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Contents.

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TABLE OF CONTENTS OF SCIENTIFIC AMERICAN SUPPLEMENT No. 840.

For the Week Ending February 6, 1892.

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REMOVAL OF SNOW BY MELTING.

The subject of disposing of snow which has fallen in the streets by some more rapid and less cumbrous method than that of carting it away has attracted considerable attention from time to time. Various systems of melting it have been proposed, and calculations as to the thermal energy required indicate the practicability of so doing. As fast as melted the water could be run away through the sewers. The calculations were made and the possible economies of the process were examined into, and the results were published some years ago in these columns. It appeared that snow could probably be more economically disposed of thus than by carting it off to the distant river edge and there dumping it into the water.

Mr. Charles E. Emery, the distinguished civil engineer, and one of the highest authorities on the use and distribution of steam, examined the question at about the period alluded to, and reached the same conclusion. Still more recently the subject has been taken up in England and the proposition has been made to use gas for melting snow. While gas is an expensive fuel, it develops a definite economy in use, because it can be more advantageously applied than any other fuel, where the center of heating is of limited area or volume. Putting the price of gas at a fair figure for England, 2s. 6d. per thousand cubic feet, an English contemporary, *The Building News*, concludes that snow could be very advantageously disposed of by melting with burning gas.

Mr. Emery did not examine the subject from a theoretical standpoint only. He also tried a steam melting process, which gave excellent results and was distinguished by great simplicity of appliances. A tarpaulin 25 feet square was used to cover an area. It was drawn about upon a sled and spread where required. When spread, the steam was admitted to its interior as it lay upon the snow, and the latter was rapidly melted. In this way it was found that large areas could be denuded of snow with economy.

The great trouble was the supply of steam. In streets possessing steam mains this trouble would not exist, but in other places a portable boiler would have to accompany the apparatus. The method seems far simpler and more practical than gas melting with special burners and melting plates, and for this country at least would, we believe, prove far more economical. The steam process involves the direct contact of steam and snow. In the gas process as described the conduction of heat through a metal heating plate is also involved, which would be a cause of inefficiency and would retard to a degree the melting.

THE EVENING SKY.

The early evening sky just now presents a spectacle of uncommon beauty. Sweeping with the eye upward from the western horizon, the lovely crescent of the new moon meets the view; next, the brilliant orb of Venus, gleaming with golden splendor; higher up is the refulgent globe of Jupiter, the largest of the planets, the fastest in circumferential motion, attended by four moons, visible in the telescope. The exterior of the earth turns at the rate of a thousand miles an hour; that of Jupiter, twenty-seven thousand miles an hour. Continuing upward are the fabled Pleiades, the seven stars, visible in all lands—a cluster of flaming suns, forever flying onward in space.

The rosy red Aldebaran next is seen, burning (if you look in the spectroscope) with hydrogen, sodium, magnesium, calcium, iron, tellurium, antimony, and mercury. Looking eastward, that wondrous constellation Orion is beheld, with his three-starred belt, three equidistant suns, one degree apart, and those more distant stars, four in number, of which Regel below the belt and Betelguese above are brilliantly conspicuous. Below Orion, toward the east, shines the majestic Sirius, brightest of the stars. Still eastward is Procyon, above it Castor and Pollux, Capella and Algol, all prominent in the heavenly dome.

Astronomy is indeed the sublimest of the sciences; no study is more interesting, none more elevating to the soul; yet how few pursue it! Probably less than one in ten thousand persons can recognize or name the principal constellations. The glories of the heavens pass by unnoticed and unknown.

THE WAR SHIP AND HER CREW.

The relative possible effectiveness of modern war ships may be measured by comparing the strength of armor, of battery, power of engines and the like, the one with the other. But other factors must be determined in order to come to anything like a reliable conclusion as to the result of an engagement between one type and another, to wit, the experience and training of officers and crew, and their familiarity with the apparatus they handle; else the opposing commanders might come together before engaging and, sitting down at a table, with pencil and paper before them, calculate the chances and award the victory without firing a gun. Given two ships of equal armor, armament and power, who will doubt that, barring accidents, the one whose crew is quickest and surest at the gun practice, whose officers are quickest at maneuver, will win? So, too, of ships unequal in size and armament. The most powerful will not necessarily have the advantage.

It is an axiom among boxers that a good big man is better than a good little man, but that a clever little man is better than a sluggish big man. On the same theory a big ship, however heavily armored and armed, with unskillful officers and men not used to or slovenly at the guns, would be no match for a much smaller craft with less powerful guns but officers well schooled, energetic and enterprising, and a crew well drilled and handy. Those who have read the naval history of the United States will recall the victories gained by the Yankee ships in the war of 1812, through superior seamanship and gunnery. Though often opposed to ships of superior tonnage and weight of battery, manned by men whose courage had been tried in many seas, the advantage in training proved to be a factor that turned the scale in favor of the Yankee crews. It is upon the superior training, the energy and the enterprise of the officers and crews of our fleet that we must, in large part, rely in the possible contingency of war with Chile. There is one Chilean ship, the Capitan Prat, now being completed in a French yard, that, in point of size, armament and armor, is superior to any ship which we, at present, have afloat. But there is reason to believe that any one of several of our ships could profitably engage her, for, with such a crew as she is likely to get, nothing like the maximum effectiveness of her apparatus could be developed.

Texas Lignite.

According to Professor E. T. Dumble, a very careful comparison of Texas lignites with those of Germany and Austria shows that they are in all respects fully equal to some of the better grades of those in use, and equally applicable for all fuel purposes under similar conditions. This conclusion is supported by the indorsement of some of the most eminent authorities on the subject in Germany and Austria, to whom specimens were submitted for examination.

Lignite of this character is found at Rockdale, on the International & Great Northern R.R., and at Elgin, on the Houston & Texas Central R.R., both of which localities are sufficiently near to Austin to give an abundant supply of the fuel at a very low price. The bed at Rockdale is open, and is being worked on a small scale; that below Elgin was opened by Captain Mather, of the Austin water works, who reports the seam to be about eight feet in thickness and that it was similar in all respects to that at Rockdale. Taking into consideration the character of the lignite which occurs at Rockdale, which has been fully tested by the geological survey, and that at Elgin, and the extent of these deposits, there is no reason why the fuel cannot be mined and delivered in Austin at a price which will make it the cheapest of the cheap fuels; and its quality is such that it can be used with greatest success and economy in the manufacture of lime, cement, brick, stoneware, glassware, pottery, etc., and under steam boilers of every kind, thus being entirely suited to all the manufacturing needs of Austin.

In developing the iron resources of central Texas it will be possible to use some of these lignites as part of the fuel of the smelting furnace. The character of coke which can be made from them is now the subject of experiment, but it is too early to make any definite statements regarding it. Outside the first smelting of the iron, however, the quality of the lignites adjacent to Austin is fully sufficient for all the operations for converting pig iron into wrought iron and steel, as well as for all rolling mill purposes.

All that is needed to secure the desired results is a proper construction of the fire boxes, grate, etc., general plans for which can be secured through this department, or directly from the mechanical engineers of Germany and Austria.

An Electric Mail Car.

One novelty in the way of electric traction on the St. Louis and Suburban Railway, now in successful operation in St. Louis, Mo., is the application of electric motors to a United States mail car, which makes regular trips over the entire line, distributing and collecting the mail at the different railway stations, as is done on steam railways. This car is of the same length as an ordinary steam railway mail car, and is equipped with double trucks with 36 inch wheels, a Thomson-Houston motor of 15 horse power capacity being connected to each truck. A very high speed is attained, and the delivery and collection of mail is made without stopping the car, as in steam service.

AT Fagersta, in Sweden, briquettes are now being manufactured out of wood charcoal by the addition of coal tar. A paste is made out of the charcoal and the tar, which is transferred to a press, whence it issues in slabs about 16 in. thick, which are exposed to the air on the ground for several weeks, during which period the water in the tar evaporates. This combustible has been successfully employed for steam boilers, its calorific power being said to approach that of the best English coals.

An Englishman's Views on the Great Exposition.

Mr. James Dredge, editor of *Engineering* and British commissioner, visited this country not long ago to examine and report to his government upon the condition and prospects of the Chicago Exposition. Recently he read an able and exhaustive paper before the Society of Arts, in London, which is full of instructive particulars relating to the great enterprise. The following are his concluding remarks:

I hope I have made it clear that the pre-eminence of the Columbian Exposition may be fairly claimed by its organizers, not only because it will be far larger than any international exhibition that has preceded it—that is simply a law of natural development—but because of the real beauty and grandeur of its buildings, and, I think, because of the greater variety, novelty, and interest of its contents. The development of industry in the United States has advanced at such a prodigious rate of late years that no one can form even a faint idea of its present condition, except by facts and figures, than which nothing is more misleading. Last year I ventured to suggest several reasons why this exhibition should be truly international, and to-day I find no reason to modify the opinions I then expressed. On the contrary, many significant facts combine to prove the correctness of those views, and that they were not overstated, at all events, so far as this country is concerned. There is a very general feeling of resentment against the United States, because she surrounds her industries with a high barrier of tariffs. Nothing could be more unreasonable than this resentment; it is the business of every country to guard its welfare in the way which seems best to itself, whether by great armies, powerful navies, or internal policy. And, in spite of all the impediments placed in the way of our industrials, no less than one sixth of our total exports find their way through the protected ports of North America. This vast volume of trade is carried on to the mutual benefit of sellers on this side and of buyers on the other side of the Atlantic. It seems to me that among these great interests involved, there would be enough to occupy all the space that has been assigned to us at the exhibition. Again, we have many special industries, the products of which are of the luxurious and costly kind, to acquire which is the privilege of wealth; and there is no country in the world that can compare with the United States in the number and capacity of such purchasers. This should prove a sufficient inducement to many manufacturers who may become exhibitors at Chicago, with every reasonable certainty of selling all that they may send, and of establishing permanent and profitable connections in the future. Americans are rapidly becoming leading patrons of art. The fact that most art students from the United States go to Paris to study is probably the reason why the French school controls the American market. It is time that this condition of things is changed; and there is little doubt that it will be changed, if English artists respond to the invitation to exhibit, and are fitly represented in the noble gallery of fine arts that will form so conspicuous a figure at the Chicago exhibition. English sentiments will remain deeply implanted in American nature, and will respond freely to the feelings expressed by the noble English school, which won so much admiration and surprise at the Paris Exhibition of 1889.

I have pointed out that it is the avowed intention, in American official quarters, to make a bold stroke at our South American trade, and to wrest from us as much of our commerce in the western southern hemisphere and elsewhere as may be possible. Being forewarned of this approaching struggle, which is without unfairness and without bitterness, our manufacturers should be forearmed, and, by carrying the war into our commercial enemy's camp, should turn the exhibition to their advantage, and prove to all the world the incontestable superiority of the goods which we export, both as regards quality and price. Whatever benefits the United States may derive from the policy of high tariffs, it is certain that such complete protection must act prejudiciously on many industries, both as regards the quality of the goods produced and the cost of producing them. This is an inevitable consequence of the absence of the healthy stimulus of competition. When, therefore, foreign purchasers have an opportunity of comparing at Chicago the relative values of our own goods, side by side with similar articles made in the United States, I think there need be little fear of the result. Of course, this has not a universal application; we cannot expect to hold the lead in every branch of manufacture, and it must be frankly admitted—and admitted, I hope, with due admiration of American ingenuity, skill, and enterprise—that in many things the United States have left us far behind. Any attempt at competition in those directions would, of course, be useless, and only lead to disappointment and loss of money.

Another important inducement to manufacturers to be present at Chicago must not be lost sight of. The number of Americans visiting Europe increases year by year; for the most part they are wealthy and leave large sums of money behind them, and, fortunately for our trade, England is rising in favor with these visitors. Many shopkeepers and manufacturers enjoy great support from American customers, and it would be bad policy for them to neglect the means which will be afforded them in 1893 for increasing this support and making new connections. Exhibitors of such goods as the wealthy American tourist loves to buy will be remembered long after the exhibition has been closed, and will be sought for in England by visitors who will remember their displays at the exhibition.

To the horticulturist, the coming exhibition affords the certainty of a rich harvest, for as it has already been pointed out, our pre-eminence in flower culture is undisputed, and this branch of industry is less hampered by tariff obstacles than most others.

Much machinery of varied classes may be exhibited with profit, chiefly for the benefit of foreign customers, but in some cases also to meet the demands of the American market. A large exhibit of objects connected with transportation—such as railway rolling stock and ship models—may be confidently expected; these would be shown, not with the expectation of any actual trade benefit, but for the information of Americans who sooner or later will visit Europe. With a more direct purpose, the manufacturers of bicycles and tricycles may be expected to attend, for they represent a very important industry, in which this country takes an undoubted lead. Patentees of machinery and of processes may, if their exhibits possess real merit, fairly hope to do business in the United States, and our most advanced steam engine practice will certainly be represented there on a large scale. Altogether, one way and another, we may fairly hope that the area allotted to us in the Machinery Hall will be filled with representative exhibits, and that the displays in the Electricity and Mining Building will not be unworthy of the country. As regards agricultural exhibits, American manufacturers have taken so decided a lead in the implement trade that there appears but a slender chance for the British exhibitor in America; but the classification in this department is so wide and varied that it embraces many objects in which we can be represented with profit; especially is this the case with live stock for breeding purposes, for which there is always a demand in the United States, and an exemption from duty.

To urge manufacturers to incur the trouble and expense of exhibiting at the Chicago Exhibition, on the merely sentimental ground of aiding in the triumph of a great work, would be absurd, although there are idealists on both sides of the Atlantic who see in the general advancement of humanity sufficient reason for demanding on the part of others large pecuniary sacrifices. But an exhibition can only be successful as a commercial enterprise, and any manufacturer would be as foolish to participate without reasonable prospect of benefit as he would be to abstain from mere prejudice against the tariff. Let our manufacturers consider, therefore, carefully before deciding; they can obtain sufficient data from which to form a fair appreciation of the chances of profit or loss, and if the odds are in favor of the former, they may go to Chicago, certain of a reception they have never experienced before at any international exhibition; a reception based on true generosity and friendship, from a nation speaking their own language, bound to them by ties of kinship, and by community of sentiment; competitors only so far as competition is inseparable in the struggle for pre-eminence.

Resinized Silver Paper.

The particular method of preparing the paper recommended by Herr Valenta is as follows: Ten parts of chloride of ammonia are to be dissolved in one hundred parts of water; from three to four parts of gelatine should be swollen in water. To prepare the saponified solution of resin, some water is heated to boiling point in a porcelain dish, and some solution of ammonia added, and the light yellow French resin, finely powdered, added in small quantities, with constant stirring. When all the resin is saponified and the solution quite clear, the swollen gelatine is added and dissolved, the solution of chloride of ammonium is now added, and the bulk of the solution made up to one thousand parts with distilled water, carefully neutralized with dilute hydrochloric acid; and finally a concentrated solution of citric acid added till a strong acid reaction is given. The resin is precipitated in a very fine state of division by the addition of the acid, and a milky liquid thus obtained, which is used to salt the paper with.

Rives paper gives the best results, and it is best salted by spreading the warm solution over the paper with a pad, and then allowing it to float on the warm solution for three minutes. The salted paper should be dried in a fairly hot room. Sensitizing may be effected as usual by floating on a 50 or 60 grain silver solution for two to three minutes, and then drying in the dark.

The paper should be fumed for ten minutes before use, as greater brilliancy and quicker printing is thus obtained. The prints, when removed from the printing frame, have a dark-blue, violet shade, and if washed slightly and then fixed in an acid fixing bath, a pleasing reddish-brown tone results. The prints are not sunken in, and possess much greater brilliancy and purer whites than ordinary salted paper prints.

Beautiful black prints may be obtained by the following procedure, and they closely resemble good platinotypes. The prints must be well washed to free from nitrate of silver, immersed in a bath of gold chloride 1 part, borax 80 parts, water 10,000 parts, till they assume a deep violet tone when examined by transmitted light. They should be then washed and placed in a platinum bath, composed of 1 part chloroplatinite of potash, 300 parts of water, and 15 to 20 drops of hydrochloric acid. They tone very quickly to a fine black, and should be then well washed and fixed. It is essential to print very deep for this platinum toning.

If the prints are fixed on removal from the gold bath, the image on drying is a good reddish-black, and if an acid uranium nitrate bath be substituted for the gold and borax bath, a fine red tone is obtained.—*Amateur Photographer.*

The Crushing Resistance of Bricks.

The Department of Experimental Engineering, Sibley College, recently received from an Ithaca manufacturer four samples of brick to be tested. All the brick were tested entire and on edge, as they would be used for the purpose of paving. The sides were dressed to parallel planes on an emery wheel, so that the bearing should be uniform over every part. A single layer of thick paper was placed between the surfaces of the brick and the testing machine.

The repressed brick exhibits the greatest crushing strength of any brick on record; it is also superior in strength to sandstone, and fully four-fifths as strong as granite. The tests of stone are usually made on cubes one or two inches on each edge, and such tests show a greater strength per square inch than would be the case if the form of the block was like that of the brick tested; so if the proper allowance for form should be made, there is little doubt but that the crushing strength of the best brick would compare favorably with the strongest granite. The best results from ordinary pressed brick usually show a strength from 6,000 to 10,000 pounds per square inch, so that the other bricks tested, considering the quality and method of manufacture, show an extraordinary strength. No test could be made for wearing qualities, but the brick exhibit, so far as can be determined by striking them with a hammer, sufficient toughness to make them a superior article of paving brick.

Cloud Rain.

Mr. John Aitken, the well known meteorological investigator, to whom we are indebted for the discovery of several fundamental facts in connection with the formation of fogs and dew, has been investigating clouds from the summit of the Rigi and Pilatus. He now finds, as in former observations, that fog is intimately dependent on the presence of dust particles in the air, each of the invisible granules forming the nucleus of a tiny head of water, these vesicles constituting in the aggregate clouds, mists, and their kindred. At elevated situations the air is comparatively free from dust, while lower down it is full of it. But while clouds are passing over a peak the number of particles varies considerably. This, he discovers by a series of carefully compiled data, is due to the fact that the air entering into the clouds has forced itself up from the valley below. Hence the mountain air is pure or impure in exact accordance with the amount of this lower world current which has reached it. When the cloud vanishes, the ether resumes its old composition. Another curious fact just discovered by the same indefatigable observer is that the moment a cloud forms it begins to discharge its contents in the shape of a steady shower of minute drops. These drops are not capable of being appreciated by the unassisted senses; but by the "fog counter," an instrument of Mr. Aitken's invention, the exact number falling on a given space can be readily noted. What is still more curious is that though the air is in such circumstances saturated with damp, seats, stones, and other large objects near the earth are perfectly dry, the drops being evaporated by the radiant heat of the ground; but a pin's head or other small object, not offering the same area, is in these circumstances often covered with a minute globule of water. The fact of a cloud thus beginning to rain small drops whenever it is formed may account for the disappearance of these vaporous masses by gradual exhaustion, without any change in the wind or temperature.

Articular Rheumatism.

In the *North American Practitioner* for September, 1891, Dr. Joseph Lane Hancock writes that for the last two years he has been treating cases of inflammatory rheumatism with a local application of carbolic acid applied in the form of a four per cent solution on a warm flannel cloth wrapped closely around the entire affected joint.

Dr. Hancock states that his custom is to leave this dressing on overnight, placing it in position just before the patient retires.