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SCIENTIFIC AMERICAN SUPPLEMENT

No. 619.

For the Week Ending November 12, 1887.

Price 10 cents. For sale by all newsdealers.

THE RICH COAL FIELDS OF COLORADO.

Prof. Newberry, of Columbia College, at a meeting of the New York Academy of Sciences, October 31, gave an enthusiastic description of some exceedingly rich coal fields in western Colorado. He exhibited specimens of coal that he had taken from various veins there but a few weeks ago, equal to any mined anywhere in the world, some of it showing only three per cent of ash and one-half of one per cent of sulphur. Some of the coals were anthracite and others bituminous, with an abundance of excellent coking coals, portions of some veins just as found comparing favorably with the best Connellsville coke.

One of the veins he described as 18 feet thick of solid coal, with numerous other veins of 14, 10, 8, and 6 feet thickness. Three railways are now approaching this wonderfully rich coal field, and, notwithstanding the great difficulties attending freight transportation in so mountainous a region, its almost exhaustless stores of the best of fuel will soon be furnished in abundance for that large section of almost treeless country just east of the foothills of the Rocky Mountains, from Dakota to Texas.

BOOKS FOR THE INSANE IN ASYLUMS.

From Georgia a very touching appeal has reached us. The State Lunatic Asylum at Milledgeville has within its walls between twelve and fifteen hundred patients. Many of them are not only well able to read in spite of their mental infirmity, but really need and crave some such literary exercise. A hall within the institution is fitted up for a library, but there are no books. To supply this pressing need, contributions of any kind, old books, magazines, periodicals, and the like, are solicited. We trust that many will respond to the demand, directing their contributions to the superintendent, Dr. T. O. Powell.

We notice the above mentioned appeal not only for its own sake, but because it seems to us the index of what is probably one of the great needs of our country. All through it are large insane asylums, but in how many of them is there any certainty that a sufficient library is provided for the inmates? No class would seem so open to benefit from literature as the insane. The majority are monomaniacs, or at least possess a part of their understanding. They emphatically require to be taken out of themselves. The error many sane people make is to depend too much on reading and too little on thought. The reverse may be made an aphorism for the insane, as they certainly brood or think too much.

It would appear that an opening for a most beneficent charity might be found in this direction. The asylums of the country should be investigated, and the extent of their libraries determined, and efforts made to supply their deficiencies. Every house has in it some unused books that idly fill the shelves, and which having been read once are never again opened. These could find no more useful destination than the one suggested. Many periodicals accumulate, to be ultimately destroyed. All such we are sure would be gladly received by the superintendents of the insane asylums.

So much is now done by organized charity that the suggestion of a new field for work will undoubtedly find many willing to assist in it. The question of the character of the books might safely be left to those in charge of each asylum. Even if the indiscriminate use of books were permitted, then for one patient who would be excited or injured by some work fostering or increasing his delusion, probably hundreds would be benefited. If ill effects were feared, the books could be examined and weeded out before being sent.

It is clear that a need exists, and that it is one which can be easily supplied. We hope soon to receive evidence that work is doing in this field.

THE AMERICAN INSTITUTE EXHIBITION.

The American Institute exhibition in this city is now at its best. In general it is fully up to the standard of former years, and in some respects it is far in advance. The electrical display is especially noteworthy. A large number of dynamos and electric motors are shown in operation. The halls are illuminated by electric light exclusively. The arc lights, 100 in number, within and without the building, are operated by four Ball unipolar dynamos, driven by a smooth running high speed engine made by the Ball Engine Co., of Erie, Pa.

Two No. 16 400 ampere Edison dynamos are exhibited, one being used for incandescent lights, and the other for supplying current to motors. One of the Edison machines is driven by the well known Armington & Sims high speed engine, the power being communicated from the engine to the dynamo by a leather link belt. This belt hugs the pulleys closely, and envelops much more of their peripheries than does the ordinary belt. The other Edison dynamo is driven by a Straight Line engine, which seems to do its work quietly and with great ease.

The Mather Electric Co., of Hartford, Conn., exhibit a 500 light dynamo, driven by a Trenton high speed engine, made by the Phœnix Iron Co., of Trenton, N. J. This dynamo supplies a current to 500 incandescent lamps. Another 250 light machine of the same make takes its power from the line shaft of the exhibition building, and supplies a current for running various electric motors. A 50 light dynamo of the same make furnishes a current for the "C. & C." motors.

The Oerlikon Machine Works, of Switzerland, exhibit a compact, efficient dynamo, running incandescent and arc lamps in the same circuit. It has a capacity of 120 incandescent lamps and 12 arc lamps.

The Mutual Electric Manufacturing Co., of Brooklyn, exhibit the Knowles system of electric lighting, in which the dynamo supplies a current to arc and incandescent lamps, and also to motors upon the same circuit. The feature of the dynamo which renders this possible consists of a very sensitive regulator, which is capable of quickly shifting the current according to the electric load. This dynamo is driven by a Hill clutch and pulley on a line shaft.

A feature of electric lighting which has often been discussed, but never practically realized until now, is that of economically producing steady incandescent electric lights through the agency of the dynamo by power derived from a gas engine. Otis Brothers & Co., of New York, exhibit a 4 h. p. Baldwin gas engine, which drives a United States dynamo, and furnishes a current to thirty-two 16 candle power incandescent lamps. The engine, consuming 30 ft. of gas per h. p. per hour, makes the expenditure of gas for the production of 16 candle power 3¾ ft., whereas a 15 candle gas light requires 5 ft. of gas per hour. The lights are readily maintained at a high incandescence, and are absolutely steady. To show the possibilities of electric illumination by means of a gas engine, the dynamo driven by the Baldwin engine is connected with a Julien storage battery when not furnishing a current directly to the lamps. The storage battery requires about five hours for charging, and will maintain 52 lamps for about three hours, thus making it possible to furnish 84 lights with a single 4 h. p. engine.

The gas engine exhibit of the present year excels that of any previous year, both as regards the number shown and the variety and quality of the engines. Messrs. A. C. Manning & Co., agents for the Otto engine in this city, exhibit a 10 h. p. engine running idle, a 7 h. p. engine running arc lights, two 4 h. p., one 2 h. p., and one 1 h. p. engine. The 7 h. p. engine drives a Waterhouse dynamo, which supplies a current to 8 arc lamps. The Clerk gas engine is in place, but not in operation. The Charter gas engine is also in place, and is occasionally in operation.

The Economic Gas Engine Company have an exhibit of six small engines, ranging between 1 man power and 1 h. p. These little engines are extensively used in and about New York for pumping water for household purposes and for running light machinery. They are exceedingly simple and well adapted for any use requiring not more than 1 h. p.

Undoubtedly the greatest novelty exhibited this year is that of the electric welding of metals. This new art of electric welding is one discovered by Prof. Elihu Thomson, of Lynn, Mass. The invention is under the control of the Thomson Electric Welding Company, of Lynn, Mass. The welding is accomplished by sending a very heavy current of electricity through the bars of metal to be joined by welding, the resistance offered by the comparatively imperfect contact between the abutting surfaces serving to create a temperature sufficiently high for the purpose. As the contact surfaces soften under the great heat, they are forced together, and the heat extends to the contiguous surfaces until the adjoining ends are in perfect contact and the union of the metal is complete.

In the exhibit the current is furnished by a Thomson-Houston alternating current dynamo of high voltage, and this current is reduced to low voltage and large quantity by a transformer consisting of a primary and secondary coil and a magnetic core. The primary wire in this case, unlike an ordinary induction coil, is small and long, while the secondary conductor is very large and short. The terminals of the secondary conductor are connected with the clamp by which the material to be operated upon is held in position for welding. There seems to be no limit to the possibilities of this process. All of the metals, so far as known, may be successfully welded by the electric current. No exception is made of aluminum or cast iron. Wrought iron, steel, brass, and copper are readily united, the joint being generally stronger than the other portions of the metal. Unlike metals are also successfully welded—iron and steel, brass and iron, and brass and German silver are examples.

Among electric motors in operation will be found the Daft motor, driving a street car, another applied directly to a Sturtevant blower, another operating an elevator. The Sprague Electric Company show a motor running a band saw, another running a printing press, another driving a large blower. This company also exhibit a railroad car having the electric motor attached. The "C. & C." Electric Motor Co. exhibit a large number of their motors of different sizes, doing various kinds of work—running sewing machines, blowing organs, operating ventilating and cooling fans, etc.