Scientific American.

NEW YORK, NOVEMBER 28, 1857.

American Cotton and its Present Interests.

There is no material which affects so many manufacturing interests as that which forms the subject of this article. It has now arisen to be the most important of all fibrous substances employed in the arts; and it is not a little surprising that it has attained to this position within a very recent period. Our country is the chief source of its supply, furnishing as it does about eighty per cent of the whole product. Millions of anxious minds are, therefore, continually directed to the source of its cultivation, because an abundant or deficient crop, by raising or lowering its price, either gives them plentiful labor and the means of comfortable subsistence, or stops the wheels of industry, and makes them go idle in the streets, suppliants for work or bread.

In 1641, cotton was first spun in England, on the common hand wheel, but was only employed mixed with wool in cloth; and small, indeed, was the quantity used, even for this purpose. From 1700 to 1760, the only persons who used it were weavers, who wove it into cloth during the day, their wives and children having spun it in the evenings and leisure hours. It was then a dear material—although much cheaper than fine flax—owing to the difficulty of separating the cotton from its seed, this having been done either by hand picking or by passing it between rotating rollers. Notwithstanding this, however, its use increased, and the demand for it soon exceeded the supply. The invention of the cotton gin gave a wonderful impetus to its culture; and the inventions of the spinning jenny, mule spinner, and power looms, whereby, from the field to woven fabric, it could be operated by machinery, at last raised it to the pinnacle of manufacturing fibrous materials. In England, in 1757, only 4,765,000 lbs. were consumed; in 1856, no less than 1,023,000,000 lbs. were imported into that country. Previous to the present financial difficulties, the demand for it far exceeded the supply, and would do so now, were these difficulties removed. Before the Sepoy mutiny took place, large meetings of cotton manufacturers were held in England, for the purpose of influencing government to offer greater encouragement to its cultivation in the East Indies and other colonies, because they felt they were entirely dependent on our Southern States, and were becoming more so every year.

For the last thirty years its consumption has doubled every twelve years; and at the end of 1856 there was only seven weeks' supply of it in all Great Britain. In its manufacture 379,213 British operatives were engaged, whose yearly earnings exceed $50,000,000, and the capital invested in machinery and buildings exceeds $200,000,000. Two months ago, owing to the increased demand for cotton, its price had arisen to double what it was ten years since, and many of our cotton manufacturers, as well as those of other countries, had to suspend operations, because the manufactured cloth could only be sold for about the price of the raw material, weight for weight. At present, most of the cotton factories in England are working only on half time, and those of our own country even less than this. Our financial difficulties, no doubt, aggravate this evil, but they are not its sole cause; it is the high price of cotton. Since so many persons are dependent on cotton manufacturing, it is an important question whether its supply can be increased in proportion to the demand for it, and its price lowered to meet that demand.

It appears to us that after the present financial crisis is over, the price of cotton fabrics must advance considerably, and this will call those factories which are now idle into active operation. The price of cotton cannot come down to the low figure at which it ranged ten years ago; and our Southern States will maintain the monopoly of its supply to the world for many years to come, at least, if not for ever. The East Indies was the first field to which the British cotton manufacturers were looking for a future cheap supply, to place them independent of our planters; but the late mutiny of the Bengal army and the insurrectionary state of that country have put East India cotton entirely out of the question. Our cotton crop last year amounted, in value, to $130,000,000; this year, the calculation is that it will amount to $160,000,000. Its value is increasing rapidly every year. It is one of the chief sources of our national wealth; and upon our yearly crop the whole cotton manufacturing world is, at present, depending.

Fuels, Mineral and Vegetable.

The process of combustion is but an oxydation of the substance being burnt, and the heat evolved is the result of this chemical combination. Any material that is capable of oxydation may be used as a fuel; but as an economical question, we can only usefully employ those which contain a great quantity of heat-making matter in a small space, so we have adopted carbon and its compounds as our every-day warmth-givers. These compounds of carbon form a wonderful series of bodies—sparkling in the diamond, glistening in graphite, shining in anthracite, transparent as air in carbonic acid, and a fine black powder in soot. The most really economical, in point of heat, is charcoal, which is nearly pure carbon, and is capable of giving out a most powerful heat; it is prepared by heating wood in close vessels, when all the gases, resins and tars distil over, and pure charcoal remains behind. It should retain perfectly the shape and run of the fibers of the wood, and should be hard, compact and rather brittle, to be good. In wood there is generally from 24 to 26 per cent of pure charcoal. On the average, a given weight of charcoal will give out more heat than the same weight of any other fuel, with the exception of two varieties of soft coal from South Wales. Next in order comes anthracite, which is the oldest of all kinds of fossil fuel. Its structure is perfectly homogenous, or precisely the same throughout the mass; it breaks with a shell-like fracture, has a jet black color, and a glassy luster, on which is often seen a beautiful play of colors. Of this there is plenty in the world, only requiring to be raised. Pennsylvania alone has sufficient to supply us for an definite period; and in this country it is, practically, the best fuel that can be obtained. The average of American anthracite contains about 90 per cent of carbon, while that of France (of which however, there is very little) contains 94 per cent of the same.

After anthracite is coke, which is, so to speak, coal charcoal. When brown or soft coal is heated in close vessels or in heaps, to which very little or no air has access, the tar and gases are driven off, and coke remains. The gases are now generally collected, and with them we light our houses and streets, and the tar serves many a useful purpose.

Good coke should possess sufficient solidity to bear the weight of a smelting furnace without crushing, as smelting is one of its principal uses. It ought to be hard and coal-like in form, and should have no soft, damp, black dust on its surface, and must not be exposed too long to the action of the atmosphere and weather, or it will soon perish, and become valueless. It is sometimes made by the coal being carbonized in heaps, other times in brick mound-shaped fireplaces, and the best is carbonized in ovens, while the worst varieties are those which come from the gas-house, and have been carbonized in retorts. It should be almost pure carbon, having in addition only the mineral constituents or ashes of the coal from which it was made.

Brown, or soft coal, is well known by everybody; it breaks in layers, is shiny when broken, but quickly loses that appearance, blacks the fingers when touched, and contains a great quantity of tar; the various varieties contain from 60 to 90 per cent of carbon, and all give forth, in burning, a dense, black smoke, owing to its want of compactness, and imperfect combustion. The great beds of soft coal are in Great Britain, of which a great quantity, nearly one quarter of her whole area, is coal.

Peat is semi-fossilized vegetable matter, or rather woody fiber in a state of semi-decay; it occurs in bogs, of which those of Ireland are notorious. It is cut in square blocks and dried, when it forms a good and pleasant fuel, and has a peculiar odor, that is considered agreeable by those who use it. A very good quality of charcoal can be made from it, that is of great value in certain smelting operations; and we are inclined to think that peat is destined to enjoy greater respect, as an object of economical use, than it yet has done.

Wood is the oldest used of all fuels, because the most easily attainable. Of wood, ash, fir, lime and elm are the best, and next to these come poplar, sycamore, beech and oak, in point of economy. But in all cases, the choice of fuel must depend more on locality than on philosophical principles; and we have but given the result of much patient investigation and actual experiment.

Motion and Motors.

The question "What is motion?" is so often asked, and just as often unsatisfactorily answered, that we will endeavor to throw some light on the subject. When a body occupies successively different positions in space, we say it is in motion. A log which rolls along the ground, a horse that walks along a road, a boat descending a river with the current, are instances of bodies in motion. Each of these changes its position in regard to objects which we call fixed, although really there is no stand-still in nature; but as we relatively take part in the same motion as the trees, the hills and other land-marks, to us they appear as fixed. To return to our question "What is motion?" we reply, motion is the result of the action of the elemental forces of nature; and as they are always at work, and ever have been, motion is eternal, illimitable, and all-present. We call these forces electricity, magnetism, gravity, attraction, chemical action, and life, together with heat and light. To these forces may be traced all the wondrous changes of nature that are daily going on around us; and to the application of these forces to our own wants and requirements, we ascribe all that man has done to render easy the high roads of civilization, and make ways for truth through the trackless ocean. Nature is the prime action, and art the combined and controlled action of them; or, in other words, in nature they act governed only by their own laws, and in art their laws are made subservient to the wants of man. The planets in their movements around the sun, the sun carrying, by the force of his attraction, the planetary system through space, the motions of all the heavenly bodies, are the result of combined attraction and gravity. The trees growing in the field, animals increasing on the earth, and man standing as a presiding genius over the whole, owe their existence to life and chemical action. The rock crumbling under the action of the weather, the steamer crossing the mighty deep, the locomotive pursuing its undeviating path, are the results of heat. Light shines everywhere, and influences all created things. These are the motors of creation out of the power of man to create, but in his power to control.

Venturing cautiously a little deeper into the subject, we find that all the above mentioned forces are related intimately the one to the other, and that in many instances, one can develop the rest. Thus, electricity can develop heat, light, magnetism, attraction, and chemical action, but not gravity or life, for life, we know, is the direct gift of a Higher Power; and it would really seem that all these which we now call separate and distinct are but the developments of one great force which yet remains to be discovered.

Much has been said and written on this subject, but without contributing any great amount of knowledge to that already in our possession, as each author has taken more trouble to prove some theory of his own than to investigate the simple truth. This much, however, we know, that the above are the fountains of motion, and there are no effects that cannot be traced to them.

Trial Trip of the Adriatic.

The long expected trial trip of the *Adriatic* has been successfully made, and the ship is now on her first voyage to Liverpool. It is the wish of all America, and it is, perhaps, just to say, of the world, that she may prove superior to any steamship previously constructed. She is, certainly, the largest yet afloat; and during the latter hour of her trial trip made the greatest speed on record, for vessels of her class. In coming up the harbor on Monday morning, the 16th inst., she ran from an accurately-ascertained point off Sandy Hook, to an equally definite point near Governor's Island, a distance of 21½ statute miles, in one hour and four minutes. This is a trifle over twenty miles per hour. Long and sharp river steamers have frequently moved from twenty to twenty-five miles per hour, but heavy sea-going vessels rarely exceed sixteen. The great speed of the ship in this instance should not, however, lead to too extraordinary expectations in regard to her general performance, on account of a circumstance not alluded to in the daily papers—the disuse of her "cut-off" during the whole trial. On starting from the dock it was found that the valves slammed too violently when dropped in the manner intended, and the engines were, consequently, adjusted to work with the steam following the piston at full pressure during the entire stroke. This method of working consumes steam very rapidly, and develops somewhat more power than when worked properly; and the rapid run was probably due to the fact that a high pressure of steam existed in the boilers at the commencement, and was expended to develop extraordinary power in running down as she neared her dock. The "dash pots," as the parts are technically termed which check the descent of the valves, are to be replaced by larger or more efficient ones.

The trial trip, so far as it was a trial, was successful, but it demonstrated nothing definite with regard to the working of the valves, nor with regard to the normal speed of the ship under proper conditions. The model appears to be, as was generally expected, exceedingly well adapted to high speed, and the heavy work of the engines has been proved admirably perfect. It is yet possible that the valve gear will be subjected to several alterations, though nothing has been definitely proved that points to such a necessity.

Indemnity to the Widow of an American Inventor.

Some months ago, Charles Morey, an American inventor, was temporarily imprisoned at Paris, and while gazing out of the window of the prison, was suddenly shot dead by a soldier on guard below. The soldier had misconstrued the orders of his superior officers. Through the efforts of the American Minister, Mr. Mason, the French government has lately been induced to grant to Mrs. Morey, the widow, the sum of $15,000, as indemnity money for the loss of her husband.

Charles Morey was well known in this country, for his inventions. Morey & Johnson's patent was one of the earliest sewing machines—a species of mechanism that is now rapidly finding its way into every household.

An Interesting Spectacle.—A political party in the City Hall Park (New York), rejoicing over a victory by consuming a generous quantity of powder at fifty cents a pound, and having for spectators a crowd of *starving* people smoking segars.

A Model.—We have received a model of a mathematical instrument, which awaits proper advices from the inventor. There is no name on it, therefore we cannot find out its origin.