

helped, to commit people, in the way suggested, to special forms of speaking on such high matters, or to induce them to register themselves publicly on this side or on that.

Of course a time may come, when such a proceeding will be indispensable, and we must keep the contingency in view; as others, no doubt, do, whom we revere and confide in. But since it might bring on the gravest consequences, both to the church and to individuals, no man should take part in it in a hurry, nor hurry another into it.

This suspension of joint action clearly implies that in our places we should be more watchful and active than ever in diffusing and recommending the truth; not, if we can help it, controversially, but positively and without danger.

I believe that such as this would be the course of true patience and wisdom, and therefore of true Christian courage, and we may hope that it will have an especial blessing, in that it will involve in keen and eager spirits no small measure of self-denial for the church's sake.

I remain, dear sir, your obedient servant,

JOHN KEENE.

### News Department.

From Papers by Steamer Canada, Sept'r 13.

[From the London Times, Aug. 23]

Yesterday, the new and extremely ingenious process just patented by Mr. H. Bessemer, of manufacturing malleable iron and steel without fuel, and recently propounded by him at the meeting of the British Association for the Advancement of Science, in a paper replete with interest, was put to a severe practical test, but with the most successful result, at Baxter House, St. Pancras road, in the occupation of that gentleman and his partner, Mr. Longdon, in the presence of several ironmasters carrying on an extensive business in different parts of the country, and many practical engineers and scientific men resident in the metropolis. The company by whom the experiment was witnessed included, among others, Capt. Margesson, Major Stowell, Mr. G. Bailey Tomes, from the Derwent Ironworks; Mr. J. Robinson, Ebbw Vale Works; Mr. R. Simpson, Cwm Celyn Works; Mr. T. M. Gladstone, Austin Friars; Mr. T. Stirling Begbie, Mr. T. H. Henry, F.R.S.; Mr. W. Carpmal, Mr. William Smith, Mr. E. F. Bramwell, Mr. T. S. Prédcaux, Mr. A. M. Perkins, and Mr. B. Burleigh.

The magnitude and importance of this discovery of Mr. Bessemer can scarcely be exaggerated. The only parallel to it is to be found in the kindred invention of Henry Cort, which, towards the close of the last century, relieved this country to a great extent from its commercial servitude to Russia and Sweden in regard to its supply of wrought iron. Two years have been spent by Mr. Bessemer in the perfection of his scheme; and when, the other day, he divulged it to the world before men distinguished for their scientific attainments, and practical manufacturers well able to appreciate its vast public significance and its whole bearing on the trade in which they are interested, it took them wholly by surprise, superseding, as it does, the expensive, laborious, and tedious processes now in use in the production, and the application in some cases, of malleable iron and steel in this and many other countries, cheapening the articles to an extent which will lead to their employment, and especially steel, for purposes to which they have never yet been subservient, and in many respects refining and improving the quality of the metal. Men like the two Kennies, Nasmyth, and others of less note, but of great experience as engineers and iron manufacturers, have pronounced emphatically and without qualification in its favour, while some, including Nasmyth, declared themselves unable to foresee the whole of the advantageous results calculated to spring from its discovery, not to this country alone; but wherever else it may be brought into use. It is to the credit of the Emperor of the French that, when the invention then in an imperfect state, was brought under his notice within the last year, and when he comprehended its full import from personal interviews which he graciously conceded to Mr. Bessemer, he afforded him great facilities for conducting his experiments to a successful result, and has since intimated his intention of bringing the plan into practical operation in the arsenal at Rouelle. Far different was the reception which Mr. Bessemer states he experienced from the heads of an important department at Woolwich when he endeavoured to prove its value and importance to them. They sought, he says, to throw cold water on it by alleging that Mr. Nasmyth had already made substantially the same discovery, which that gentleman has since been the first to disclaim.

The essential feature of Mr. Bessemer's invention is that he takes crude iron directly from the ordinary blast furnace, and in the incredibly short space of thirty minutes, converts it into ingots of malleable iron or steel of any size, and fit for the various manipulations ordinarily employed to adapt them to all the material purposes to which they are now applied. He thus dispenses with all the intermediate processes to which recourse has been had to produce the same effect within the last seventy years, including the making iron into pigs, and the refining, puddling, and squeezing stages, with all their attendant labor and fuel. Paradoxical as it may seem, it is not the less true, that he has achieved this great result by the application to the iron, in its transition from the blast furnace to the condition of the ingot, of a heat inconceivably intense, generated without furnace or fuel, and simply by blasts of cold air.—By this means he not only avoids the injurious action of mineral fuel on the iron under operation, which has always deteriorated the quality of English iron, but saves all the expense of the fuel. He sets out with the assumption that crude iron contains about 5 per cent. of carbon; that carbon cannot exist at a white heat in the presence of oxygen without uniting therewith and producing combustion; that such combustion would proceed with a rapidity dependent on the amount of surface of carbon exposed; and, lastly, that the temperature which the metal would acquire would be also dependent on the rapidity with which the oxygen and carbon were made to combine, and consequently that it was only necessary to bring the oxygen and carbon together in such a manner that a vast surface should be exposed to their mutual action, in order to produce a temperature hitherto unattainable in our largest furnaces. With a view of testing practically this theory, he has constructed a cylindrical vessel of three feet in diameter, and five feet in height, somewhat like an ordinary cupola furnace, the interior of which is lined with fire bricks, and about two inches from the bottom of it he inserted five tuyere pipes, the nozzles of which are formed of well burnt fire clay, the orifice of which tuyere being about the eighth of an inch in diameter. At one side is a hole made for running in the crude metal, and on the opposite side there is a tap-hole stopped with loam, by which the iron is run out to the end of the process. A vessel is placed so near to the discharge hole of the blast furnace as to allow the iron to flow along a gutter into it, and a small blast cylinder is used capable of compressing air to about 8 lb. or 10 lb. to the square inch. A communication having been made between it and the tuyeres, the converting vessel is in a condition to commence work. The blast being turned on, and the fluid iron run into the vessel, a rapid boiling up of the metal is heard going on within the vessel, the metal being dashed violently about, and tossed from side to side, shaking the vessel by the force with which it moves, from the throat of the converting vessel. This continues for about fifteen or twenty minutes, during which the oxygen in the atmospheric air combines with the carbon contained in the iron, producing carbonic acid gas, and at the same time evolving a powerful heat. The rapid union of carbon and oxygen adds still further to the temperature of the metal, while the diminished quantity of carbon present allows a part of the oxygen to combine with the iron, which undergoes combustion and is converted into an oxide. At the excessive temperature that the metal has now acquired, the oxide, as soon as formed, undergoes fusion and forms a powerful solvent of those earthy bases which are so associated with the iron. The violent ebullition going on mixes most intimately the scoria and metal, every part of which is thus brought into contact with the fluid oxide, which washes and cleanses the metal most thoroughly from the siliceous and other earthy bases that are combined with the crude iron, while the sulphur and other volatile matters that cling so tenaciously to iron at ordinary temperatures are driven off, the sulphur combining with the oxygen and forming sulphurous acid gas.

In conducting the demonstration yesterday, 6 cwt. 3 qr. 18 lb. of molten iron from a furnace was poured into a fire-brick vessel, already described, at 1:12 o'clock, the blast having been applied at a pressure of about 8 lb. per square inch, and continued until 1:27. The mass of metal began to boil up, and the cinders and other impurities were extruded from the top of the vessel by two apertures provided for the purpose. Showers of brilliant sparks were thrown off during this process, which lasted several minutes, and as the object was to produce a mass of cast steel, rather than continue the process to the extent necessary for making pure iron free from carbon, the vessel was tapped at 1:36 o'clock, and the contents drawn off. Small specimen ingots being first taken, the general mass was

run into an ingeniously contrived mold concealed in the floor in front of the apparatus, and, after remaining there a few minutes, cooling down, it was raised out of the mold in a red-hot state by a hydraulic ram, and placed upon a weighing machine. The ingot thus produced, with the two specimen ingots, weighed 6 cwt. Without the aid of fuel, this mass of material was converted in 24 minutes from crude cast iron as it comes from the furnace blast, into steel of fine quality.

The experiment was unanimously pronounced by the company to be perfectly satisfactory. It is a peculiar and important feature in the process, that by continuing the boiling a few minutes longer the whole of the carbon still remaining in the mass of metal, and which gives to it the character known as steel, would have been drawn off, and a pure spongy mass of crystalline iron would have been the result.

Mr. Bessemer states that hitherto the finest qualities of iron have always been imported from Sweden and Russia, and these are now sold in this country from £20 to £30 a ton; but, by the new process, iron can be manufactured of equal quality at a cost of £2 per ton less than the present cost of common English iron. If this statement be borne out by experience of his invention, we shall no longer be dependent on the foreign market for the production of iron of the finest quality. He also speaks with something like enthusiasm of the extent to which what he called semi-steel, of a quality between malleable iron and steel in ordinary use, as manufactured under his patent, may be expected to supersede, in time, the use of malleable iron for railway plates and many other purposes to which the latter is not altogether adapted; and he as confidently asserts that the process of forging and welding, which, under the existing system, is necessary whenever a piece of iron work of a larger size than 80 to 100 pounds is required to be constructed, will be dispensed with. He looks also to the universal use of his discovery, seeing that atmospheric air is the primo element used in producing the desired result; it is not, therefore, dependent upon any local circumstances.

### TOPICS OF THE VACATION.

THE vacation has begun, on the whole, in a pacific spirit, as far as the Church is concerned; though a few voices are heard from the provinces, indicating that the seeming peace is but a lull; and among them Sir William Clay's, who is taking counsel with his Dissenting friends about the Abolition of Church-rates, which he determines to press, with or without Government help, next session. The one engrossing question of the hour is that of the judgment against the Archdeacon of Taunton: whether any kind of revocation will be proposed by him, or accepted by the court, is as uncertain as ever.—The retirement of the Bishops of London and Durham, which was so bitterly complained of by the Latitudinarian party, is now regarded by them with some favor; as the act which provides for the retiring prelates adopts the principle (according to the *Spectator*) that bishops may be merely state pensioners, if Parliament so wills it, any day. Other papers are gladly echoing the *Spectator*.

By far the most important movement of the present season is that which has for its object the establishment of National "Reformatories." The *Gazette* announces the names of thirty Reformatory-schools already opened in England, and twenty in Scotland. All parties have agreed that the present mode of treating the criminal classes is at an end. Transportation is found a mistake, if not an impossibility on the scale required. Capital punishments must become more and more rare, and however the law may stand, they will practically be restricted to the darkest class of crimes. At Bristol and other great towns, the tone of the metropolis has been responded to, and there can be no doubt that the task of "reformation" will be resolutely undertaken on political and economical grounds, if on no other. But it will be found that reform without religion is impossible; and if so, the "national religion" must be much more distinctly resorted to by our political philanthropists. The necessities of our times may bring men, perhaps, to some better conclusions in this respect, than reason or right feeling have done. The voluminous moral report just returned to the French Emperor contains a good deal that we might profit by. The French are beginning to use their national church by letting the Church do her own work in her own way. And this is the only way in which spiritual work will tell on the consciences of a people. Mere state-directed mechanism will never do it.—*Lit. Churchman*.

### SCOTLAND.

The sectarians are not failing to act with zeal, on their own principles, for what they deem the moral elevation of the people; and Glasgow has been honored