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(Illustrated articles are marked with an asterisk.)

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SCIENTIFIC AMERICAN SUPPLEMENT

No. 885.

For the Week Ending December 17, 1892.

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PNEUMATIC TUBES FOR MAIL SERVICE.

"A scheme that will revolutionize the mail service," is the caption of a recent dispatch from Washington referring to transmission by pneumatic tubes. "Proposals," so the dispatch reads, "are now in the hands of Postmaster-General Wanamaker for the establishment of a line between New York and Brooklyn, and in Philadelphia, from the general post office to substations." Systems of small pneumatic tubes have for years been in use in Paris, London, Berlin, Vienna, New York, and other places. They are used chiefly for carrying telegraph messages between local stations. But they have not as yet "revolutionized" the mail service, and are not likely to. The capacity of the tubes is small, and the expense of working them large.

There are other means of securing frequent delivery which may be had for a tithe of the tube expense, if only the already established means of conveyance, such, for example, as is afforded by the street railways, is intelligently utilized. As illustrative we may say that messengers dispatched from the New York general post office to the Brooklyn general office at intervals of fifteen minutes would get the mail to Brooklyn faster than it probably could be distributed throughout that city by the carriers and yet would not cost, so it has been computed, as much as the interest would amount to on a pneumatic service between the two post offices. Following a like plan, if messengers should be dispatched at short intervals to and from the general post office and the sub-stations by way of the elevated and cross-town lines, letters and packages could easily be delivered between these points as fast as it would be possible for them to be distributed. Nor would the cost be anything like that of a pneumatic service. This being the case, it is to be hoped that the Postmaster-General will not commit the government to any costly schemes like those suggested.

THE METEORS OF NOVEMBER, 1892.

BY PROF. DANIEL KIRKWOOD, OF RIVERSIDE.

Within the memory of persons now living the meteors called shooting stars were regarded as gaseous matter generated in the atmosphere. Their true nature was wholly unknown, and works on astronomy made no attempt to account for their origin. Fortunately such phenomena are now better understood.

Persons who happened to be in the open air on Wednesday evening, November 23, had the privilege of witnessing a phenomenon of more than ordinary interest. A brilliant display of celestial fireworks commenced about six o'clock, and lasted several hours. Meteors at the rate of several hundred per hour were watched and counted by numerous spectators. The writer, at early twilight, counted 150 meteors in thirty minutes. Later, a neighbor made the number 700 per hour, and the whole number seen at a single station during the display must have amounted to thousands. How are the phenomena to be accounted for? How frequently do they occur? and When may they be again expected? were questions asked by many observers during the display in Southern California.

Aged persons remember Biela's comet—a telescopic body having a period of six years and eight months, or three periods in twenty years. One of its returns was due in the latter part of 1845. Instead of appearing alone, as on former returns, it was seen as two separate bodies, as far apart as the moon and the earth. The dissolution of this wonderful body had therefore commenced, and the return (in 1852) was accordingly looked for with still increasing interest. It came true to time, but the fragments still further apart. That was the last time it ever appeared *as a comet*. It was due in 1859, 1865 or 1866, 1872, 1878, 1885, and in November, 1892. This process of falling to pieces began, as we have seen, in 1845, advanced from year to year till the fragments became too small to be individually seen. They pass, however, through our atmosphere, become ignited, and are thus rendered visible. In a work entitled "Comets and Meteors," published several years since, it was said of this shower's predecessor: "This cometary mass will be in close proximity to the earth about the last of November, 1892. Another brilliant meteoric shower may therefore be expected at that epoch."* This is the shower just seen, as predicted in 1873. The study of these periodic showers has established many facts in regard to their phenomena—facts now to be found in recent works on astronomy.

DR. ERNST WERNER SIEMENS.

This well known electrician and engineer died December 6, at Berlin, Germany, 76 years of age, having been born at Lenthe, near Hanover, December 13, 1816. He was the elder of the three bothers, Ernst W., Karl Wilhelm, and Friedrich, all of whom have made brilliant records in science. Ernst Werner was educated at the Lubec Gymnasium, and joined the Prussian Artillery in 1834, where his eminent talents soon attracted notice, and having passed through the military schools, gained him the rank of lieutenant in 1837. While still holding this appointment in the army he applied himself with great zeal to the study of practical chemistry and the physical sciences, and became the inventor of the process of electro-gilding, of the differential governor, and of the electric automatic recording telegraph.

As member of a commission of the Prussian General Staff for the introduction of the electric telegraph system in place of the optical telegraphs, he proposed, in 1847, the application of subterranean conductors, insulated by gutta percha, by means of a press invented by him for that purpose, which is still being used in the manufacture of cables. With the help of these insulated wires he succeeded, in the spring of 1848, together with Prof. Himly, in laying the first submarine mines with electric ignition for the protection of the harbor of Kiel from the Danish fleet. In the same year he carried out the first great telegraph line in Germany between Berlin and Frankfort-on-Main, and in the following year the subterranean line between Berlin and Cologne.

Dr. Siemens left the government service in 1850, and devoted himself afterward entirely to scientific studies and to private enterprises. In 1847 he had already laid the foundation of the telegraph works afterward carried on by him under the firm name of Siemens & Halske in Berlin, the celebrated establishment which was destined to become, and at present is, one of the chief centers for the application of electricity to the industrial arts.

The late Emperor Frederick III., of Germany, conferred upon him the patent of nobility. He was also the recipient of many other distinctions and honors.

Dr. Siemens' lectures and papers have been published in the transactions of different learned and scientific societies and in various periodicals.

Dr. Siemens' was an honorary member of the British Institute of Electrical Engineers. At the time of his death he was engaged in building an electric railroad in Berlin.

* Page 88.

The Third Annual Mineralogical Exhibition of the Brooklyn Institute.

The mineralogical section of the Brooklyn Institute has had the good fortune to attract a group of collectors who have combined scientific precision with the more popular enthusiasm for beautiful specimens. It has, therefore, been able to make a public exhibit at once instructive and entertaining, and the exhibition given last week by its members of selections from their cabinets was unquestionably one of great merit. It would have delighted the most fastidious, and to the observer its numerous examples of mineralogical association, form, and distribution were of real importance. The large room of the Institute devoted to the meetings of the art section of the institution was well filled with the cases of members of the mineralogical section, in which, with much taste, care, and discriminating arrangement, they displayed the treasures of their separate cabinets. A brief and necessarily imperfect glance at the many interesting exhibits will afford the readers of the SCIENTIFIC AMERICAN some suggestion of the varied and even brilliant exhibit.

Among the first cases to attract the visitor was that of Mr. Charles L. Hatch, of Brooklyn, where a very excellent suite of Paterson minerals were exhibited, taken from the classic Hoxie's quarry, which has contributed almost a new chapter in the study of secondary minerals. Among these was an amethyst group, perhaps the finest secured at Paterson; some of the peculiar quartz pseudomorphs, prehnite; stilbite in process of silicification; datalite in large green crystals; very large apophyllite prisms; cut and polished prehnite, very charming with its mottled and clouded surfaces; a large henlandite, and some laumontite specimens.

Near Mr. Hatch were some striking objects in the exhibit of Mr. J. W. Freckelton, the industrious and painstaking treasurer of the association. Here were interesting sections of stalactites, horizontal and longitudinal, showing their wave-like accretion; lamellar copper-red zincites from New Jersey; large pectalite spheres from Paterson; a handsome calcite, with cleavage seams over its surface; and handsome apophyllites.

Dr. R. W. Raymond showed a wood-copper with reticulated surface, apparently resulting from replacement of ligneous fiber; bright yellow gold most captivatingly inclosed in white quartz, from Mariposa, Cal., and many other admirable specimens. Dr. S. E. Stiles exhibited a pseudomorph of serpentine after actinolite, scattered in green blades over foliated talc, from Tompkinsville, S. I.; and a curious hydrodolomite, from Mott Haven, with pipe-like pustulose projections. Dr. J. H. Hunt displayed a Paterson suite, among which was a large mass of the quartz pseudomorph so characteristic of this locality, coated with quartz, hematite, laumonite, apophyllite, and henlandite—a remarkable illustration of mineralogical differentiation. Dr. Hunt also showed a handsome tourmaline, from New Hampshire, and the radiated rubellite in lepidolite schist from San Diego County, Cal. Wm. Urban had the distinction of exhibiting the largest and most deeply colored prehnite, from Paterson, a really splendid ex-

ample; and in his case were some very interesting ferruginous stilbites from McDowell & Osborn's quarry at Upper Montclair, N. J.; with remarkable analcites, from Paterson. Mr. Frank B. Jones, of Brooklyn, exhibited a choice selection of cut gem stones, with unique conceits, as tortoises in quartz, alligators in opal, slippers in pagodite, and faces cut in moonstone and labradorite. L. M. De la Mater had a fine suite of English minerals on exhibition, among which some very acutely pointed scalenoluchal calcite was of interest, and a very beautiful sprouting surface of dog-tooth spar, handsomely shaded with iron stains.

Prof. D. S. Martin exhibited a unique collection of salt, from Central New York, with specimens from other American localities; with an instructive map, showing disposition of the salt mines south of Lake Ontario. W. D. Schoonmaker exhibited a very choice and carefully selected group, among which the beautiful rubellite from California, the calcite spherules from Guanajuato, Mexico, the fine English calcites, a tourmaline implanted in quartz from Maine, and a fine blue suffused halite were conspicuous. A. C. Bates gave a very excellent impression of the composite forms of quartz, making from this species alone a capital and instructive display. The crinoidal displacement and replacement in this case was noticeable. J. A. Grenziger had some excellent fluorites and barites, with a notable illustration of velvety pyrite. G. M. Mather had a strong suite of agatized woods. G. O. Simmons an instructive selection of species, among which the malacalite, from Sing Sing, and the spheroidal dolomite, Kremnitz, Hungary, attracted attention. Mr. A. Chamberlain exhibited a very extensive and beautiful suite of gem material, somewhat injured by yellow labels. Geo. L. English showed the delicate and variegated garnet and vesuvianite stone, from Mexico, in slabs; agates of much splendor, from Brazil; a magnificent series of rubellite, from San Diego, Cal.; stibnites, twinned calcites, cut stones, and opal, from Barcoo River, Australia.

F. Braun, the indefatigable collector and investigator, exhibited a long line of pseudomorphs, not all, we should say, beyond question, but nevertheless making one of the most suggestive groups in the exhibit. With these were some very fine fossil species. Mr. Braun's exhibit was very extensive. W. G. Rothe furnished a very elegant suite of minerals, among which intersecting gypsum, from Austria; a huge marble polished ball; aragonite twins, from Sicily; hyalite, quartz with hornblende inclusions, barite with realgar, Bareno orthoclase, coppers twinned calcites, were of especial interest or beauty. J. Walker arranged a case showing geographical or local distribution and association of minerals at Paterson, Tilly Foster mine, Putnam County, N. Y., Franklin Furnace, and Hoboken, N. J. These groups were worthy of especial notice—they were so instructive and suggestive, and conveyed such a sharp impression of the mineralogical facies and spirit, so to speak, of each locality. Mr. A. H. Ehrman, his neighbor, followed a similar plan, showing some glorious canary-yellow willemite, from Franklin Furnace, and some magnetite, with very conspicuous and exquisitely ruled oscillations. Mr. W. Goold Levison had a mica exhibit of great excellence, with a curious and interesting specimen of henlandite on a soft, papyraceous, altered sphere of pectolite. Mr. Chas. Hyde Denison exhibited an amethyst of some size with the quartz pseudomorph, from Paterson; also excellent calcozincite, from Ogdensburg, N. Y., which, with Mr. Hatch's from the same locality, were the best examples of this species in the exhibit. Mr. Denison also showed an interesting combination of calamine and azurite and an example of the so-called masonite, from Natic, R. I., of which two large bowlders were known at this locality, one of which has been built into the foundation of a cotton mill and the second one broken up and distributed in cabinets. Mr. Denison possesses a very fine stilbite, taken at Paterson, and a gossan rock—cellular and fragile quartz—wherein a decomposition of auriferous pyrite has left a precipitate in the rock of native gold and sulphur.

Certainly the thanks of the community are deserved by the mineralogical section of the Brooklyn Institute for their energy and public spirit in making this exhibit, and there can be little doubt, from the extreme interest shown by both lay and scientific visitors, that their efforts are recognized and will be remembered.

L. P. G.

Barley.

Barley as a regular grain crop is but little known in the South. It is, however, one of the standards in various parts of the world, in the old world especially. All over the Pacific coast of North America the grain is extensively grown, taking the place of our Indian corn as an element of food for horses and other live stock on the farm or ranch. The California crop of barley is immense, there being, as a rule, no corn cultivated in that State except on a small scale in a few localities, and then the product is confined almost exclusively to the roasting ear patch. Not one horse in a thousand in California knows what corn is.

It is a little remarkable that our Southern people have so long neglected this valuable grain. It is more valuable as a horse food than corn, and it is far more easily cultivated. There is also more economy in growing barley. With the majority of our Southern farmers corn is one of the most troublesome and expensive of all the grains to cultivate. To grow it successfully requires long and close attention, the season of its culture and harvesting stretching from February to November.

With the same expense of cultivation and labor generally put into a barley crop, the barley will be worth largely more to the Southern farmer than the corn crop gives on our average land, while the period of cultivation and harvesting embraces only a few days each in the fall and summer.

One of the great advantages barley has over corn is that it enables the farmers to dispose of the employment and feeding of hoe hands through the long months of summer. Another advantage lies in the fact that one of the most valuable features of the barley crop comes in the rich pasture, or soiling, which the plant affords in the winter time when green food is scarce and important. Experiments made by some of our most progressive farmers in Georgia in the cultivation of barley show that it can not only be grown with great success as a grain crop here, but those experiments have demonstrated clearly also that it is one of our most valuable plants for soiling purposes.

The season of the year is now approaching for sowing barley. We would advise our planters who have not heretofore had experience in growing the grain to plant a few acres as an experimental crop. The ground should be well prepared, well fertilized and plowed deeply; and then the grain sowed very thickly and harrowed in, leaving the land so that a scythe or mowing machine can easily run over it.—*M. V. M., in Houston Post.*

The Hydrophone.

An ingenious electrical and telephonic apparatus for defending roadsteads, anchorages, and mine fields, by giving warning by visible and audible signals on shore of the approach at night or during thick weather of torpedo boats or other hostile vessels, has just been subjected to experiments extending over several weeks at the mining establishment in Stokes Bay, where it was witnessed in operation by Colonel Vetch, of the War Department, a committee of royal engineers from Chatham, and various officers belonging to the Vernon. The instrument is called a hydrophone, and its inventor is Captain McEvoy, the well-known torpedo and submarine mining expert, formerly attached to the Confederate army.

The hydrophone consists of two parts. One part is placed at the bottom of the water outside the anchorage or mine field at a depth of from five to fifteen fathoms, and the other is fixed in a station on the shore, and the two are electrically connected by cable at distances of from one to five miles. In the present instance the instrument was sunk in seven fathoms and about 300 yards off Fort Gilkicker. The submerged part consists of a bell-shaped iron case, three-quarters of an inch thick, 20 inches in height and extreme diameter, and weighing about 340 pounds. At the top is fitted a sensitive vibrator or diaphragm inclosed in a copper box. It is formed of a plate of ebonite with carbon attachments, and when the case is submerged the delicate mechanism is kept clear of the water by means of the column of compressed air, which is inclosed as in a diving bell. No sooner does a torpedo boat approach within a radius of half a mile or a man-of-war within a mile than the pulsations of her propellers produce a vibratory movement inside the case. These vibrations are transmitted to the station on shore in the following manner:

The electric current from the land battery passes through the vibrating mechanism and also through the apparatus on the shore, in the circuit of which is placed an instrument named a kinesiscope, which is somewhat of the nature of a galvanometer. By means of this the perturbations in the water are communicated to a needle flickering in a graduated arc, and when the oscillations become pronounced the needle is clutched by a magnet at the end of the arc. Contact is thus made, and the vibrations in the submerged case are made visible and audible by means of flashing lights, the firing of a gun, and the ringing of a bell. Telephonic signals are also transmitted through the same current. The whole of these operations were successfully performed in the presence of the visitors.

The idea is that for coast defense a number of hydrophones should be sunk in the approaches to a port or dockyard and connected with a central station, and that, as soon as one of them has given its warning of the neighborhood of an enemy, the information should be communicated to the threatened point by independent cables. It is contended, also, that another field of operations is open to hydrophones in dangerous zones around certain well known headlands that are frequently fatal to shipping in dense fogs. Captain McEvoy would connect a danger zone by means of hydrophones with the nearest coastguard stations. By these means a ship would be warned of the danger it was in by the automatic firing of a gun or flashing of a light.

London Fog.

The smell of London fog is, in fact, that of wood burning. This naturally suggests that if the lighting of fires could be dispensed with, much of the evil might be mitigated. Or if coal fires could be allowed to burn slowly overnight, so as to dispense with morning lighting, the nuisance might—to some extent, at any rate—be avoided. Although all are agreed that fogs and mists constitute a pest which must be got rid of, there remains one compensating advantage which has often been overlooked. It is reasonable to suppose that a fog effects a partial purification of the atmosphere. This is borne out by the fact that when a fog subsides the deposit contains the carbon, sulphur, organic bases, and other injurious and irritating particles which formerly existed in a state of suspension in the atmosphere. Just as water is freed from objectionable suspended matter by the addition of an impalpable powder, or a mixture which gives rise to a fine precipitate, so probably is the air deprived of suspended impurities by the subsidence of the moisture particles in which the impurities become entangled. It is a matter of common observation that the air is remarkably clear after the subsidence of fog or mist. Wind or rain are, however, equally effective and much more agreeable agents in accomplishing this purification. If we cannot get rid of mists while we are beset with the peculiar conditions which characterize the climate of this country, we can at least make an attempt to prevent the emission of those particles into the air which convert that mist into the intolerable and irritating vapor ever known and remembered as London fog.—*Lancet.*

A Word to Mail Subscribers.

At the end of every year a great many subscriptions to the various SCIENTIFIC AMERICAN publications expire.

The bills for 1893 for the SCIENTIFIC AMERICAN, the SCIENTIFIC AMERICAN SUPPLEMENT and the ARCHITECT'S AND BUILDER'S EDITION of the SCIENTIFIC AMERICAN are now being mailed to those whose subscriptions come to an end with the year. Responding promptly to the invitation to renew saves removing the name from our subscription books, and secures without interruption the reception of the paper by the subscriber.

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Purifying Black Lead.

The following are four processes which have recently been patented for effecting the purification of black lead, with a view to removing iron and other impurities and obtaining the resulting product in a fine state of division:

(*a*) Pulverized black lead is moistened with concentrated nitric or sulphuric acid, or both. It is next washed till the wash water is free from acid, and then calcined.

(*b*) The black lead may be heated with a solution of bichromate or permanganate and acid, and subsequently calcined.

(*c*) Brodie's process may be employed by substituting nitric for sulphuric acid.

(*d*) The black lead is heated with concentrated nitric or sulphuric acid, scooped out, washed, and calcined.

To obtain a finer product, the black lead obtained at the end of these processes can, if desired, be thrown into water, stirred, scooped off, and dried.

Lubricating Composition.

A composition which is designed for use with bearings, commutator brushes, projectile covers, may, it is stated, be prepared by mixing plumbago in excess with wood or other vegetable fiber. The materials are mixed with water, and the plastic mixture moulded under pressure. The mould is so arranged that the water in escaping tends to set the fibers on end with regard to the bearing surface. When moulded the article is dried and impregnated with linseed oil, and the oil finally hardened by the application of heat. The process is patented.

Iodine Soap.

In order to prepare a soap containing iodine it has been suggested to first iodize the fat or fatty matter by heating it with iodine, and then saponifying in the usual way.