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(Illustrated articles are marked with an asterisk.)

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SCIENTIFIC AMERICAN SUPPLEMENT

No. 755.

For the Week Ending June 21, 1890.

Price 10 cents. For sale by all newsdealers

THE WINNEBAGO COUNTY (IOWA) METEORITES.

On Friday evening, May 2, 1890, at 5:30 P. M., standard Western time, a meteor was observed over a good part of the State of Iowa, and is described as a bright ball of fire, even in the sunlight, moving from west to east, leaving a trail of smoke which was visible for some minutes. It was accompanied by a noise likened to that of heavy cannonading or thunder; and many people rushed to the doors, thinking it was the rumbling of an earthquake. Substantiated reports have been received from Des Moines, Mason City, Fort Dodge, Emmetsburg, Algonia, Ruthven, Britt, and Forest City. The noise was also heard at Sioux City. Some of these places were at a distance of over a hundred miles from the point where the meteor fell. It exploded at Leland, about eleven miles northwest of Forest City, Winnebago County, in the center of the northern part of Iowa, latitude 43° 15', longitude 93° 45' west of Greenwich, near the Minnesota State line. The fragments were scattered over a considerable surface of ground. Up to the present time there have been found a 66 pound mass, a 10 pound mass, two 4 pound masses, and 500 fragments weighing from one-twentieth to 20 ounces each, one lot of twenty masses weighing only 12 pennyweights. A part of the main mass of the meteorite is believed to have passed over into Minnesota. The pieces are all angular, with rounded edges.

This meteorite is a typical chrondite, apparently of the type of the Parnallite group of Meunier, which fell February 28, 1857, at Parnallee, India. The stone is porous, and when it is placed in water to ascertain its specific gravity, there is a considerable ebullition of air. The specific gravity of a fifteengramme piece was found to be 3·638. The crust is rather thin, opaque black, not shining, and, under the microscope, is very scorious, resembling the Knyahinya (Hungary) and the West Liberty (Iowa) meteoric stones. A broken surface shows the interior color to be gray, spotted with brown, black, and white; the latter showing the existence of small specks of meteoric iron from one-tenth to four-tenths of a millimeter across. Troilite is also present in small rounded masses of about the same size. On one broken surface was a very thin seam of a soft black substance, evidently graphite (?), and soft enough to mark white paper. A feldspar (anorthite?) was also observed, and enstatite was also present.

Professor H. A. Newton says: "The path that satisfies best the accounts that appear to be reliable was directed from a point a little north of west and somewhat higher than the sun, the sun being then about 20° high and due west. The velocity of the meteorite may be safely assumed to have been greater than that of Encke's comet at distance unity, and less than that belonging to a parabolic orbit. With this assumption the orbit would be inclined to the ecliptic between 10° and 20° with direct motion. The ascending node is in longitude 42°.5. The body had passed perihelion several weeks, how long depends mainly upon the inclination to the horizon of the path through the air. The perihelion distance was probably between 0·50 and 0·70, this element also being largely dependent upon the same inclination. Better observations of thin inclination than are now in hand are hoped for."

This is the fourth meteorite that has been seen to fall in Iowa. The other three falls were as follows: At Hartford, Linn County, February 25, 1847; at West Liberty, Iowa County, February 12, 1875; and the great fall of siderolites at Estherville, Emmet County, May 10, 1879, which fall comprised over two thousand pieces weighing from a tenth of an ounce to four hundred pounds.

We are indebted for the foregoing to Mr. George Frederick Kunz; he has secured over 300 pieces for his collection.

The Great Wall of China.

The Rev. Wm. P. Sprague, of Kalgan, North China, writes as follows to the *Missionary Herald:*

If any one doubts the existence of China's great wall, let him come with me to Kalgan, and see for himself the identical wall built by the first Emperor Chin, in 200 B. C.

Take a steamer across the Pacific to Tientsen, then a native boat up the Pei Ho River three days, then pack saddle or mule litter five days more, through mountains and plains to Kalgan. Before you reach the city you see a dark line along the hilltops just beyond the town, and by the time you enter our compound you see the wall stretching away over the mountains as far as the eye can reach, both east and west, with towers on all the prominent elevations. As we pay it a visit for closer inspection, you find it a windrow or ridge of reddish-brown porphyry rock broken, not cut, into irregular blocks. These are so well fitted to each other that the outer surface is tolerably smooth, and has somewhat the appearance of crazy patchwork.

It is about ten feet broad at the base and fifteen feet high, the sides sloping to a sharp ridge like a steep house roof. You may follow this wall eastward to the sea, and westward to Kansuh, the northwestern province; and so doing you will have traversed the entire northern frontier of China, fifteen hundred miles. Though you find several hundred miles of adobe sun-dried mud wall, yet other hundreds of miles are of good brick and higher than at Kalgan By the time you have traced its length you will be willing to concede not only that China has a great wall, but also that the ruler who could conquer so vast a country, drive out the invading Tartars, and build a fortification fifteen hundred miles long to keep them out, was worthy to be called the first emperor, and to give his name (China) to the country.

If any one laughs at the folly of spending so much labor on such a useless defense, let him remember that it was a defense only against horseback riders, armed with nothing but bows and arrows. A few guards on the watchtowers could, with their signal fires on the mountain tops, easily rouse the villagers, far and near, to the defense of their homes. And this wall accomplished its purpose for over a thousand years, when the great Ghenghis Khan with his brave Mongol followers broke their way through.

This section of the great wall becomes for half a mile the city wall of Kalgan. A beautiful temple is built on this wall to celebrate Ghenghis Khan's victorious passage.

This two thousand year old wall is little known to the world at large, because there is another wall much oftener visited and described by visitors from the western world. It is near Peking and a far more imposing structure. This is only an inner arm of the great wall, but five hundred miles long, and not so old by seven hundred years. It is built of cut granite and good brick, and is thirty feet wide at its base, twenty-five feet wide at the top, and thirty feet high. It is a fine sight as it winds over the highest mountain tops.

The Art of Living to a Great Age.

The enchanters of China promised the emperors of that country to find an elixir of long life that should efface the irreparable inroad of years. The astrologers and necromancers of the middle ages flattered themselves to have discovered the fountain of youth, in which a person had merely to bathe in order to recover his youth. All such dreams were long ago dispelled by the progress of science. Yet, in the heart of most men there is such a desire to prolong their stay upon the earth that the art of living for a long time has not ceased to impassion a large number of persons who would be willing to endure all the evils of an indefinitely prolonged old age. We have several times had proof of this mania, which Dean Swift has so wittily stigmatized in his second voyage of Gulliver, by showing in what a state of abjection the mortals of Laputalived—those unfortunates who were condemned to survive their own selves through the loss of memory of what they had been.

One of the perpetual secretaries of the Academy of Sciences has written a volume to prove that man should consider himself young up to eighty years of age. A noble Venetian named Cornaro spent twenty years in a scale pan in order to ascertain what alimentary regimen was best adapted to him. We have known old men who, having learned that Mr. Chevreul had never drank anything but water, took the resolution to abstain wholly from wine, hoping in this way to exceed a hundred years. Fortunately, a rag gatherer, who reached the same age as the celebrated academician, spared them this sacrifice by informing his confrere in longevity that he had never drank anything but wine.

But of all these whimsical tentatives, there doubtless is none more worthy of exciting our risibilities than the one to which the Society of Hygiene, of Vienna, is now devoting itself. In fact, this association has just started an extensive investigation in order to determine what it is necessary to do in order scientifically to prolong life beyond the ordinary limits and to rival the patriarchs of the Scriptures, as compared with whom Mr. Chevreul himself was but a child.

The Society of Hygiene has therefore drawn up a circular which it has sent to all the old men of Germany and Austria-Hungary occupying a certain position in the world, and which contains a multitude of questions about their regimen, their habits, the duration of their intellectual work, the nature of their recreation, their manner of clothing themselves, etc. The good Viennese hope in this way to get up a practical manual designed for those who wish some day to double the formidable cape of eighty years.

We wish the hygienists luck, but we much doubt whether this tentative will have the effects that they anticipate from it, so great are the differences in physical aptitudes and in the occupations of each person.

The prolongation of human life is in itself a desirable result when it is obtained, in a manner, by a series of progressive measures, and not by an *ensemble* of minute precautions which would make life a sort of anticipated hell.—*La Science Illustrée.*

IF you want a lovely odor in your rooms, break off branches of the Norway spruce and arrange them in a large jug well filled with water. In a few days tender, pale green branches feather out soft and cool to the touch, and giving the delightful health-giving odor.

Mounting Photographs.

Procure from your grocer a supply of "flour of rice" (I don't mean rice starch), take two tablespoonfuls, and with a little water work it up into a nice thick cream in a common bowl. When this is done, and it is seen that there are no lumps, go on adding water to the extent of about twenty ounces. Keep well stirred, and add a teaspoonful of powdered alum when quite dissolved. Take a suitable enameled pot or other clean one, such as in Scotland we make our porridge in, stretch over the top of it a piece of coarse muslin, and pour through the same into the pot the rice flour and water. While these operations have been going on a little gelatine, about twenty grains or so, is to be softened in clean cold water. When quite soft place this also in the pot and add thirty drops of oil of cloves. Place over a gas stove or bright fire free from dust, and bring gently to the boil, stirring well all the time. When the boil is reached the result will be a nice thin paste. If too thick, it must be thinned down by the addition of water at this stage and gently boiled a little longer. I may just describe that when the paste assumes a thickness of the consistency of thin treacle, or when it will of its own accord permit its being poured from the pot direct into a wide-mouthed bottle, it will at the end of the operation be about right.

If it is seen that at this stage the paste is of the right thickness, add one ounce of alcohol, and when the same is well stirred and incorporated with the paste, pour the whole into a wide-mouthed bottle, set aside to cool, and when quite cold you have a permanent mountant that will delight the heart of the most fastidious operator. Let me add, then, when cold and going to use it, the same should be taken out of the bottle with a spoon and placed in a saucer or cup and beaten up with the hog's hair mounting brush, the bottle being carefully corked again till future use. A dirty or used brush should not be allowed to go into the bottle or remain there, as we so often see done with common gum bottles. If such little precautions as these are attended to, the stock bottle will keep good indefinitely, and the amateur or professional, wherever he may be, will have on hand always a stock of as good a mounting medium as the world has ever seen.

The color of this paste is one of its great points, while it has very excellent adhesive properties. A print, if carefully brushed over round the edges, will never lift, provided the mount is what it ought to be.

I now proceed to give a few hints, which I believe are not generally known to the great bulk of amateurs, or professionals either for that matter, on the mounting of prints in optical contact on glass.

First of all get your glasses thoroughly clean and dry, and be sure they are free from dust. When quite dry, brush over the surface of them a quantity of mounting medium, work this well on to the face of the glasses, and set aside for a few moments while you give a similar treatment to the "face" of the print, which ought to be damp. When the face of the print has been well brushed over with the medium, it is placed face down on the prepared side of the glass. I feel it is at this stage that many have gone wrong in their attempts to mount their prints in optical contact with cold starch. Were a squegee to be applied to the back of the print in this state, it is just about ten to one it would result in the tearing of the print by the friction of the rough surface of the back of the paper with the rubber of the squegee; but once this difficulty is recognized, and a simple means adopted whereby some efficient lubricator is brought to bear on the back of the print that will permit of the squegee slipping nicely along its surface without any fear of tearing, even when a fair amount of pressure is applied, the difficulty will be at once solved. I remember once when giving a demonstration to a photographic society how pleased a gentleman was to find what a little matter stood between him and success in his endeavors to put his prints on to glass by this means. Now the secret of success lies in not only brushing the cold mountant over the face of the print, but the back also. When the print is placed face down on the glass, take the brush and apply a good dose of mountant to the back also. This done, the squegee will slide most beautifully, and no tearing of the prints results.

For many years I have mounted all my prints in optical contact in this manner, and have often smiled when being told that I used hot gelatine for it. I find my prints keep quite as well as those mounted with gelatine, and no one can tell the difference. If the face of glasses and prints are free from grit or grease, there will be no slug markings. I can confidently recommend those who have a supply of old negatives or spoiled glasses to utilize them in this manner.

So much for placing the prints on the glasses. When dry, a neat appearance may be given to the pictures by binding round the edges of them a suitable colored paper. Most artists' colormen keep a supply of gold and other colored papers, and a few pence will acquire a sufficiency of such to bind a lot of pictures. Having made up your mind as to the color of the paper, cut even strips of same about one inch broad, and having provided some cardboards the same size as the pictures as a backing (or another spoiled glass the same size as the picture will do equally well), bind them together just like a lantern slide. When dry, a small ring or piece of ribbon may be attached to the backs to hang the picture by.—*T. N. Armstrong, in Brit. Jour. of Photo.*

Key West and Yellow Fever.

In Surgeon-General Hamilton's abstract of sanitary reports. No. 11, March, 1890, there is a report by Dr. J. L. Posey upon the sanitary condition of Key West, Fla., from which we make the following extracts:

The city of Key West covers an area of 1½ square miles of the island, which is 7 miles in length and 2 miles in breadth, and is between latitude 24° 32′ 58″ and longitude 81° 48′ 4″, 80 miles distant from the city of Havana and 230 miles from the port of Tampa, Fla. The entire island is a coral rock formation (oolitic limestone) rising at a slight elevation out of the waters of the Gulf of Mexico, constantly swept by strong and varying winds, and its atmosphere tempered by the Gulf Stream. The products of the soil are tropical in character, lofty cocoanut and date palms, cactus trees, wild fig, and Indian-laurel and many handsome flowering shrubs thrive in the gardens; low brush thickets of buttonwood, acacia, and mango cover the uninhabited area. The climate of this island is delightful, and is unexcelled, I think, in any section of the United States of America, with an average winter temperature of 70°, and 85° in summer. The surface of the island is generally level, with slight undulations north and south, east and west. The estimated population is 20,000 souls, comprising Anglo Saxons, Cubans (Spanish creoles), negroes, and mulattoes, the Cubans and negroes predominating. The manufacture of cigars and the sponge fisheries constitute the most valuable industries. After a thorough and systematic sanitary survey of this city, covering some weeks, and in which I was materially assisted by Dr. C. B. Sweeting, port physician, I find that there are many evils to condemn, and very few features in municipal sanitation to commend. The general condition of the principal streets is cleanly, but badly graded and imperfectly drained, and during the rainy season most of them are flooded, making it impossible for pedestrians to get about dry shod. On many of the streets there are no sidewalks and no drains. The average condition of premises, as seen from the street, is among the intelligent and better classes of Americans and Spanish creoles clean and well kept, and contrasts forcibly with the filthy yards and alley ways where the negro and Cuban population, employes of the cigar factories, are huddled together in smal huts and shanties, and whose stolid apathy and utter indifference to even ordinary personal cleanliness and domestic hygiene and sanitation is apparent. In the majority of instances the garbage, refuse of kitchens, and a variety of offensive material, when not cast loose into the narrow streets or alleys, is heaped under their wretched hovels to undergo a slow process of moist decomposition. The yards of many of these dwellings after the heavy tropical rains are inundated, the contents of the shallow cesspools, mingling with the festering garbage, are floated abroad to be subjected to the rays of a tropical sun, which promptly distills an abundance of mephitic vapors, whose baneful influence is in part happily diminished by the constant disinfection of the winds from the sea that sweep over the isle.

One of the main sources of atmospheric pollution, as well as of the soil (which, though rocky, is more or less porous), is the privy vault system which is in vogue here. These vaults are dug to a depth of 4 to 6 feet, 3 to 6 feet in length, and about 2½ feet wide. I have ascertained that where the premises are small, the house occupying the greater portion of the lot, after the cesspool was filled it was covered over with sand and broken rock and a new one dug, and the practice repeated until many small yards were honeycombed with these fecal pools, and the important question to tenant or owner arose where to locate the next receptacle for human dejecta. This is certainly a deplorable system, and must be productive of foul atmospheric conditions in dwellings in a latitude where the thermometric markings range from 60° to 90° Fahrenheit the entire year. The water supply for domestic purposes is obtained from underground reservoirs excavated in the rock and cemented, which receive the washings from the roofs of dwellings during the prevalence of heavy tropical showers of the spring and summer months. In the poorer classes of premises the privy vaults are not many feet distant from these subterranean cisterns, and during periods of drought and in badly cemented reservoirs it is possible that by seepage from the closets the water may become contaminated with organic matter. I am of opinion that during the dry season water obtained from these reservoirs bears some close relation to the production of types of continued fever (non-malarial in character), presenting some typhoidal symptoms. There are several large covered drains in different parts of the city, one on Simonton street, leading from the head of Eaton street to the sea, and another on Angela street, extending to a salt pond in the rear of quarters used by the sergeant in charge of Fort Taylor. The history of sickness along the course of these drains is well known to many old residents.

The history of yellow fever in Key West (being the most exposed point in the United States) dates from a very early period. The frequent occurrence of epidemics of this disease, the recurrence of isolated cases between epidemic periods, its recent reappearance in October, 1889, and during the month of January, 1890, point, in my opinion, to but one rational conclusion—that the disease has finally become endemic in Key West. What constitute the principal factors involved in the production of this condition are matters of the first consideration: First, the very unsanitary conditions of the city yield a favorable nidus for the propagation and preservation of the germs of this disease; second, certain classes only of the population furnish the pabulum which evinces the presence of the apparently inactive and latent poison of yellow fever. I believe that only a thorough and vigorous cleansing of the city will rid it of the strongholds of disease, which will otherwise increase in number, and during the summer season develop the epidemic state, unless the municipal government of Key West begins at an early date to rid their rich and growing city of this "pest of the tropics," which was originally introduced on their island by infected vessels and by their creole industrial classes, but which, owing to years of criminal apathy and sordid indifference to the simplest laws of sanitation, has become (finding a congenial nidus in the filthy inhabited areas) at last domesticated.

The city of Key West is the only point in the United States that continues to harbor this "dreaded infection," and is coming to be noted as a great manufacturing center of the fragrant "conchas, principes, and regalias," and also the distributing focus of yellow fever fomites. A formidable rival of Havana in the manufacture of tobacco, she will soon enjoy the unenviable reputation, from the view of the sanitarian, of an equally active competition in the production of the "microbe." As long as her citizens are willing to live without the adoption and execution of such modern sanitary reforms as scientific sewerage, good drainage, abundant and pure water supply, cremation of garbage, well-graded and clean thoroughfares, public parks, improved domestic hygiene, so long will her sister cities on the mainland secure the dollars of the tourist, invalid, and capitalist. A system of sewerage, which seems entirely practical and efficient, is contemplated by the present municipal council, who were especially appointed to carry out the needed sanitary reforms, and the taxpayers should demand that the work be commenced and completed as soon as the funds voted for that purpose are obtained. The city has issued bonds to the amount of a half million, which is to be devoted to this general sanitary improvement.

In concluding this report I cannot refrain from expressing as my conviction that yellow fever is a preventable disease, and that its intimate relation to foul and filthy conditions of soil in towns and cities is no longer a surmise, but a fact, and that this city has become temporarily an endemic center from such conditions, and will so remain until they are removed.

The people of the United States cannot permit the city of Key West to remain a center of infection of the "fiebre amarilla" or "fiebre perniciosa," the prevalence of which among the infantile population of the island city, and the strangers within their gates, excites no alarm or fear among the heterogeneous inhabitants of this island. The State and national health authorities will, if this condition prevails much longer, be forced to adopt the same measures against Key West as are enforced against the infected ports of the island of Cuba.

DECISIONS RELATING TO PATENTS.

U. S. Circuit Court.—District of Minnesota.

MCCORMICK HARVESTING MACHINE COMPANY *v.* MINNEAPOLIS HARVESTER WORKS.

Nelson, J.

An inventor who first conceives and gives expression to the idea of an invention in such clear and intelligible manner that a person skilled in the business could construct the thing is entitled to a patent, provided he uses reasonable diligence in perfecting it, as against an inventor whose conception was of later date, but who was earlier to apply for a patent.

An inventor is entitled to a reasonable time, to be judged of according to the circumstances of the case, in which to perfect his invention and reduce it to practice without impairing his claim to priority.

"I NOTICE one thing," says an observant manufacturer, "and that is that hard wood logs, especially oak, that have been placed in the water immediately after cutting and allowed to thoroughly soak, make brighter lumber, with less tendency to sap stain, than that from logs that are left on the ground for several months. I find, also, that in green logs, if sawed immediately after cutting, and the lumber is thoroughly steamed preparatory to placing it in the dry kiln, the same results will be obtained, greatly enhancing the value of the lumber for fine finishing purposes.