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The Editor is always glad to receive for examination illustrated articles on subjects of timely interest. If the photographs are *sharp*, the articles *short*, and the facts *authentic*, the contributions will receive special attention. Accepted articles will be paid for at regular space rates.

THE AFTERMATH OF THE COAL STRIKE.

The effects of the great strike in the anthracite coal regions will make themselves felt in a very practical way long after the more dramatic incidents of the strike have passed from the public mind. That the immediate pecuniary losses both to capital and labor resulting from the strike will be enormous, goes without saying; but in addition to these the anthracite coal trade will unquestionably suffer a serious loss, because of the widespread public attention which had been directed to the great question of utilizing other domestic fuel supplies than that of anthracite coal.

After all is said and done, we are very much the creatures of habit, even in America. We have used anthracite coal so long, and so exclusively, that to the majority of workaday citizens it has never occurred that there might be substitutes which would be superior to anthracite in economy, and greatly superior to it in convenience and cleanliness of use and operation. There are thousands of homes, in which, previous to the strike, the use of gas and coal oil for heating and cooking purposes was unknown, that have been driven by necessity to the use of these fuels, and have formed such a good opinion of their qualities, that they are certain to continue their use, either in whole or in part, to the prejudice of the interests of the retail coal dealer. Just how far the consumption of coal will be affected, will only be known as the winter months advance; but it is certain that the vigorous campaign of instruction which has been carried on by the gas companies and the manufacturers of coal-oil stoves and ranges, will result throughout the anthracite-using districts in a great increase in the domestic consumption of oil and gas fuel.

Elsewhere in these columns will be found a discussion of the relative merits of fuels other than anthracite coal, and in the current issue of the SUPPLEMENT we publish an illustrated article describing a number of methods of lighting and heating by alcohol, which were shown in an exposition devoted to the subject that has recently taken place in the city of Paris. While it is true that the present strike has been settled, and the supply and price of coal are likely to resume gradually their normal conditions, it is certain that the lessons of the strike will be very lasting in the public mind; and the most important of these lessons, as far as they touch the comfort of the individual householder, is that by familiarizing himself with oil and gas fuels he should make provision against the serious contingency of a coal famine as it has recently presented itself with very alarming distinctness during the past few weeks.

OUTPUT OF THE UNITED STATES STEEL CORPORATION.

In view of the vast extent of the plant and operations of the United States Steel Corporation, it will come as a surprise to many people to learn how large a proportion of the production of iron and steel of the United States is still turned out from mills and forges other than those included in the great steel trust. According to figures published by the American Iron and Steel Association, out of a total production in 1901 of 28,887,479 tons of iron ore, 43.9 per cent was produced by the United States Steel Corporation, and the balance by individual firms. From this ore there was produced 15,878,354 tons of pig iron, of which 42.9 per cent was the output of the corporation's furnaces. The total production of Bessemer and open-hearth steel ingots and castings in the same year was 13,369,611 tons, 66.3 per cent of which was produced by the United States Steel Corporation. They also produced 59.9 per cent of the steel rails, 62.2 per cent of structural shapes, 77.6 per cent of the wire rods and 50.1 per cent of a total of all rolled products of 12,349,327 tons.

It will thus be seen that the Steel Trust is far from having a monopoly of the steel trade in this country, and it is gratifying to know that this great corporation has made a wise use of its enormous influence in the steel trade, and prices have been maintained at a reasonable figure. There is no gainsaying the fact that the control of about 65 per cent of the total production of iron and steel in this country stands for a most powerful influence, should it come to the question of the control of the market, and it is sincerely to be hoped that the moderation which has marked the conduct of the affairs of the corporation will be a lasting characteristic; for herein lies the guarantee of the permanence of a prosperity in the steel and iron trade which has excited the interest and wonder of the world.

ELECTRIC EQUIPMENT OF A GREAT RAILROAD.

One of the most notable movements yet recorded in the substitution of electric for steam traction on trunk railroads is now in progress on the North-Eastern Railway, one of the most important systems in Great Britain. Special interest attaches to this work from the fact that the change is being made on a stretch of road that is not in any sense suburban, since it runs largely through an agricultural district. The change involves the electrifying of 35 miles of double-track main line, 4 miles of single-track, and 2 miles of four-track road. With the exception of a road recently constructed in Italy, this will be by far the longest stretch of electrically-operated main line in the world.

A study of the call by the North-Eastern Railway Company for bids for the construction of this work shows that the company has had the wisdom to leave a great deal to the discretion of the contractors in the matter of the plant and equipment. Alternating current will be furnished by the Newcastle-upon-Tyne Electric Supply Company, at a pressure of 6,000 volts, and this will be stepped down to 650 volts for use at the motors. The important detail of the method of reduction of the current, and other details of less importance, are left to the discretion of the contractor, although the North-Eastern Company prefers that direct current be used.

This decision of the company to leave the question of the type of current open will be commended by electric engineers in general, inasmuch as it takes cognizance of the important experimental work which is being done on the Continent in the direction of the use of alternating, high-pressure current direct at the motors. The indications are that for trunk line installations, such as this on the North-Eastern, the Ganz system or some modification of it will be found to be most efficient.

The advertisement for bids specifies that the work must be completed within twelve months from the date of signing of the contract; and if the scheme is pushed through with a vigor corresponding to the sweeping nature of the change proposed, it is likely that, before the New York Central Railroad commences the much-talked-of electrical equipping of its main lines into New York, it will have an opportunity to avail itself of the practical results achieved on this English road.

BALLOON TRIP ACROSS THE SAHARA.

In the month of December Capt. Debureaux is to commence his project of crossing the Sahara by balloon. It is intended to explore the region by a balloon containing four aeronauts, probably including Count Castillon de Saint-Victor, Jacques Balsan and Lieutenant of Marine Hourts. Before making the attempt it has been decided to carry out a preliminary experiment with a balloon of 1,300 cubic yards' capacity which is to be furnished by the Minister of the Marine. This balloon, however, will not be mounted by aeronauts; it is provided with automatic apparatus for assuring the equilibrium and for throwing out ballast at the right time, and these will take the place of the aeronauts. The equilibrium is to be obtained by a steel guide-rope measuring 2,400 to 2,700 feet long and weighing 550 to 660 pounds. The ballast arrangement is a water reservoir, which is provided with a simple automatic device so that when the balloon comes within 150 feet of the ground a valve is opened and the proper quantity of water discharged. An air-bag inside the balloon is kept inflated by an automatic air fan, and thus keeps up the form of the balloon should the gas leak out or contract under the influence of a lowering of temperature. The start will take place from Gabes, on the Mediterranean coast, about 150 miles southeast of Tunis, taking advantage of the north northwest winds which prevail constantly in the Sahara region from the beginning of October to April. These winds should drive the balloon with its guide-rope at a mean speed of 12 miles an hour. The distance to be covered, from Gabes to the Niger, is about 1,400 miles, so that the balloon should traverse this part of the Sahara in about five days. The projectors have also provided for the case where the guide-rope becomes entangled in an obstacle along the route, and for this purpose the cable possesses four points of rupture, whose resistance increases with the length of the rope, going toward the balloon. The lower sections will thus be broken first and free the balloon. Automatic registering devices will be carried, as well as carrier pigeons, which will have their cages opened by an automatic release when the car touches ground. The experiment, which is to cost about $1,600, has been favored by the government, and the Minister of the Marine, besides furnishing the balloon, will no doubt bear the expenses of the inflation which will be carried out with pure hydrogen, as well as of the transport of the material. The Municipal Council of Paris and other bodies have also given financial aid to the project. If the first experiment succeeds it will no doubt be followed by an attempt to cross the Sahara in a balloon mounted by Capt. Debureaux and the three aeronauts mentioned above.

RECENT IMPROVEMENTS IN WEAVING.

An interesting lecture was recently delivered in London before the Society of Arts by Prof. Beaumont upon the most important recent improvements in weaving. In the ordinary power loom for weaving plain simple fabrics, the difficulty for many years has been to initiate improvements which would result in greater productive power. Experiment and experience alike have demonstrated that beyond a certain speed it is undesirable to attempt economy by higher running power, which applies additional strain to the warp and augments the degree of vibration on the motive parts of the loom. If the maximum speed of a loom has been obtained on a given quality and fineness of thread, the problem arises, In what direction are further advances to be made in the construction of power looms for weaving simple types of fabrics? The builder of looms as well as the student of weaving has for some time past realized the loss of time necessitated in the recharging of the shuttle with weft yarn Other methods of conveying the weft into the warp than by the use of the flying shuttle have been attempted, but the difficulties of weft insertion have so far proved beyond solution by any more efficient means than the common shuttle.

Accepting the shuttle as the most practical weft conveyor yet devised, the modern loom builder has endeavored to provide a continuous supply of weft in two ways: First, by ejecting a spent bobbin from the shuttle and introducing a full one; and, secondly, by ejecting the shuttle containing the empty bobbin and replacing it by a shuttle with a full bobbin. The first system has been developed to such an extent by the Draper Company, of Massachusetts, that between 70,000 and 80,000 looms have been made on this principle. This invention has effected much economy in the weaving of plain fabrics. A weaver is able to mind 18 to 20 of these looms, where on the ordinary system 4 to 6 was considered the maximum. To change from one bobbin to another in a shuttle without removing from the shuttle box, and the loom running at full speed, making 190 to 200 shots per minute, is a mechanical triumph. To obtain a constant supply of weft English and Continental inventors have adopted the principle of changing the shuttle while the loom is running. Important motions for doing this are the Crossley, Hodgson and Hattersley; the two former change the shuttle while the loom is running, but in the latter the loom is for a brief period ingeniously made inoperative, and automatically re-started.

With regard to inventions applied to looms for special styles of fabrics such as velvet, swivel and lappet, two ingenious contrivances have been devised for this purpose by Mr. Hollingworth, of Dobcross, England, and Mr. Hutchins, of Worcester, Mass., respectively. In the Hollingworth device, which is for looms used in the weaving of fabrics in which wires are inserted into the warp to produce a pile effect as in carpet, velvet and plush, the reed and shuttle boxes are separated, thus providing more space for the wiring motion. The chief mechanical difficulty in such disconnection of parts—which in ordinary looms are combined—consists in securing a relative turning of the reed and shuttle boxes, so that they will be perfectly level with each other when the picking motion comes into action. Any failure of this results in the shuttle not traveling in a straight line and diverging out of its course. The Hollingworth invention is constructed in such a manner that there is little possibility of such defects arising.

The Hutchins invention relates to swivel weaving and its object is to substitute the ordinary shuttle by shuttles having a needle or pointed appearance, and in a line with, instead of at right angles to, the warp and forming one continuous series of shuttles from side to side. The chief advantage of this invention is the frequency with which the swivel shuttles may figure this fabric, there being 3 or 4 to the inch; and, secondly, in the indication of their entrance into the warp by the Jacquard, so that they be retained in or out of action for any period demanded.

In small ware looms the Poyser loom has accomplished what was, anterior to its inception, quite impossible. In this device there is a shuttle behind the reed, necessitating a division in the reed to allow the tongue or projection of the shuttle to place the thread of weft against the fell of the fabric. One advantage of this system is that the shuttle places the thread