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For the Week ending April 7, 1877.
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The Bress Prize for New Discoveries.—On the Ventilation of Rooms, by F. E. THICKE.

The Bressa Prize for New Discovenes. On the target and y F. E. THICKE. Recent Trials of the 81 Ton Gun, with 4 illustrations of the target and he remarkable effects of the shot thereon.—New Rivet-heating Fur-

Recent Trials of the shot the shot thereon.—New Rivet-heating Fur-nacces; 2 engravings. Cooper's Steam Boiler, with 5 illustrations.—Kendall and Gent's Ma-chine for Drilling Holler Shells, with 1 engraving.—Foncalt's new De-vice for Raising Water.—On the Racing of Propellers at Sea.

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PUBLISHERS' NOTICE TO MAIL SUBSCRIBERS.

each paper the time for which they have prepaid. Before the time indicated expires, to insure a continuity of numbers, their subscriptions expire.

New subscriptions will be entered from the time the order be sent from January when desired. In this case, the subscription will date from the commencement of the volume, and the latter will be complete for preservation or binding.

THE PRESERVATION OF LEARNING.

Printing has been apply styled the art conservative of all printing?

As was shown in our recent suggestion "For Posterity," books and papers as they are now printed are exceedingly short-lived; and the chance that any existing print will be preserved a thousand years, if matters take their ordinary in some secure place for the benefit of future ages.

be its possible exposure to fire.

tion of heat and pressure mould them into solid blocks. the combustion he mentions, not the evolution of hydrogen This done, the blocks might be placed in earthen vessels and or electricity. covered with melted copal. Thus, like flies in amber, the geological era-such fossilized records of our day and genthe limbo of forgotten existences.

cost would be infinitesimal. Before, we merely threw out a power experienced by the General in the use of his famous suggestion; now we would make a serious proposition. It is blue glass experiment upon the barrow pig. this:

In a few years one of the grandest monuments of the age will be erected in or near this city-the magnificent gift of

The proprietor of an extensive medical bath-house informs Mail subscribers will observe on the printed address of us that, in deference to the demands of his patrons, he has placed blue glass in his windows; but the only practical effect thus far perceived is to make his premises dark and gloomy, especially on cloudy days. He states as the result subscribers should remit for another year. For the con- of his observations, extending over several years, that venience of the mail clerks, they will please also state when patients derive the most benefit from air baths in pure sunshine, without the interposition of any glass whatever.

Upon what basis or evidence does the supposed power of blue glass upon the animal economy rest? Upon no other, is received; but the back numbers of either the SCIENTIFIC apparently, than the ludicrous inferences and whimsicalities AMERICAN or the SCIENTIFIC AMERICAN SUPPLEMENT will of good old General Pleasonton, whose ideas of science and mathematics seem to be sadly mixed. Being requested, by the President of the Philadelphia Society for Promoting Agriculture, to explain to that body the nature and facts of his discovery, he gave the following as its original experimental basis: On the 3d of November, A.D., 1869, he imprisoned three sows and a barrow pig, all weighing 203 lbs., in a common sty; and on the same day, three other sows the arts. But what shall conserve the products of the art of and a barrow pig, all weighing $167\frac{1}{2}$ lbs., in a blue glass sty. On the 4th day of March, 1870, the animals were weighed, and it was found that the common sty pigs weighed 537 lbs., the blue glass pigs 5221 lbs. Allowing for the original difference in weight, this showed a gain for the blue glass pigs of 21 lbs., or $5\frac{1}{3}$ lbs. each pig, in four course, is slight indeed. Even of the writings that have been months' time. From these and other comparisons the Genconsidered most sacred, and have been guarded most religious- eral infers that "it seems obvious that the influence of the ly, perfect copies a thousand years old are extremely rare. And violet-colored glass was very marked." He, however, states when we take into account the vicissitudes of five, ten, or that the barrow pig in the common pen increased 151 lbs., fifty thousand years, the likelihood that our remote posterity while the barrow pig in the blue glass pen only increased will retain any literary record of these days, or any exact $124\frac{1}{2}$ lbs. Here is a gain of $26\frac{1}{2}$ lbs. in a single animal in the knowledge of the civilization we enjoy, is too slight to be en- common sty over a single animal confined in a blue glass sty. tertained for a moment. Yet it is certain that, whatever may The General explains this by saying that the common sty be the condition of mankind at any future epoch far remote pig was a strong fellow who stole more food from his comfrom us, such a record would be of inestimable value. Our panions than well behaved swine are expected to take. But suggestion, therefore, was that an effort be made to put into any person not a blue glass believer would naturally infer imperishable form some of the more valuable of the repre- that the reason why the common sty pig gained $26\frac{1}{2}$ lbs. sentative works of modern civilization, and store them away over the blue glass pig was that, for barrow pigs at least, the blue glass was a damage rather than a benefit. After A correspondent, who favors the idea, suggests that the mentioning these pig experiments and that of a calf, the cost of imperishable stereotype plates might be saved by the General proceeds to explain to his hearers that it is electricity use of gum copal. The fact that this substance has with- evolved by blue glass that makes it so powerful; it is elecstood the elements for such a considerable period, as is indi- tricity, he says, that produces the sparks that we sometimes cated by the conditions under which it is found, is ample see when a horse's shoe strikes the pavement; electricity, he proof of its durability under ordinary circumstances; and says, ignites the hydrogen gas which is evolved when two all that would have to be specially guarded against would sticks of wood are rubbed together until fire is produced. But here the General's science is as lacking in weight as his The plan proposed is briefly this: To varnish on both sides blue glass barrow pig. It is the affinity of oxygen for the the printed sheets to be preserved, and then by the applica- heated particles of iron or wood that causes the spark and

It is well known that Dr. Crookes' admirable little instruideas of the present age might be fossilized and laid away in ment, the radiometer, is very sensitive to electricity; and if, their integrity for the entertainment or enlightenment of as the General supposes, the blue glass rayshave superior electimes to come. Buried under public buildings, or other trical or other power, the vanes of the instrument should rotate structures likely to remain in some form to challenge the faster under blue glass than under common glass. But a curiosity of explorers-geologists, maybe, of some distant friend of ours, who lately tried the experiment, reports that, while his radiometer made 135 turns per minute in the suneration might be the only clue to the mental and moral con- light, behind ordinary window glass, it fell to only 60 turns dition of a type of humanity that had long since passed to a minute when placed behind a sheet of General Pleasonton's blue glass. If, then, we designate 135° as the indicated power As we urged before, the cost of such a legacy to posterity of common light in this experiment, we lose 75° of power would be small compared with the benefits it would carry. by the use of the General's blue glass; which corresponds If the amended suggestion should be adopted, the relative relatively, to some extent at least, with the loss of pork

A CURIOUS HISTORY OF AN OLD INVENTOR.

A queer bit of history concerning an inventor has recently France in commemoration of our Centennial year. When been unearthed in England, which may well serve as a com we are building the tower on which to set the colossal statue panion piece to the interesting article on Papin's achieveof Liberty giving Light to the World, let us make room in the ments, which Professor Joy recently contributed to our colfoundation, or elsewhere, for a legacy of intellectual light to umns. Solomon De Caus was engineer and architect to remote posterity. Without weakening the structure in the Louis XIII., King of France; and he stands fourth in chronoleast, spaces might be left for storing our more precious and logical order on that list of the original discoverers of steam instructive volumes, duly embalmed in copal or otherwise, power, which is headed by Hero of Alexandria. In 1615, to remain undisturbed until the celebration of our tenth De Caus published a book quaintly entitled the "Causes of centennial year, or longer, in case the preservation of ordi- moving forces, with divers machines useful as well as pleasnary books and records should be more satisfactory than we ant," in which he states that "water will, by the aid of fire, have anticipated. This would simply be carrying out in a mount higher than its level;" and he describes a globe filled more scientific and comprehensive way the common practice | with water and an attached vertical pipe, through which the of depositing newspapers and transient matter in corner water was elevated by the expansion of the steam generated

O. D. MUNN.

stones. A more favorable opportunity for setting a signal by heating the vessel. This is the sum and substance of De Ĕ.

Briting establishments. Frew mode of reinpering diass. - Diconstants in Education.
 Pipes for Gas and Other Purposes. --OnSpigot and Socket Joints, w th 3 engravings, table of weights of lead for joints. --Whitehead's Machine for Socketed Drain Pipes, with 3 illustrations.
 On the Preservation of Foods by means of Salicylic Acid and its use in the Household. How to preserve Raw Mest, Milk, Butter, Fruts, Vegetables. How to purify the air of rooms, to Cleanse bottles, corks, etc., by Salicylic Acid. How to Print in Carbon.
 III. CHEMISTHY, METALLURGY, ECC.--On the Solubility of Ether in Aqueous Hydrochloric Acid, by H. N. DRAPER, F.C.S. -On the Retardation of Chemical Reactions by Glycerin and other Matters. By DR. 6. LUNGE.
 On the Adult pretion of Milk Br. HENEY A MOTT L. of New York

the Adulteration of Milk. By HENRY A. MOTT, Jr., of New York.

On the Authorston of Max. By HEART L. MOTA, J., of New York.
 A valuable and exhaustive paper.
 The Fluorescent Matter in Atropa Belladonna.
 IV. ELECTRICITY, LIGHT, HEAT, SOUND, ETC. -New Electrical Clock Regulator. -Early Experiments with Lightning, with eight engravings. -Duplex Telegraphy as practised in England.
 Polariscope Objects, by W. SPOTTISWOODE. -Sympathetic Resonance.

- V. ASTRONOMY.—The Moon: Abstracts from the remarkable work of Edmund Neison, lately published.—The plains, mountains, rings, craters, and other objects observed on the Moon's surface. The Moon's Atmo-sphere. Effects of her Glaciers. Ice, but no water, on the Moon's sur-face.—The Colored Belts on Jupiter.
- MEDICINE, HYGIENE, ETC.-Prevention of Cloudiness on Explor-ing Mirrors.-Carbon disulphide as an antiseptic.-Magenta in the Hood. γı ogne Water as an Anæsthetic
- VII. AGRICULTURE, HORTICULTURE, ETC.—Plan for a small Early Vegetable House, or Greenery.—Best Flooring for Stables.—The Diges-tive functions of Vegetables.—Immense flocks of Grasshoppers.

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example to the civilized world touching this matter is not Caus' discovery, but it is obviously one of importance; and likely soon to occur than in connection with the light-bear- even in the early period when it was produced, it attracted Let it be done!

THE BLUE GLASS EPIDEMIC.

ing statue of Liberty; nor a more appropriate opportunity. the attention of scientific men, and among others that of the Marquis of Worcester. That noble inventor seems to have appropriated De Caus' idea, and many years later he described in his "Century of Invention" a substantially sim

The blue glass epidemic continues its silent progress; it is 'ilar device to De Caus', which he constructed and operated, now quite common along our streets and avenues to see and on which his fame as another original inventor of the frames of the azure crystals hanging within dwelling house steam engine is founded.

windows; while, on sunny days, the invalid grandfather or So much for fact and for De Caus' work, and by way other patient, may be noticed basking in the ethereal rays, of preamble to his history. That record, as usually met his countenance filled with hope, though streaked with blue. with, is to the effect that Solomon one day suddenly van-In one case, that of an old lady of seventy-four, that lately ished, that he fell a victim to royal jealousy, and that he came to our knowledge, in her desire to secure the coveted was imprisoned for being ahead of his time. Subsequently benefits of the blue, she took her seat before the glass after he went mad, and was shut up in an asylum, and there he the sun had nearly gone down, and in a short time declared was visited, says the chronicle, by the Marquis of Worcester, that the blue glass had thrown her into a perspiration. This who, during a lucid interval of the unhappy inventor, obsuggests the possibility that the blue glass may be used to tained from him the secret of his discovery. All this makes better advantage, upon some persons, in the absence of sun- a very tragic story, which the world has credited for about shine, and perhaps in the absence of light. forty years, and which has placed Solomon de Caus in popScience.

The difficulty is, however, that the statements are pure turns to the compiler. fiction; and that the inventor's reputation was manufactured for him by the brilliant imagination of a not over-conscien- because they relate to pure practice and what has been done, by the editor of the SCIENTIFIC AMERICAN a century hence. tious editor, is the substance of the story which our English and are free from speculations, mere theories, and second- He will have a larger story to tell, and likely, be less modest contemporary now vouches for as truth. In 1834, there ex- hand statements. It is well to remember also that the neces- than the editor of to day. isted in France a journal called the Musée des Familles, which sity of keeping indices or notebooks is a growing one. was addicted to blood-curdling romances, after the fashion of The tendency of every profession, every trade, every calling, many of our present periodicals. The editor, wanting an illus- is toward differentiation. People are becoming specialists tration of a maniac in a cell to illustrate some harrowing re- by force of circumstances. No one now pretends to know in the large hall of Kurtz' photographic establishment, 23d cital, ordered a suitable engraving. But the engraver failed any one science or trade thoroughly: certainly not in this to finish his work in time, and the cut was not received until country, where the progress of invention is so rapid, or in after the paper was published. The economical editor, not this age, when new discoveries are of almost daily occurrence. dent. On each of twenty tables were four instruments, ilwishing to lose his picture, thereupon set to work to write The greatest portion of any man's knowledge must remain luminated by one or two student's lamps, so that about eighty up a story appropriate to that engraving, and he accordingly in the condition of an index; he may not remember the detook down a "Universal Biography" to find a fitting his- tails of a subject, but he can know where he can place his hibitors. Various kinds of microscopes were shown, from torical personage to serve as his crazy hero. Solomon de hand on a source whence he can derive all the information; the most elaborate and expensive to the simplest: while some Caus' name was the first one he saw; and it occurred to him and to this last species of knowledge the well maintained that Solomon's genius might have driven him mad, even if notebook is a most important aid. it actually did not. Consequently he made the inventor into No one, we believe, has ever imputed the gift of prophecy a maniac; and to give an air of truth to the romance, the to that great satirist and poet, Alexander Pope. We are ineditor put his story in the form of a letter written by a court clined to think him in a most prophetic mood, however, lady who had seen De Caus in prison, in which letter the when he penned the couplet-far more true in our days than visit of the Marquis of Worcester was incidentally described. in his: When the romance was published, it created an unlooked-for sensation; people accepted the story so completely that, even when the editor acknowledged that it was wholly imaginary, he was not believed, and learned antiquaries insisted that it was genuine. Consequently, ever since, Solomon de Caus has been regarded as a wretched lunatic who perished miser- country will find that the record of the same naturally di- table under the objective lenses, and the whole arrangement ably; while the truth is that he never was imprisoned, never vides itself into two distinct parts, each marking a separate is evidently the result of the experience of a hardworking went mad, but lived a learned and honorable life, and, on dying, received special funereal honors from his king.

us in their letters on the responsibilities of editors-and of during the second, which includes the present time, the ten- ments of diatoms, first produced several years ago by a lady scientific editors in particular-we commend the above story dency of inventors has been more towards seeking new ap- in London: they were for a long time a profound mystery, as a text for future admonitions.

ON KEEPING AN INDEX.

jects, in which the authors all state that the work originated with the end of the year 1849. Inspection of the records of in casual notes gathered during the study or active practice the Patent Office shows quite clearly the substantial basis city lately showed us a huge volume, constructed in a way ashes. During that year, the total number of patents was of an inch or thereabout. well suited to this purpose, in which, for several years, he but 3; the following year it amounted to 33, and then for information at hand, acquired with very little trouble, the value of which can hardly be overestimated.

and we would strongly commend the extension of the prac-An enormous amount of the most useful material And the earlier this habit is acquired the better. An apprentice in almost any shop is sure to see the older workmen doing work after a fashion of their own. He may not know why one man who produces particularly good castings-rams his mould, for instance, in a certain way—or hammers an back to his notes and find in them aid which is of money graph, and Ericsson's steam fire engine.

"For index learning turns no student pale, Yet holds the eel of Science by the tail." -----

AMERICAN INVENTIVE PROGRESS.

earlier embodiments of the same.

The first era begins with the labors of Franklin, Ritten-The recent production of several books on scientific sub- house, Hare, Evans, and their contemporaries. It terminates to an accompanying catalogue.

value. In the same way, the student will find a college To show with what rapidity inventors made improve- of the human eye, which contract and dilate the pupil: these course far more useful to him if he will watch for "points" ments on inventions embodying original principles, it may muscles can only be revealed by the use of polarized light. in his various studies. Many a professor has a short way of be noted that in the early days of the sewing machine 116 his own for working this or that problem, or a neat explana- patents were granted for improvements thereon in a single exhibits, although many of them deserve honorable mention; tion or illustration of a knotty fact, or a short cut around year; and out of the 2,910 patents issued in the year 1857, but Zentmayer's improved stand, with rotating and centersome technical difficulty, by which he secures his pupils' 152 were for improved cotton gins and presses, 164 for im-1 ing stage, an arrangement which causes the mirror to work more rapid advancement. provements in the steam engine, and 198 for novel devices in the optical axis, McAllister's four microscopes, and those We once heard an old housewife say that she saved all the relating to railroads and improvements in the rolling stock. of George Wales and Pike, may be specially mentioned. stray bits of carpet, broken furniture, and other apparent In the year 1848, three years after the publication of this Crouch, of London, was represented by eight splendid intrash, because it was, according to her experience, "sure to paper was commenced, but 660 patents were granted; but struments, all provided with his own objectives. Woolman come useful sometime within seven years." We do not adhere under the stimulus of publishing those inventions as they exhibited some fine instruments by Queen of Philadelphia, to the mystical number seven; but doubtless she was substan- were patented, ten years later, in 1858, the number had and four London ones, three by Beck and one by Crouch. tially right, and the same rule will hold good regarding the increased sixfold, reaching 3,710, while up to January 1, odd scraps of information gathered. We would more espe- 1850, as already stated, the aggregate of patents issued cially commend the above to readers of this journal. If all amounted to 17,447; since that time and up to the present study of microscopy. our one hundred thousand readers, in their great variety of the total is 181,015. callings, would keep such records, and each one would once Curiosity here leads us to review our own work, extendin a while favor us with a few lines therefrom regarding in- ing back for, say, twenty years, or to 1857, a period during teresting facts which had been noted, an immense fund of which 170,745 patents have been issued. We find, by actual valuable suggestions could be given to the world, and useful count, that 62,662 applications have been made through the thoughts thus be rapidly interchanged. Besides, the effect Scientific American Patent Agency for patents in the United would be to spare us the necessity of inserting that para. States and abroad. This averages almost ten applications graph which heads our query column every week, wherein per day, Sundays excluded, over the entire period, and bears we inform A. B., forperhaps the twentieth time, that a recipe the relation of more than one quarter to the total number of for dissolving rubber or bronzing gun barrels will be found patents issued in this country up to the time of writing. on page so and so, this or that volume, etc. As we said in We might indulge in some pardonable egotism in claiming and horses were not frightened.

ular estimation in a high place among the "martyrs of the beginning, many valuable books are prepared from notes to nave done no small share toward aiding the development thus made, and these become a source of considerable re- of the inventive genius of our country, and thus advancing our national prosperity-the above statistics would seem to

Such books, moreover, are generally exceptionally good justify it—but this we forego, or better, leave it to be done

EXHIBITION OF MICROSCOPES.

The soirée of the American Microscopical Society was held street, New York city, on the evening of March 6. The exhibits were admirably arranged by Dr. Rich, the Presiinstruments were exhibited, representing thirty or forty exwere noticeable for originality and special adaptation. inferior instrument was to be found in the collection.

Dr. Rich exhibited six microscopes, a Beck grand binocular, a Zentmayer grand, a Curtis mounting microscope, two Wales and Hawkins improved, and a Beck "popular." Special mention must be made of Dr. E. Curtis' invention, which, in regard to convenience in use, originality of design, and capability of diverse applications, stands foremost; it is undoubtedly the best dissecting microscope, it may be used as a binocular, and is simple as well as compound. The stage and illuminator are not attached to the microscope, but The future historian of the inventive progress of this consist of an oblong rectangular box which stands on the era. These may be termed respectively the period of con-professional microscopist. Dr. Rich exhibited under these ception and the period of development. During the former instruments most beautiful specimens of the wing cover of To those excellent readers of ours who occasionally lecture most of the great American inventions were first originated; the West Indian beetle, and also some remarkable arrangeplications for established principles or improving upon until the German scientist Müller, in Holstein, produced them for the trade. The diatoms are on slides containing 100, 400, or 600 specimens each, all classified in species according

Among the appendages shown was the improved section cutter of Dr. E. Curtis, in which the knife is inclosed in a of their various professions, will suggest to many the advan- for the division we have suggested. The first patent granted | frame moving over a plate of glass, in the center of which tages of keeping an index or memorandum of facts met with by the United States was dated July 31, 1790, and was issued the object to be cut is screwed upward through a hole, and in reading or observation. A well known engineer of this to Samuel Hopkins for a process of making pot and pearl may be made to project a distance as small as one thousandth

Mr. Rutherford exhibited a microscope by the famous has noted down, indexing as he proceeded, all the useful ar sixteen years the aggregate fluctuated, falling as low as 11 Italian maker Amici, which was presented to him by Amici, ticles and hints relating to engineering or mechanical sub-, and reaching as high as 99. For the seventeen years fol- when in Italy thirty years ago. The connoisseurs present all jects which had appeared in the various publications which lowing the variations were between 100 and 300, the last- agreed that Amici was far ahead of his time; and his instruhe deemed worth remembering. He did not of course copy mentioned number not being exceeded until 1825. The in-ment, so far as optical effects are concerned, compares fathe articles entire, but simply jotted down a sentence or two crease subsequently was more rapid; and by August, 1836, vorably with many of the best imported microscopes of the embodying their gist, and an accurate reference to the source when the present system of numbering the patents began present day. Professor Julien, of the School of Mines, Coof information-often merely the latter. By practice he had (it appears with those of Thomas Blanchard, for turning ir- lumbia College, showed five sections of various stones, such acquired the habit of making these rough note; on the spot, regular forms), the total had reached 10,041; or, for the period as granite, agate, etc., by means of two Power and Leland wherever he might be. Once a month or so he gathers his of sixty years comprised in the first era, the aggregate grand binoculars, which have an ingenious arrangement for scraps into his book and posts his index; an hour or two's amounted to 17,447. Yet in this small number are included swinging the polarizer in and out of the tube. Dr. Vander work at the most. The result is that he now has a fund of Whitney's cotton gin, McKean's first steam saw mill, Whit- Weyde exhibited four instruments: one by Andrew Ross, to temore's wool and cotton card-making machine, Hare's oxy- which various attachments had been made to change it into hydrogen blowpipe, Blanchard's tack machine, Fulton's a single dissecting microscope, an inverted chemical micros-This is only one instance of others within our knowledge, steamboats, Hall's breech-loading fire-arms, Perkins' steel cope, a horizontal microscope, especially adapted for drawengraving, Stevens' tubular boiler and screw propeller, ing, and an instrument to which had been attached an eye-Lowell's power loom, Burden's horseshoe and spike ma- piece for two observers, the invention of the exhibitor. In never finds its way into books. We would not confine our chinery, Mott's stoves for small coal, Saxton's magneto- this device, one observer sees the object under polarized light notes to newspaper articles alone, but include in them all electric machine, Bogardus' ring fiyer for cotton spinning and the other under unpolarized. Dr. Vander Weyde also facts likely to be of future use which come under personal and the long category of other important devices of that showed a large inverted microscope of his own invention, observation or are obtained in conversation with others. wonderfully prolific inventor, Professor Henry's splendid with a colossal eyepiece and a large field (this was illustrated electro-magnetic discoveries, Morse's telegraph, Guthrie's and described in the "Record of Scientific Progress" for discovery of chloroform, Boyden's patent leather, Baldwin's 1865, published by MUNN & Co.); and also a new polarizing improvements in the locomotive, Howe's pin machine, Mc- instrument for observing the colored rings around the axes of Cormick's reaper, Colt's revolvers, Wells' hat body machine, crystals, whereby the system to which they belong may be Goodyear's vulcanization of india rubber, Bigelow's carpet determined. The same inventor also showed several little iron plate to straighten it after a certain manner peculiar to loom, Howe's sewing machine, Sickel's cut-off, Morton's contrivances, which he explained to those interested in prachimself; yet he can use his eyes and ask questions, and put discovery of the anæsthetic qualities of chloroform, Rod- tical microscopy: such as new methods of illumination, a down what he sees and is told. In after years, he may turn man's hollow casting of ordnance, House's printing tele. new finder, and a micrometer of new and peculiar construction. His most remarkable exhibit consisted of the muscles

> Want of space prevents our mentioning in detail all the The visitors were all much interested in the exhibition, which will doubtless do much to popularize the fascinating

Steam in the Streets of Philadelphia.

Seven steam street cars were placed upon the Market Street Railway, Philadelphia, on March 21. A small boiler incased in wood is placed in front of the car, and by an ingenious contrivance the whole power of the engine can be concentrated on the brakes. The trial trips were very successful, the cars being stopped in a few seconds, even when going at high speed, heavy grades not causing as much trouble as had been anticipated. The engines were noiseless,