of his own flesh, from the time that he first saw himself in print in the work in question. How does this bear upon the *Review* of Mr. Hall's work, on the score of *impartiality?* When a man is out of temper, it generally happens that he is no less out of argument; and when he cannot keep his own counsel, he must prepare himself for exposure.

The work which he professes to *review*, in the spirit, of course, which he has brought to it, is thrown aside with an air of superiority, mingled with contempt and sarcasm. "Of the book itself," says he, "as a literary production, we shall abstain from criticism, for it is beyond it; but though we are prepared to expect little from a gentleman who, after a half a century of pig-boiling, turns to book-making; we regret, for his own sake, that Mr. Hall did not confide his MS. to some judicious friend, able and willing to prepare it for publication.* This is echoed by another reviewer, who appears to have taken his cue from this source: "Mr. Joseph Hall," he observes, "will add but little to his success [referring to trade] by the publication of this ill-conceived, ill-executed, and ill-destined book."† "O," said the first of these reviewers, "I have disposed of Mr. Hall's work in another way." Marvellous to state, these writers, instead of passing the book unnoticed, or dismissing it with a single paragraph, each has honoured it with a formal "Review;" the one embracing a folio column and three quarters, of close, small type, and the other with from four to five octavo columns, of still smaller print. Contempt and sarcasm are cheap commodities in literary warfare. They are less expensive than argument, and sooner resorted to than matter of fact. Besides, one literary mendicant can pour contempt upon another as ill-clothed,

* Engineer. † Mechanics' Mag.

and as ill-fed himself, without the one being depressed or the other exalted. It is a game at which two can play, without the one or the other establishing his character as either a skilful tactician or an adept in logic.

With what different eyes will two persons look on the same painting; nay, on the same book! Mr. Hall's work is eulogized in the "NEWCASTLE COURANT,"* for the clear, manly sense which it displays; the writer in the "ENGINEER," professing superior intelligence, and after writing an elaborate review of it, closes his critique with the following summary of its character, *italicised*—"*There is nothing in it.*" Here is a reviewer, who, while he professes to criticise others, shews his superior wisdom, by taking upon himself the impossible, and therefore, unprofitable task of proving a *negative;* reminding his readers of the absurdity of those who set themselves to work to "prove there is no God"—a work much more difficult than to prove that there *is*. The subject, of course, recoils upon the enlightened reviewer himself:—From Nothing, take Nothing, and Nothing remains! Where is the gentleman now? and where his elaborate critique on a work "beyond" criticism? "Emphatically," in his own language, "*there is nothing in it;*"—nothing, either in the critique or the censure.

Not only is Mr. Hall's book so contemptible, as to be "beyond" criticism, while devoting so much critical attention to its pages, but the reviewer, after furnishing a long extract, distinguished for plain, common sense, says, "If our readers understand this, they are much cleverer than we are."† Possibly so, without any great compliment to the readers. A person once accosted Dr. Johnson with, "Sir, I don't understand you." "I have furnished you with an argument," returned the Doctor gruffly, "I am not obliged to fur-

* "The work is distinguished for openness, manly sense, and candour; and though the writer is capable of sporting a touch of dry humour where he is confident he is in possession of the mastery over mere speculatists, he observes in his preface—and his general remarks bear him out,—that 'He merely states as a practical man, what he has found most advantageous to himself in the manufacture of iron, and leaves others to adopt, decline, or discard, as judgment may direct.' Any one, however, adopting his plans, and prosecuting his processes, which are laid down with great precision and graphic force, will be certain to find the good results."

† Engineer.

nish you with an understanding." The reviewer will, perhaps, have met, in the course of his reading, with the account of the philosopher's wife, who complained that the house was dark, when it turned out that she herself was blind! Without presuming to place the reviewer in the position of either the Doctor's interlocutor, or the philosopher's lady, he may be reminded of an old proverb, which affirms, that "No one is so blind as the person that will not see." But the extract happens to be the one in which the writer in the "ENGINEER" is taken to task, and in which he associates himself with the "EXAMINER," sympathizing with him as a *fellow-sufferer!* The film which covers mental vision, and of which he complains so heavily, is not quite so thick, as to render it necessary for him to consult his readers in the capacity of oculists; for it seems, though his word is not to be depended upon in this instance, that he really does "understand" something about the selected passage, his *sufferings* having helped his vision, and quickened his intelligence. The old proverb, despite of ourselves, obtrudes itself upon our recollections. The "special notice" of Mr. Hall, and of which the writer so piteously complains, shews that the "*thorn*" is still rankling in "his side," and that the "*weary gnat*" is still gnawing his spirit; and some sympathy ought to be extended to a person under torture,—some little allowance for any extravagance in the form of expression: for though, of the book, it may be said, "emphatically—*there is nothing in it,*" we all know there is something *real* in *suffering*. However, when the pangs are off,—when agony subsides, we naturally wind round again to something like composure. Thus it is with the reviewer, who, in his last paragraph, observes with unusual complacency, as "in a lady's letter the choicest moral [moral?] lies in the postscript, so in Mr. Hall's *brochure*, the only really practical information lies in the Appendix, but this is accounted for by the fact that it is nearly all quoted matter."* There is wit in the "lady's postscript;" what a pity that it were not his own; but it is "only quoted matter." It has, however, helped him to a thought; and

* Engineer.

the only pity is, that he should have broken down under its weight. The "brochure" with which Mr. Hall favours his readers is "nearly all quoted matter;" but then, the "Appendix"—this "brochure," is replete with "practical information!" No bad compliment—though unintentional on the part of the reviewer—to the taste and judgment of a muddy-headed writer, to be able to make such judicious selections! The truth will slip out. Compliments fall upon a man from quarters he least expects.

"If Mr. Hall," states the same writer, "be not possessed of the lust of wealth, he is not free from that which belongs to the same genera—*the greed of reputation.*"* The last sentence is italicised, like "nothing in it." As unusual attention is invited, the call is obeyed. The reviewer, however, as in other cases, forgets himself, and neutralizes that which he has evidently prepared as a sparkling beverage, and with a view to be more than usually grateful to the palate. "It must be something terrible to a man," he remarks, "to feel that, after fifty years spent in close application to his trade, the maintenance of his repute as a skilful manufacturer necessitated, or in any way depended upon the publication of a book like this." It must be confessed, from these two extracts, that the case of Mr. Hall is somewhat extraordinary. After "fifty years close application to trade," during which period, it is not even insinuated, that he ever once attempted to steal into notice to attract public attention, he, all of a sudden, bursts forth from the chrysalis in which he had been wrapped, like an insect, in the pupa state,—though in the decline of life, when the grasshopper becomes a burthen to man, to flutter and bask in the sunshine of popular applause! Surely, "*the greed of reputation,*" had it acquired any degree of strength, would never have slumbered half a century without waking into consciousness, and peeping out at some odd crevice or another. The "*greed*" of a miser, a swindler, a gamester,—makes its appearance long before such a length of time has expired. The "ruling passion," said to be so "strong in death," is certain to reveal itself in the hey-day of life. How was it, that

* Engineer.

Mr. Fairbairn, who was in quest of the inventor of the "pig-boiling process," and to whom the "History of the Iron Trade" was so familiar, did not, from some quarter or other, hear of one Joseph Hall? He would have heard, if Joseph Hall, like many ill-savoured poppies, had been flaunting about the country, and blazoning forth his own praise, eaten up, meanwhile, with "*the greed of reputation.*" While, thus, by one writer, charged with "the greed of reputation," another enquires, in the spirit of reprehension, if Mr. Hall's "discoveries were made so far back as 1816, or forty years ago," why did he not make the "announcement of them till 1857?"* Mr. Hall might here refer the reviewers to the Fable of the Old Man, the Boy, and the Ass; for whether the bipeds carry the quadruped, or the quadruped the bipeds, it is equally difficult to please.

Strange to state, while one turns his readers over to Mr. Hall's work, to endeavour to filch out the meaning of that which is unintelligible to himself, and the other characterises it as badly conceived and executed, dooming it to a bad end, both, with whetted appetite, are hungering and thirsting for more. Mr. Hall, after having stated, with great minuteness and perspicuity, the different stages of his process, and various experiments, arrives, at length, at a point where he is brought to a pause, without allowing the intensely curious to have the full benefit of his practice, by a peep behind the scene. The reader, nevertheless, is led steadily on through so much of the process as to be able to produce a good, tough, malleable iron: but still the impression remains, that, though good iron, it is not *the* iron for which the Bloomfield Works are famed. This is very vexatious, and is so felt by both reviewers. "We are not aware," says one, "that it is necessary to publish a book, to proclaim the discovery without explaining the process. If, however, Mr. Hall be one whit the happier for it, by all means let him experience all the enjoyment and all the advantage which the discovery can yield him."† Then follows the echo; "We look in vain for a description of the method by which

* Mechanics' Mag. † Engineer.

any one quality may be developed. A perfect mystery is maintained as to the means employed."* Is it correct in either statement, that Mr. Hall has avoided "explaining the process," and that persons may "look in vain for a description of the method by which any one quality may be developed?" And yet, while nothing is done in the shape of discovery or development, he is charged by the one with a "boastful trumpeting anent certain discoveries he believes he has made,"†—discoveries which he not only believes in, but by which he has actually "been enabled to tie up cold iron" into a knot; the other declaring, that, as "a practical man," he is, "throughout the whole of his pages, profuse as to what *he* can accomplish in the way of iron making, and of his wonderful dexterity in producing any desired quality!"‡ Whatever may be the statement of Mr. Hall, he throws open for inspection the qualities produced. This is all very good: but these writers, incomprehensible as Mr. Hall is, and defective as are his conception and execution, they wish to become as wise as himself,—as practical as himself,—to enrich themselves by his discoveries,—to be able to compete with him in the market at his own expense!! Is that the wish? All that need be said is, that he would be a fool for his trouble, unless paid for it; not to say, that they demand from him, that which they themselves would, in all probability refuse, were they in his position.

Mr. Hall's "book would not have been written," it is affirmed, "had it not been that Mr. Bessemer threatened to compete with him, and deprive him of that *éclat* which he had enjoyed for so many years as a practical iron-maker;"§ and then follows the echo; "we cannot possibly be mistaken, in assuming that the Bessemer Process has been introduced into the title-page, simply in order that public attention might be drawn to Mr. Hall's little effort;" adding, "and certainly the attraction was by no means unnecessary."‖ Admitting the fact, Mr. Hall is involved only in the condemnation in which the writers themselves are involved, inasmuch as their reviews "would not have been written, had it

* Mechanics' Mag. † Engineer. ‡ Mechanics' Mag. § Engineer. ‖ Mechanics' Mag.

not been that" Mr. Hall had written; a condemnation in which thousands are involved, for thousands of volumes would never have appeared, had it not been for the pretensions, claims, errors, calumnies, and even discoveries of their predecessors or contemporaries. If Mr. Hall had "enjoyed" for so "many years," "*éclat*" so savory, "as a practical iron-maker," as ceded in the statement, he, certainly, as a *practical* man, had the less to fear, in the sympathetic language of the same writer, from "poor Mr. Bessemer" as a mere *theorist;* as well might a person, flush of capital, stand in awe of a mendicant. And as to the finding it "necessary" to bolster himself up with the name of Mr. Bessemer, who, by the way—though unsuccessful—is to be praised for his enterprising efforts, he was in a much less necessitous position than those who have prompted and aided in writing the review in the Mechanics' Magazine, mounting Mr. Henry Cort on the back of Mr. Hall, with the evident intention to aid the Cort Testimonial, at his expense, though one of the subscribers; a somewhat singular mode of manifesting grateful feeling. Complaint is made, at the same time, of so little being said of Mr. Bessemer in the body of Mr. Hall's book. The latter, it will be seen, has given an opinion; avoiding unnecessarily to enlarge, with a liberty to add the opinions of others in the Appendix, to show that he did not stand alone; thus giving additional weight to his own testimony. Any one curious in these matters, may be referred to Mr. Timbs, in whose work,* every thing pro and con will be found stated, sufficient for a cursory reading.

It is to be regretted, that so much time is necessary to expose the *animus* of the reviewers referred to; but it only tends to show how vulnerable they are in other quarters, in thus permitting themselves to be so influenced, and in consequence of such undue influence, to place themselves in such a position.

"Mr. Hall," it is remarked, "claims, page 91, to be the originator and inventor of the *principle* of boiling iron. He mentions 'principle,' but he means the process of boiling iron—for how can

* Year Book of Facts. † Mechanics' Mag.

a man invent a principle?"† While the writer professes to correct one error, he places himself in the pillory, by committing another. He refers to "page 91." Who can tell whether he is correct in his quotation? The book, including Appendix, comprises only 74 pages. Now, it is as easy for Mr. Hall to "invent a principle," as for the writer, by any torture of the inventive faculty, to prove that 74 is equal to 91. But giving him the benefit of his detection; if a man is not to have the credit of *inventing*, he may be allowed the merit of *discovering* a "principle;" and discovery to him, in its beneficial results, is equal to the act of invention. An undiscovered country, though in actual existence, like a principle, will afford as little footing as sustenance, till found; and not a little credit is due to the navigator and the traveller—say a Columbus and a Cook, a Park and a Livingston, who lay claim to such discoveries for the benefit of themselves and others. Mr. Hall, without doubt, claims the credit of originating the "pig-boiling process," as established in his work; a claim ceded to him by the first iron-masters in the kingdom, and can adduce living witnesses to attest the validity of it, as to the time and place of invention.

Appended to a long "extract from the patent of Cort of 1784," it is observed, "Here then we have Cort the inventor, among other things, of the boiling process. The description of the process is so graphic, that no one acquainted, ever so slightly, with iron manufacturing, can confound it with the puddling process. The words '*ebullition*,' '*effervescence*,' cannot by any sophistry be made to refer to puddling refined metal."* Had the reviewer himself, to employ his own language, been "ever so slightly" acquainted with the manufacture of iron, he must have known, that there was never any iron made, whether in the reverberatory or air furnace, even on the dry-puddling process, and sand bottom, without *ebullition*, *effervescence*, or what the workmen denominate —which amounts to the same thing—*fermentation*. But it does not necessarily follow, that it means what is known by pig-boiling. Any person maintaining such a position, would be scouted by the

* Mechanics Mag.

meanest boy employed in the manufacture of iron. In all melted metal for puddling, there must of necessity be *ebullition:* if so, then Cort himself is stript of his laurels, for metal was melted, and, of course, gave forth signs of ebullition, thousands of years before he was born; not altogether as guided by the judgment of the workman, but *naturally*, as an *effect* produced by a certain *cause*—the presence of *fire*.

An intelligent writer, who calmly and dispassionately views both sides of the subject, observes, "Mr. Scrivenor, in his *History of the Iron Trade*, published in 1854, describes Mr. Cort's process of puddling, and speaking of the iron when raised to the greatest heat during the process, says—'The hottest part of the iron now begins to heave and swell, and emit a deep blue lambent flame, which appearance is called *fermentation;*' and after the process has proceeded somewhat longer, 'the iron,' he says, 'is at length brought to the consistency of sand;' a description which cannot possibly be mistaken for the boiling process; whilst what he terms *fermentation* might, without any straining of language, be described as 'ebullition or effervescence.' He goes on to state that this process was found not to succeed till Mr. Homfray adopted the plan of first melting the pig-iron in fineries by coke, which is the process Mr. Hall claims the merit of dispensing with. Although Mr. Scrivenor only slightly alludes to the process of 'puddle-boiling,' and does not appear to have very correctly estimated its importance, he distinctly recognizes it as a process distinct from, and subsequent to, not only the discovery of puddling by Mr. Cort, but also the adoption of the refinery, which was necessary to render Mr. Cort's invention practically available."*

In "dry-puddling," the metal, *after* ebullition, effervescence, or fermentation takes place, is then, in the language of Mr. Cort's specification, "moved about through apertures by means of iron bars and other instruments fitly shaped, in the bason of the puddling furnace," which "operation is continued in such a manner as may be requisite during the remainder of the process." This

* Mining Journal.

operation is styled "*drying the iron,*" by the workmen, through which nearly all the foreign impurities are amalgamated instead of being thrown off; nor can it be otherwise by such process,—the desired effect being only to be accomplished by combustion at a given temperature of heat, by *pig-boiling*. Here we have the difference between the two processes, together with their separate effects; and this difference is sustained by the fact itself of Cort being reduced to the necessity of resorting to the refinery, to enable him to perfect his process, which refinery, so essential in his case, is unnecessary in that of Mr. Hall, in reference to *pig-boiling*. Could Mr. Cort,—can any of his supporters, bring together heat, oxygen, and carbon, and by such process, without the manipulation of the workmen, produce tough, fibrous, malleable bar-iron? If so, let them shew it; and then will be decided at once the question of difference between *dry-puddling* and *pig-boiling*.

Great stress is laid on Mr. Cort's specification of 1784, as to his asserted claims, but the writer already referred to, in the MINING JOURNAL, very properly remarks, "that the insertion of a claim in a specification can never be admitted as evidence that the result was really attained for practical purposes by the inventor. Mr. Bessemer claims to produce malleable iron from pig-iron by a single process, without the employment of manipulation or fuel, and because this claim appears in his specification, is it to be said that any future patent inventor who may hereafter achieve this result, in whole or in part, will be entitled to no claim to merit for his invention, because Mr. Bessemer had previously specified a patent for the accomplishment of the same object? If the claims of patentees were in all cases represented by corresponding practical inventions, what extraordinary wonders would human ingenuity have achieved, and how rapid would be the progress of the human race in the arts of civilization. Mr. Cort's specification, not only claims for making iron from the pig, but equally, and first in order, 'for preparing, manufacturing, and working of iron *from the ore;*' and is it to be said that this has yet been accomplished by any practical process of puddling without the use of 'any blast?' To

ascertain what any inventor has really achieved, we must look to the practical results, and not to the claims inserted in his specification."* Mr. Richard Cort, and his well instructed friend, the one in the MINING JOURNAL of Feb. 28, and the other in the MECHANICS' MAGAZINE for Feb. 28, both of whom, as by concert, insert the same lengthened extract from the specification, and employ it for the same purpose, are welcome to all the aid the above remarks will afford their cause.

The advocates of Mr. Cort, are no less at sea on the subject of the refinery. "Though the refining," it is remarked, "was considered an improvement on his [Mr. Cort's] patented mode, the use of the finery does not dispense with his reverberatory furnaces."† Who ever said it did? But that is not the point. The question is—What would Cort's process have been worth without the refinery? His furnaces, as then constructed, and left by him, when patented, were not capable of enduring the intensity of the flux and heat, necessary for pig-boiling. The writer is anxious to impress his readers with the notion, that all that Mr. Hall has "done has been in the way of carrying out Cort's original great discoveries."‡ The fact is, his "discoveries" were useles without the refinery. How stands Mr. Cort here? So far as dry-puddling on a sand bottom is connected with them, they were of no real value, and only made available for any useful purpose by the skill of another,—by Mr. Samuel Homfray, of the Penydarran Iron Works,§ who, it is reported, was assisted by one of his workmen, of the name of Matthews, a native of Staffordshire; thus completely severing Mr. Hall from Cort, without being indebted to his discoveries for the smallest assistance.

"With respect to the expression employed in the specification," says the writer "to whose judicious remarks reference has already been had, that 'the whole of the above part of my method and process of preparing, manufacturing, and working of iron *is substituted instead of the finery*,' a little enquiry will shew that this

* Mining Journal. † Mechanics' Mag. ‡ Mechanics' Mag.
§ Scrivenor's History of the Iron Trade.

cannot possibly refer to the refinery, which the process of 'pig-boiling' dispenses with, and the origin of which is subsequent to the time of Mr. Cort. Before he invented the process of puddling, pig-iron was converted into bar-iron by means of a refinery, in which charcoal was used as fuel, and a blast was employed. Through this refinery the iron had to pass twice, and sometimes three times, according to Scrivenor, before it was sufficiently malleable to be worked. It was this refinery which Mr. Cort's method of puddling was to be a substitute for, and not the refinery which was subsequently introduced by Mr. Samual Homfray, in order to carry out that process effectually."*

The same writer is equally explicit on the furnace, to which reference is made in one of the above paragraphs, stating, "The process of 'puddle-boiling,' on account of the extreme heat to which the metal is raised, cannot be conducted in the furnaces which were in use long after Mr. Cort's death. The sand bottoms of those furnaces, as well as the sides, would be destroyed by the excessive temperature attending that process; and Mr. Hall's great difficulty in carrying out this system arose from the necessity of constructing a furnace which was capable of withstanding the effects of that great heat connected with this process. Yet Mr. Cort says not one word about any improvement in the construction of the furnace, which is an essential element in the successful adoption of this process."

In his closing remarks, which are as excellent as they are candid, he observes, "To sum up the question in a few words, it appears that Mr. Henry Cort invented the process of puddling, which he believed to be sufficient to effect the conversion of pig-iron into malleable iron, without any other process, but experience proved that this method was in itself unsatisfactory, until an intermediate process, to which the old name of refining was applied, was introduced; and this double process, effected by the refinery and the "dry-puddling' furnace, prevailed for many years, until Mr. Hall, by dint of careful observation, sagacious experiment, and unflinch-

* Mining Journal.

ing perseverance, succeeded in realizing Mr. Cort's original idea of producing malleable iron direct from the pig by a single process of puddling. But it is perfectly clear that the invention, as Mr. Cort transmitted it to the country, required the refinery to supplement it, in order for it to be of extensive practical benefit, and that the full realization of his conception required another inventor. —To this merit Mr. Hall lays claim, and a very different class of facts and arguments to those advanced by Mr. R. Cort must be adduced before his title to that degree of merit can be invalidated."*

What Mr. Henry Cort "*might*" have done, is not a subject for speculation. Our business is with what he *has* done, and with what Mr. Hall is entitled to, in the shape of merit; merit of which some seek to deprive him, and to whose productions it is necessary to return.

When it is stated, that Mr. Hall "attempts to usurp the invention of the boiling process—a process so fully described in Cort's specification—is anything but creditable to him,"† it involves a charge which in no wise affects his reputation. The difference between Cort's process, as described in his "specification" as will have already appeared, and that described by Mr. Hall in his work, will not admit of an analogy, either as to *mode* or *result;* and if the question resolves itself simply into the fact of "boiling," why then, as already stated, it belongs to neither, as it has been found impossible, in any age of the world, to make iron without melting the metal. In short, if "boiling" embraces the whole, the *water* boils in the tea-kettle, as well as the *metal* in the furnace. But it is not simply the "boiling process," by which people are to be deceptiously drawn into the persuasion, that Messrs. Hall and Cort are one in operation. They are as wide apart from each other as east and west in position, and as the winds blowing from the east and the south, as to operation and effect, the one withering and destructive, the other cheering and fructifying;—the one "dry pig-puddling on the sand bottom," requiring the refinery, like warmth from the south, to render it at all useful, and the other "pig-

* Mining Journal. † Mechanics' Mag.

boiling," producing an excellent marketable article. Look over the boasted "specification," on which every claim for Mr. Cort is sought to be based, and say, whether "pig-boiling," or the thing implied in Mr. Hall's process, is once named. The processes described are perfectly dissimilar, the one from the other; Mr. Cort's could not stand without the prop of the refinery,—Mr. Hall's stands alone.

If the specifications of Mr. Cort were good for anything in the case of "sow and pig metal, or any other sort of cast iron," as stated, why was the introduction of the refinery, some years after, *essential* to enable him or others, to carry them out, on the points thus specified? The fact is, as Mr. Hall states in his publication, that the process of dry pig-puddling on the sand bottom, was utterly worthless without the refinery. With a view to exalt Mr. Cort, and so to aid the Testimonial, the refinery is sought to be minified: hence, it is remarked, "the refinery is merely an addition to Cort's invention, and its use in nowise detracts from his merit."* Unimportant as this little "addition" is wished to be represented, Cort's process without it, was like an arch without its key-stone,—a waggon, up to the axle tree in mud, without horses,—a train of railway carriages, without the engine. To what does this amount, but that the arch *merely* wants its key-stone,—the waggon *merely* wants the horses,—the railway carriages *merely* want the engine! But is it not easy to perceive, that, without the key-stone, the bridge, resting upon the scaffolding, is useless; as, in the other cases, the waggon must remain in the mud, and the train must remain a fixture at the station. "What next, and next?" to Cobdenize our phraseology. Why, Mr. Cort requires a refinery,—Mr. Bessemer, an inexpressible something to complete his process, just as a poor man requires a well-lined purse to help him into respectable life, and a man requires suitable gifts to become a poet. Mr. Hall has generously awarded to Mr. Cort all the merit to which he is entitled; but he is not allowed to claim the whole, when only entitled to a part.

* Mechanics' Mag.

An extract from the MECHANIC'S MAGAZINE, is published in the ENGINEER of Feb. 27th, embodying the pith of the reviewer's remarks on Cort's specification, with an evident intention to support Mr. Cort, and to impugn the claims of Mr. Hall. A reply is here given to the total of the claims put forth in favour of Mr. Cort. It is but right to notice, that as the object of the reviewers in the two periodicals thus named, is the same, viz., to exalt Mr. Cort at the expense of Mr. Hall, that a good understanding appears to have subsisted between them previously to their appearing in public; the ENGINEER, unluckily, allowing the secret to ooze out, by referring, Feb. 27th, in the ENGINEER, to the MECHANIC'S MAGAZINE, which was not published till Feb. 28th. When men cannot keep their own counsel, it is unreasonable to expect it to be kept by others: but it is in this way that some men, anxious to "*dispose*" of others, occasionally "dispose" of themselves.

One of these gentlemen is displeased, and says, "we must object to the manner in which Mr. Hall puts forth his claims. Mr. Bessemer's paper appeared in August. If Mr. Hall was aggrieved by the notice taken of this paper, (as he appears to be,) why did he not notice it at once? For three months and more Mr. Hall never wrote a word in any paper as to his claims in iron making. He ought to explain his omission. He was all along aware of Mr. Bessemer's claims, and yet for months he is silent."* If a "principle" cannot be invented, according to this writer, no more can *time* be construed into "*manner*," and it is to time he refers; telling his readers, that "Mr. Bessemer's paper appeared in August;" enquiring why, "if Mr. Hall felt himself aggrieved by the notice taken of the paper, he did not notice it at once;" allowing "three months and more" to elapse without "writing a word in any paper as to his claims in iron making." The writer, as in another case, may be here asked, whether he has really read the work he professes to review? He not only blunders as to the size, magnifying 74 pages into 91, but appears to be equally ignorant of its contents. If he will advert to page 17, he will find there, that

* Mechanics' Mag.

the "BIRMINGHAM JOURNAL" is referred to, as containing an article on the subject, signed "JOSEPH HALL," dated "Sept. 22, 1856," which article appeared in the columns of that journal on the 27th, headed, "The Issue of an Old Shoe Heel;" the very month succeeding that in which Mr. Bessemer's paper appeared. Are the public to be directed by such a writer as this, who himself, refusing to look at the guide-post placed before him, not only prefers to walk in the dark, but is disposed to push his readers into it?

Mr. Richard, the son of Mr. Henry Cort, regrets that Mr. Hall had not "purchased for a few pence, at the office of Commissioners for Patents," his father's specification, "in order that he might have learned the true character of the puddling and boiling process, so clearly defined by the greatest of all inventors."* What proof has he that Mr. Hall was not acquainted with the matter of the specification? Has Mr. Hall not asserted in his work, from a thorough knowledge of the subject, that "Mr. Cort had not the most distant claim to merit in the invention of his puddling process,"—that he had "merit in the invention of the puddling furnace,"—and that "his great merit rests in the invention of the groove rolls?" There is not anything in the specification, not even in the torture of words, in reference to it, to falsify this. The letter of Richard Cort goes as little to falsify Mr. Hall's judgment, as to establish the claims of his father, whom he seeks to enwreath with laurels he has not won. As to the specification of 1783, it has nothing to do with the question at issue; and that of 1784, is equally futile, having a reference only to dry-puddling on a sand bottom.

"Had Mr. Hall," proceeds Mr. Richard Cort, "only possessed himself of all the requisite information, as before mentioned, he might have saved the expense of publishing his book on the *Iron Question*, except to show how closely his mind, as a practical man, followed out the working of Henry Cort's invention, as described and patented by the latter, before Mr. Hall himself was born."†

* Supplement to the Mining Journal. Feb. 28. † Supplement to the Mining Journal.

Has Richard Cort, it may be again asked, read the book on which he animadverts? Let Henry Cort's process, as "described" in his "specification," and Joseph Hall's, as described in his "book," be placed side by side, and shew where the *follower* has worked according to pattern. Does Mr. Hall follow him in the dry-puddling on a sand bottom? Does he follow him in the refinery, to which the process of 1784 was so much indebted? Did Henry Cort complete the whole by one process? What says Mr. Scrivenor in his history? "Mr. Cort," he remarks, "made experiments in the progress of establishing his inventions; but so long as the various quantities of pig-iron only were the subject of operation, the results in the puddling furnace, his invention, were uncertain, attended with *waste*, and *unequal* in *quality*." Mr. Scrivenor further remarks,—"Mr. Cort's process, although so beneficial in itself, was nevertheless attended with a waste of about 20cwt. of pigs to a ton of bars, or in other words, it took two tons of pigs to make one ton of bars; and for some years afterwards it required 25 to 30cwt., even when the process became much better known: at the present time the waste does not generally exceed from 6 to 7cwt. of pigs to a ton of bars, including the waste in the refinery. The principal improvement in the puddling is the substitution of iron for sand bottoms in the furnaces. At the time when the sand bottoms were used, the puddlers seldom charged more than 2½cwt. of metal, and could not work more than four heats in the twelve hours; the principal cause of delay arose from the puddler having to make a fresh bottom each time before he charged. Neither could they puddle pig-iron alone, in consequence of its boiling and getting mixed with the sand; the waste also was considerably more in this process than in any other mode of working."* Mr. Muchet states, Mr. Cort made 29tns. 3cwt. 16lbs. of bar-iron from sixty tons of government ballast.† Is this—iron masters being the judges—the character attached to Mr. Hall's process? In other cases, the master is supposed to be superior to the pupil: but here, even on the supposition of Mr. Hall being a *copyist*—which is denied—the

* History of the Iron Trade, p. 110, 252, 253. † Papers on Iron and Steel, p. 31.

scholar excels his teacher. It is a point worth ascertaining too, how Joseph Hall can be said, according to Mr. Richard Cort, to have "followed out the working of Henry Cort's process so closely," while destitute of "all the requisite information" found in the "specification," to enable him to work after the model "described;" for if he had "possessed himself of the requisite information, he might have saved himself the expense of publishing his book!" This is exceedingly rich. A follower, and yet one who knows not his master! Working after plans of which he is ignorant! Would that Richard himself had only exercised the ordinary prudence of Henry; that he had "possessed himself of all requisite information," as to the subject on which he proposed to write, before he committed his production to the press. But the golden prize of a Testimonial, appears to have dazzled his vision so much, as to prevent him from looking at what was lying in his path; and hence his hobblings and awkward gait,—each removing at a still greater distance the contemplated boon. Dating, as he does, his letter from the "MINING JOURNAL Office, 29, Fleet-street," he certainly ought to have awakened sufficient interest in some of the officials, to furnish him with better information than he seems to possess, and such as would have preserved him from going astray in the way he has done, from fact and from argument.

While he is careful, in aid of the object of the Testimonial in progress, to blazon forth in his letter the fact "of forty of the principal iron firms" convening "a general meeting of the iron trade of Great Britain at Gloucester," with a view to state "how greatly they were indebted to the late Henry Cort for his introduction of the puddling process," he is equally careful to conceal the fact of the process being that of dry-puddling on the sand bottom. His object is evidently to produce a false impression; to effect which, he seeks to mix up with the process of his father, that of another which belongs to Mr. Hall, affirming, in a parenthesis, that his father's process "*included the boiling process;*" than which, not anything can be more remote from fact, the two processes, as already seen, bearing no analogy, the one to the other.

He avoids, too, all approach to the facts recorded in history,* that the petition of his brother, Mr. Coningsby Cort, which was presented to the House of Commons, in 1812, and "referred to a committee, was opposed by some of the iron masters, who produced evidence to prove that the iron manufactured according to Mr. Cort's process of puddling, was of a *very inferior quality*." Has this been said,—can this, by any kind of "evidence," be affirmed of Mr. Hall's process? Mr. Hall, in his work, p. 23, only iterates the opinion of the "iron masters" who opposed the petition, in stating, that "complaints at that time, as well as previously," were made, "respecting the general quality of the iron;" affirming that it arose "chiefly from the manner of treatment in the practice of dry-puddling," which "treatment produced a brittleness in the iron prejudicial to its use," and so rendered "some improved system of working necessary." Yet the very system adopted and pursued by Mr. Henry Cort, and advocated by Richard, is trumpeted forth in the letter referred to, and, by a kind of side wind, the better to make a successful voyage with the TESTIMONIAL, is sought to be supported by attaching to it the "improved system" of Mr. Hall. Mr. Richard Cort will find the fate of his brother Coningsby's "PETITION," summed up, as to the light in which it was contemplated by Government, in the following statement: "The Committee reported upon the petition, and an estimate of the sum wanted for carrying into effect the resolutions of the Committee, amounting to £250., was some time afterwards laid before the House; and here the matter rested:"† and here Mr. Richard Cort ought to have allowed the matter quietly to rest, as he has only injured his own cause by the manner in which he has obtruded himself upon the trade, in asserting higher claims than the case will warrant. Persons, by claiming too much, through "greed," very often lose all.

"Mr. Hall claims the use of the cinder," it is said, "in the 'boiling' process. But here also he has been anticipated by Cort, who thirty years previously showed that cinders might or might

* Scrivenor's History, p. 121. † Scrivenor's History.

not be used, at the pleasure of the operative."* Little more is necessary to be said on this, by way of reply, than what has been advanced in other quarters,† where the advocates of Mr. Cort are directed to page 27 of Mr. Hall's book, the latter, in describing his process of "pig-boiling," advising the operator, to "charge the furnace with good pig-iron, adding afterwards, if necessary, a sufficiency of *flux*, increasing or diminishing the same in proportion to the quality and nature of the pig-iron used." If the reviewer, it is very properly asked, alludes to the cinder as a flux, Cort's specification merely concludes by saying—"without requiring the use of the fluxes in any part of the process." The reviewer, somewhat less positive, observes, "Mr. Hall's third invention, the use of calcined tap-cinder as a repairing material, may, for aught we know, properly belong to him." Had he paused here, he might have saved himself from further exposure. But he goes on to affirm, that "the use of the cinder seems to deteriorate the iron, since it contains from 4 to 7 per cent of phospheric acid." The reviewer is here very properly met by his antagonist in the BIRMINGHAM JOURNAL, who remarks, "the fallacy of the tap-cinder deteriorating the quality of the iron, by being used as a protection to the plates of the furnace, may be answered by asking —Do the morals of the people deteriorate consequent upon the laws established for the protection of property?" When this question is satisfactorily answered, another will naturally follow, as to the propriety of protective measures required in other cases. Fences for fields, walls for gardens, prisons for felons, will require a share of attention in the discussion. But is it not a fact that Mr. Cort employed the *sand bottom*? Of what service could *cinder* be in this case? Who ever heard of *cinders* and *sand* being used together? And yet "cinders might or might not be used!!" What would be thought of the man, who should say—"Food may or may not be eaten"—"Weapons may or may not be employed in the midst of hostile tribes"—"Medicine may or may not be taken in a disease that affects life!"

* Mechanics' Mag. † Birmingham Journal, March 7th, 1857.

If "the use of the cinder deteriorates the iron," how comes it to pass, that an opposite effect is produced in the Bloomfield Iron Works, where no other is used, it being considered the very best repairing material that can be employed for producing a clear iron? Let the question be asked, What public opinion is of the B.B.H. strip and bar-iron? Enquire of other Staffordshire Works, where the said tap-cinder is also used, and the boiling process is carried out. After an appeal has been made to these, then repair to the Bloomfield Firm, and you will learn,—that they employ no commission agent, and no out-rider,—that they make upwards of 900 tons of iron in the week,—and that the great difficulty has been, not to procure, but to execute orders! If there is any defect in quality, in the Staffordshire iron, it arises, as Mr. Hall says, pp. 51, 52, from the abuse of the hot blast, which enables persons to work up an inferior material, which cannot be so worked up by the cold blast, and not from the use of the tap-cinder. Persons in the iron trade must repair to another "*tap*" than that of the review in the MECHANICS' MAGAZINE, if at all desirous of drawing off anything really serviceable in getting up a good marketable article. It is to be regretted, that a work so useful, should be marred by the introduction of such a review.

If, in the manufacture of iron, the elementary compounds, such as carbon, oxygen, and caloric, are unduly interfered with, by an unskilful hand, as observed by Mr. Hall, in the manipulation of the operator, then the effects are bad; a point truthfully and judiciously handled, by a writer interested in the present question.* Had Mr. Hall not been deeply impressed with the fact, that Mr. Bessemer's process unnaturally interfered with these elementary compounds, so as to produce an injurious effect upon the iron, he would, in all probability, have manifested the silence for which he is censured as observing "from 1816 to 1856,"† notwithstanding the charge of "the greed of reputation,"‡ so that he might have slipt out of the world without any one being privy to his "greed," except the reviewer in the ENGINEER. Mr. Cort huddles up, by

* Mining Journal. † Mechanics' Mag. ‡ Engineer.

his process, nearly the whole of the foreign impurities, found in connection with the pig-iron, by his dry-puddling on a sand bottom, and Mr. Bessemer steps in with his blast-blowing process, and puffs out that, which, for a certain period, ought to be retained in the manufacture of the article; both processes unnaturally, as extremes, interfering with the proper adjustment of these elementary compounds. Mr. Hall steals out from the covert in which he is said to have been concealed "from 1816 to 1856," and steps in between them with his process of quick combustion, on the principle of "pig-boiling," by a nice adjustment of the compounds in question, and, without the refinery, and by one process, produces bar iron, which seems to forbid improvement, as to ductility.

The writer, who blames Mr. Hall for his general reserve, is startled at what he calls "a confident assertion,"* in which the latter states, that he can "vapourize any quantity of cast iron;" having averred, that he "charged four cwts. of iron into a furnace, three cwts. of which were vapourized, *except* so much as was contained in the scoria." He remarks on this, "it does not seem to have struck Mr. Hall that the three cwts. were in the scoria in the form of the protoxide of iron." A clever writer smartly retorts,—"it does not seem to have struck the objector, that the three cwts. could *not* be contained in the scoria, and that for one very simple reason—the scoria would not weigh three quarters of a cwt."† If the subject were not a little too serious for a sportive sally, the objector—lacking already as he really seems to be, in substantiality—might be told, that Mr. Hall would find it no difficult matter to vapourize whatever might be left of himself, after the spiritual, or more etherial portion of his being, which has turned out so little in this case for eulogy, has fled.

Mr. Richard Cort helps himself in the MINING JOURNAL of *February* 28 to an Extract from the MECHANICS' MAGAZINE of the same date, just as the writer in the ENGINEER, in *February*, as already noticed, refers to the number of the MECHANICS' MAGAZINE previously to the date of publication. The alliance of

* Mechanics' Mag. † Birmingham Journal, Mar. 7th.

the three appears to be as close as that between the Siamese Twins. It is rather mortifying to detect persons so united, working hand to hand, whose hearts are set upon "disposing" of a man; but they should not make such indiscreet haste. Why not tarry till *March* had fairly set in?—till the number had obtained a proper circulation? Then, like "March hares," noted as being "wild," they might have proceeded "helter skelter" to their work. Richard was the only one before whom the "golden apple" was placed. The TESTIMONIAL was before the public; it was in the hand of one who would not suffer it to be forgotten; and from the manner in which it has been pushed into notice—the arguments employed to support it—and the restless importunity which has marked its progress, it is but fair to infer, that Richard himself would have been sufficiently active in the field, without the enlistment of less interested and less direct auxiliaries. It is unpleasant to feel oneself detected, when we have done our utmost, like the airy lapwing, to draw away others from what we wish to conceal.

What has been advanced hitherto, has been chiefly with a view to defend Mr. Hall against the aspersions thrown upon him by his reviewers, and to establish his claims to certain inventions put forth in his work. In doing this, repeated references have been made to Mr. Cort's process; references, much more numerous than would otherwise have appeared, had it not been for the way in which he has been forced upon the public to answer a certain purpose. The real ground of Mr. Cort's claims, has been already stated; and it would have been well if Mr. Richard Cort had not, whether behind the curtain or openly, dipped so deeply into the controversy, from the fact, that, the further the enlarged claims of his father are proceeded with, the less apparent his inventive faculty becomes; and the more unreasonable the son's taunt in reference to Mr. Hall, where he says, in a passage already quoted,—"Had he only possessed himself of all the requisite information, he might have saved the expense of publishing his book on the *Iron Question*, except to shew how closely his mind, as a practical man, followed out the working of Henry Cort's invention, as described and patented by

him." It will be seen by the following remarks in the ENGINEER, March 6, which refers to the MORNING POST, how far the way is open for Mr. Hall to make the complimentary return, on witnessing Henry Cort, to whom he is said to owe so much, but to whom he owes so little—not so much as even a single fraction—politely handed down from the proud position of an *original*—"from the greatest of all inventors"—to take his stand, as to the "puddling process," in the midst of a more numerous, though less elevated class of aspirants in the humble capacity of a *copyist*.

"The late Henry Cort," it is said, "to whom this country is so deeply indebted, as the introducer of 'rolling' and 'puddling' bar-iron, was in reality *the rediscoverer*, and not the discoverer of these processes, as is generally believed. This is abundantly evident upon a comparison of his specifications with others previously patented, and which are now made accessible to all inquirers. Cort's first patent which is for 'rolling,' is dated 17th January, 1783; his second, that for 'puddling,' is dated 13th February, 1784. The first was anticipated by John Payne in his patent dated 21st November, 1728; the second was anticipated (to some extent) by Peter Onions in his patent dated 7th May, 1783.

The writer proceeds with the general subjects of infringements on patents, and remarks, on his way to Henry Cort,—"A recent case is still more curious, as a proof of the way in which a patented invention, though actually become public property by lapse of time, may be rediscovered, and, in good faith, through ignorance, used for the exclusive benefit of individuals. A great noise has lately been made about the patent of Franz Uchatius, a captain in the Austrian service, for improving the manufacture of cast steel, by subjecting pig-iron, when reduced to a granulated state in crucibles, to the combined action of oxygen, heat, and fluxes. This process was patented in this country on 1st October, 1855. It is reported that the patent has been sold in England and Wales for a very large sum. It is also understood that Uchatius received £30,000. or £40,000. for it in France. It nevertheless appears that he was anticipated by John and Charles Wood, in their patent dated 29th

July, 1763, which is stated to be an improvement upon a patent of John Wood of the year 1761.

"The following is an extract from the patent of John Payne, (No. 502), dated 18th September, 1728. It is beyond doubt a patent for 'rolling.' He puts certain ingredients into fusion with pig or sow-iron; videlicet, the ashes of wood and other vegetables, all kinds of glass and sandener, common salt and rock salt, argile, kelp, and potash, slegg, or cinders, from iron furnaces and forges, proportionable parts of the said ingredients being put into fusion, or melted with pig, sow, or other brittle iron, which will make the like change as charcoal does in the fire called the finery in common forges, and will render the same into a state of malleability, so as to bear the stroke of the hammer to draw it into barrs or other forms att the pleasure of the workman, and those or other barrs being heated in the said melted ingredients in a long hott arch or cavern, as hereafter is described; and those or other barrs are to *pass between the large metall rowlers (which have proper notches or furrows upon their surfass)* by the force of my engine, hereafter described, or other power, into such shapes and forms as shall be required.' A copy of this may be had separately, for a few pence, from the Queen's printers, from whom may also, on the same terms, be obtained the other documents from which we are about to quote.

"Let us compare the above with Henry Cort's patent (No. 1,351), dated 17th January, 1783, *i. e.*, forty-five years later than Payne's patent. Cort passed 'fagoted iron,' at a welding heat, through rollers. He says that by passing the iron through his rollers, the metal is 'freed from earthy particles,' and 'compressed into a tough and fibrous state.' He adds—'a bar of the worst ordinary iron being passed through becomes instantly of good quality, and two or more such bars, or any pieces of impure iron, heated in the same manner, and passed through rollers together, become at once welded into one solid body, and meliorated into good tough iron, without being cleansed in the scouring barrel or otherwise.' He shows how plates may be formed by rolling, and directs the requisite shape to be given to the bars, by the upper rollers being

'collared,' and the under rollars being 'grooved.' He describes his invention as essentially consisting 'in taking a welding heat on several faggots of iron in the same furnace at one time, and *drawing the same into uses, either singly or by welding two or more together by the operations described, either under ther forge hemmer, or through the mill rollers,* as may best suit the use intended.' "

Then passing on to—"The patent of Peter Onions (No. 1370), dated May 7th, 1783," which, while that of Payne's strips Mr. Henry Cort of a portion of the originality with which he is plumed by his son, more immediately connects itself with the present question, it is stated that this also, "is, to a certain extent, an anticipation of Cort's puddling process of the following year. Onions employed two furnaces—a common smelting furnace, and a furnace of stone and brick, bound with iron-work, and well annealed, into which the fluid metal was received from the smelting furnace. When the liquid metal had been introduced into the second furnace by an aperture, it was closed up, and subjected to the heat of fuel and blast from below, 'until the metal became less fluid, and thickened into a kind of paste, which the workman, by opening the door, turns, and stirs with a bar or other iron instrument, and then closes the aperture again, and must apply the blast and fire until there is a *ferment* in the 'metal.' The scoria are separated by the stirring. The adherent particles of iron are collected in a mass, reheated to a white heat, and forged into malleable iron. Pig-iron may be treated in the second furnace in the same way as fluid metal taken from the first furnace. These details are sufficient to shew that Onions anticipated much of the essence of the puddling process supposed by many to be exclusively the invention of Cort. The patent of Cort is No. 1,420, and is dated 13th February, 1784. He used a reverberatory furnace heated by coal, and provided with a concave bottom. The fluid metal was run into the second furnace from the smelting furnace; or pig-iron was put into it direct; the metal was stirred with iron bars; the scull parings, and nut-iron were thrown back into the furnace. Cort says, 'the method invented by me is to continue

the loops in the same furnace, or reheat them in another air furnace to a welding heat,' and then shingle them into half blooms or slabs. The entire process, he says, may be 'completed without using finery, charcoal, cokes, chaffery, blast, or fluxes.'"

It is added, "We trust we have said enough to show that a rich mine of useful knowledge, hitherto almost unexplored, is now being opened by these publications of Her Majesty's Commissioners of Patents.—MORNING POST."

A defence is set up against Payne, in favour of Cort,* which, upon the whole, is successful, giving Cort the benefit of the possibility of Payne's proposition not being "carried out," which would not be admitted without proof, in close warfare, by an opponent. As to the other patent, and with that Mr. Hall's credit is said to be more immediately at stake, it is candidly stated—"The patent of Onions detracts from the originality of Cort's claims to the puddling process, although it is evident that Cort's improvements were fully sufficient to become the subject of another patent." Mr. Richard Cort, who, as has been noticed, dates one of his letters from the "MINING JOURNAL Office, 29, Fleet-Street," being aware, no doubt, of what appeared in the ENGINEER of March 6th, and what was prepared for the MINING JOURNAL of March 14th, felt the pinching point in these disclosures, and writes, in the latter of the same date, in a more subdued tone than he previously manifested, with an eye, meanwhile, intently fixed upon the article, and with an evident design to neutralize, as far as possible, the claims of Peter Onion's patented invention upon his father's puddling process. He regrets, that Mr. Hall did not purchase his father's specification, which would only have cost "a few pence," to acquire requisite information; and here again, Mr. Hall may regret, that Mr. Cort did not go to the "rich mine," opened up for him in "the publications of Her Majesty's Commissioners of Patents," to consult Peter Onion's specification, which, to employ his own language, would only have cost *him* "a few pence," as that might have saved him the trouble of publishing his own letter

* Mining Journal, Mar. 14, p. 196-7.

in the supplement of the MINING JOURNAL. He lays great stress on *ebullition*, as though it had for the first time been witnessed in the puddling process by his father, and yet he will find the term *ferment* employed in Onion's process, which, at least, looks in that direction. But the great sore, in the letter in the MINING JOURNAL of March 14th, seems to be in what is implied in the term "*re-discover*," as applied to his father. In this he will discover, that there is a difference of opinion among those who admit the *real claims* of his father to merit. The only question is, as to the precise amount.

These remarks may be closed with the passage from Mr. Hall's work, which seems to have given umbrage in certain quarters, in which he gives his opinion of Mr. Cort's process, as a practical man, and which matter of fact sustains:

"It is true that Mr. Cort invented puddling, the puddling furnace, and the groove rolls; but Mr. Cort has not the most distant claim to *merit* in the invention of *his* puddling *process*. Merit in the invention of the puddling furnace he had; but his *great merit* —and for this, as a practical man, he is above all praise!– rests on the invention of the groove rolls; a claim meriting substantial reward, because including a principle which has never been, and it is doubtful whether it ever will be superseded. Had the ROLLS and the FURNACE depended upon the *principle of puddling*, as at *that* time introduced, the *name* of Henry Cort, in the opinion of the writer, would not *now* have been known in the iron trade; he probably did as well as any one could do in *that day*, considering the manner of working, and the materials employed, namely, 'dry pig puddling' upon a 'sand bottom furnace.' If the principle of 'puddling' introduced by Mr. Cort, had not been succeeded by the refinery, it would have been utterly worthless." p. 39.

Here we have an honest opinion, with due discrimination; withholding neither praise nor blame, merit nor demerit; unless—taking the anticipatory inventions of Payne and Onions into account—somewhat more praise is awarded by Mr. Hall than others.

J. COULTAS, PRINTER, YORK.