## THE BRITISH ASSOCIATION.

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NEXT Wednesday the members of the British Association will hold their annual gathering, which this year is to take place in Dundee. This town is very rich in historical associations, for Edward I. burnt a large number of women and children in an old monastery there, Wallace was educated in Dundee, Bruce once made the town his residence, and he was declared king of Scotland therein, James V., Mary Queen of Scots, and James VI. visited it. Dundee was pillaged and burnt by Montrose, it was the temporary residence of Charles II., it was stormed by Gen. Monk, whose soldiers massacred the inhabitants right and left for several days, Graham of Claverhouse besieged it and was beaten off by the defenders, it was entered by the Pretender in 1716, and occupied by his followers in 1745. Thus archaeologists and politicians will have a rich field before them in the town of Dundee and its vicinity.

As regards the modern aspect of the town, it ranks next to Glasgow in commercial importance, and carries on an extensive business in linen and linen yarns, importing large quantities of fax, hemp, and jute. It is situated upon an arm of the sea, the Firth of Tay, about four miles from the German Ocean, and it is backed by hilly and picturesque scenery. The harbour usually contains a good show of shipping, and the town rather more smoke than a stranger would like, which snoke is belched forth by several tall chimneys. Dundee has about 100,000 inhabitants, who are all in a lively state of preparation for the advent of the British Association. It likewise has a Provost to rule over it, at least, we suppose it has, although we have not yet seen him. In the days of old, at all events, it certainly had a Provost, for memory dimly furnishes a picture of a Dundee Provost, who died and was buried, and left £400 in his will for the composer of a good epitaph to be inscribed over his remains. The four executors, so the legend states, resolved to compose the epitaph themselves, since it would be a pily to let the £400 go into the hands of str

The fourth in a fit of inspiration went back to the first rudiments of education, and added the line, "A, B, C, D, E, F, G."
This monument to the lamented Provost is said to be still visible in Dundee, so archæologists are earnestly requested to search for the same, and we wish they may find it, as its examination conto but excite the warmest interest in the breasts of the members of the British Association.

One of the most interesting features of the forthcoming week in Dundee is one not entered in the official programme of the British Association, amely, an experimental lecture to working men on "Matter and Force," by Dr. John Tyndall. The creation of a taste for the study of physical science, ignorance of which is such a prominent feature of the system of education in this country, will perhaps be more forcibly promoted in Dundee by this popular movement of the prince of scientific lecturers than by any other proceedings of the Association. But Dr. Tyndall, Mr. Balfour Stewart, and all the other philosophers who are deeply versed in the phenomena of heat and molecular physics, have already a terribie and unexpected rival in the field. The "Fire King" himself is now in Dundee. Dr. Tyndall will let dark rays of intense heat into his eye and lick red-hot pokers; but the great Rel Mueab, the Fire King, despises such petty performances, according to the following paragraph from the Dundee Advertiser of Tuesday last:—

THE FIRE KING AT THE ALHAMBRA MUSIC HALL.—One of the most remarkable performers that ever appeared in Dundee is at present astonishing the large audiences that nightly assemble at this favourite music-hall. The gentleman to whom we refer is Rel Mueab, the Fire King, a native of Russian Poland, who goes hrough a variety of the most marvellous feats we ever witnessed. He is a handsomely-made young man, and possesses apparently great museular strength. He brings to the stage with him a sort of force, which he employs in heating the iron used by him in doing his performances. He first makes a strip of

again.

Dundee is twenty or thirty miles from some of the finest scenery in the Scottish Highlands, within easy communication by rail. The programme of the forthcoming proceedings of the British Association has already appeared in our pages.

## METALS, MACHINERY, AND MANUFACTURES PAST AND PRESENT.

PAST AND PRESENT.

Not a few of the English visitors to the Paris International Exhibition—practical and scientific men—have come home disconcerted and east down by the evidence it has seemed to present indicative of England as a manufacturing country being a loser in the world's competitive race. In textile and fictile manufactures France and Belgium have long been ahead of us in the higher qualities of production, and even in the lower classes of cotton, silk, and woollen goods, more largely consumed by the great bulk of the peoples of various parts of the world, they have been drawing up to us rapidly. Almost universally until now, however, it has been tacitly accepted as an indisputable fact that in the production of machine tools and machinery this country has kept ahead of

all competitors. Now, however, it is feared that this master key is to be wrested from us, and that continental manufacturers are about to become independent of us for the supply of the machinery which we have hitherto exported to them, and by means of which their manufacturing industry in various departments has been so largely developed. In the machinery we have sent them the golden eggs, but have kept the goose which has laid them. Now, it seems supposed, they have got a goose of their own, and will not only not need to draw from our basket, but will go into the same markets to compete with us for the sale of the eggs. The fillip supplied by the evidences of mechanical and engineering progress made upon the continent of Europe is not unneeded, and the sharp be withering will prove salutary if due heed be given to it. Inventive genius is challenged to sleepless and sustained activity and the exercise of its best powers; and, above all, employers and employed are admonished with trumpet tongue to set their house in order, and to settle on a permanent and mutually satisfactory basis the moot points in the relations between capital and labour which lie at the root of our continued prosperity as a nation. Whether or not masters and men will adopt the motto and cordially act upon it, the conditions and results expressed certainly attach to their mutual relations—"United we stand, divided we fall." To parley or hesitate is to be undone; better keep now than seek anon—England's division and extremity will be the foreigner's opportunity.

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than seek anon—England's division and extremity will be the foreigner's opportunity.

What the returns of the national exports and imports for the current year may show it is of course impossible at present to predict. When the time may come—we hope it may never come—when "Ichabod" is to be written upon our factories and workshops, we know not, but up to the end of 1866, at any rate, that time had not come, and unless a galloping decline has commenced in the year 1867 the history of the past should encourage us to take heart of grace for the future, and to believe that as a nation of manufacturers and shopkeepers we shall not be defunct for yet awhile.

By an almost unbroken series of annual augmentations the value of the imports and exports of the United Kingdom have increased from £285, 201,145, or £9 14s, per head of the podulation of the United Kingdom in 1834, to £34,011,453, or £18 per head, in 1866; the exports in the latter year amounting to £238, 222, in 1866 it was £1,750,492, being a decrease as compared with 1865, but an increase upon 1864 and all preceding years. The value of machinery of other sorts exported in 1852 was £913,138; in 1866 it was £2,956,892, a decrease upon 1864 and 1856 (confessed) significant exceptions), but an increase upon any year preceding 1863. The iron, pig, and puddled exports amounted in 1866 to £1,544,647; of bar angle, bolt, and rod, to £2,943,488; of valironal to £1,66,410; of hoops, sheets, and £6,684,276 for 1852, and higher than any amount since that year. In the exports of copper and other metals the increase has been inconsiderable, excepting in copper, bars, rods, sheets, and rails, the value of which in 1866 was £1,119,309, or nearly double what it was in 1852. The value of the coal, cinders, and culti exported in 1852 was £1,119, in 1866 the quantity exported was £2,575,967,256 yards, or nearly fifty times the circumference of the globe! Manchester as well as Mulhouse evidently continues to prosper. The only year from 1852 to 1866 in which a greater quantity was exported was 1860, when it reached 2,776,218,427 yards. The line process of the count of the color principal articles of export essentially affected by improvements in machinery, it appears that the cotton piece goods exported in 1852 amounted to 1,544,286,331 yards. Between the one year and the other the quantities exported were increased, respectively, of woolder of the process of the

was freely offered by voluntary educationists on the one hand, and by the advocates of religious day-school education on the other. There was, notwithstanding, an immense preponderance of opinion in favour of the proposition, and it may reasonably be believed that the opinions so strongly held fifteen years ago have become intensified in the interval- that the seed sown then will soon fructify in the army of working-class voters making education a hustings question, and in their cutting the Gordian knot of educational difficulty. With primary schools where they are needed, freely accessible to all classes, well conducted by trained and efficient teachers, and under the control of responsible local or other managers, the latent intellect of the country would bedveloped in a high degree, and to the advancement of the highest interests of the nation. Religious teachers would have more hopeful material to operate upon—even elementary instruction would lead to mental culture, induce a higher moral tone, which would revolt from crude, cowardly, unjust, and illogical expedients for the promotion of class interests. As regards skilled workmen in various branches universal elementary schools would beget technical schools—would establish and promote free scientific and popular libraries, and would, in fine, add so much dignity, power, and worth to the common people, as would make Old England, in deed and truth, the "glory of the world and the envy of surrounding nations."

## DRAUGHTSMEN'S BENEVOLENT ASSOCIATION.

The following is a copy of a circular which has been forwarded to the draughtsmen of the leading engineering firms in the king-

The following is a copy of a circular which has been forwarded to the draughtsmen of the leading engineering firms in the king-dom:—

"Sir,—You are, perhaps, aware that considerable correspondence has lately taken place in the columns of The Engineers, Surveyors, and Draughtsmen's Benevolent Society."

The time seems now to have arrived when something of a more decided character than newspaper correspondence or editorial encouragement is required in order to set the matter fairly afloat, and it has been suggested that a meeting of the persons interested in the movement, and particularly of delegates from as many as possible of the large engineering offices, should be convened on an early day; such meeting to be presided over by some well-known and universally respected member of the profession. The subject could then be freely discussed, and, if desired, a committee be appointed for carrying out the wishes of the meeting, and for promoting the general success of the movement.

I, therefore, beg to inform you that as soon as the necessary stops have been taken, and the time and place of such meeting have been determined on, the invitations will be issued.

In the meantime may I also venture to commend to your earnest consideration the various advantages aimed at in this movement.

A plan is proposed for providing a fund for sickness, old age, and superannuation, also a provision for the widows and orphans of deceased members, and a scheme by which the children of assistant engineers, surveyors, and draughtsmen would be enabled to obtain a good sound education at a very reasonable rate.

Of the many details involved in these matters, you will easily understand, it is at present premature to speak. What is first wanted is to arouse general attention to the question. We may then safely reckon on securing a good and influential meeting of those who are interested, and f this be followed by a hearty cooperation of all concerned, I feel convinced that the objects can and will be speedily obtained.

Before, however, we

Signed) R. M. BANCEOFT.

P.S.—By the kind permission of the proprietors all letters may, for the present, be addressed to the honorary secretary, pro tem. of the proposed Assistant Engineers', Surveyors', and Draughtsmen's Benevolent Society, office of The Engineers, 163, Strand, London, W.C."

THE SOCIETY OF ENGINEERS.—The council of the Society have obtained permission for a visit of the society to the works of Messrs. J. Penn and Son, at Greenwich, on Friday, the 13th of September. Members and associates who purpose joining the party are requested to communicate with the secretary, on or before the 10th proximo. Members and associates to meet at the London Bridge station at a quarter past twelve o'clock, on the 13th of September, to proceed to Greenwich by train leaving at 12.31 p.m.

A SELF-LUBRICATING PACKING.—Mr. T. Silver, the American engineer, whose name has been so long connected with his well-known form of marine governor, is now engaged in introducing into this country a remarkably original kind of packing for pinton rods. It works entirely without oil, being apparently self-lubricating, though we should say that its lubricating action is possibly aided by the presnee of condensed steam. The packing, put into the stuffing-box in the ordinary way, simply consists of a plaited cotton gasket made up with a composition principally consisting of soapstone.

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A NOVEL RACE.—On Monday morning, the 26th instant, in accordance with previous arrangement, two road 'steam carriages, one made by Mr. Isaac W. Boulton, of Ashton-under-Lyne, having only one 4\frac{1}{2}in. cylinder 9\text{in. stroke, the other, made by Messars. Daniel Adamson and Co., of Newton Moor, having two cylinders 6in. diameter, 10\text{in. stroke, started from Ashton-under-Lyne, and Co., is a robe of the show ground at Old Trafford, a distance of over eight miles. The larger engine, made by Messra. Adamson and Co., is a vista well-constructed engine, and had a good with the constructed engine, and had a good with the constructed engine, and had a good the strong of the constructed engine, and had a good lead of it all the way, arriving to lot first mile, and kept a good lead of it all the way, arriving the lot of the first mile, and kept a good lead of it all the way, arriving qualities, and hoth engines turned complete circles of 27tt. diameter, both to right and left, frequently.

The STAVELEY COAL AND IRON COMPANY (LIMITED).—The fourth annual report of the directors has just been issued, and states that, notwithstanding the very exceptional year, the inherent value of the company's property has maintained its relative position. The net profit for the year, including £960 16s. 1d. from the last account, is £65, 719 7s. 2d., out of which interim dividends of £6 10s. old share and £1 1s. 8d. per new share were paid in February and June last, which have been absorbed £42,338 6s. 8d. The directors recommend a further dividend of £3 10s. on the old and 11s. 8d. on the new; to be paid on the 37d of September next, which will absorb £22,808 6s. 8d., leaving a balance £552 to be carried forward to the next account. The directors state that they have agreed to contribute to the Staveley Works Accident Fund the sum of £2000 by four yearly instalments, and after that