ASTRONOMICAL NOTES.

BY BERLIN H. WRIGHT.

PENN YAN, N. Y., Saturday, May 4, 1878.

The following calculations are adapted to the latitude of New York city, and are expressed in true or clock time, being for the date given in the caption when not otherwise stated.

PLANETS.

	H.M.		H.M.
Mercury sets	7 13 eve.	Saturn rises	3 02 mo.
Venus rises	3 09 mo.	Uranus in meridian	7 00 eve.
Mars sets	10 40 eve.	Uranus sets	1 52 mo.
Jupiter rises	0 56 mo.		

FIRST MAGNITUDE STARS.

	H.M.		H.M.
Antares rises	9 11 eve.	Sirius sets	8 50 eve.
Regulus in meridian	7 11 eve.	Procyon sets	11 01 eve.
Spica in meridian	10 28 eve.	Aldebaran sets	8 36 eve.
Arcturus in meridian	11 19 eve.	Algol (2d-4th mag. var.) sets	9 18 eve.
Altair rises	10 24 eve.	Capella sets	0 29 mo.
Vega in meridian	3 44 mo.	7 stars (cluster) sets	8 18 eve.
Deneb rises	7 51 eve.	Betelgeuse sets	9 23 eve.
Alpheratz rises	1 23 mo.	Rigel sets	7 49 eve.
Fomalhaut rises	4 03 mo.		

REMARKS.

Mercury is at inferior conjunction May 6, making a transit across the sun's disk. Transit begins at 10h. 18m. morning; middle, 2h. 5m. evening; end, 5h. 52m. evening. To obtain the time at any other city, apply the difference of time between that point and New York city to the above figures. Mars is now at his greatest northern declination, and is very near the moon May 6, being only 2° south. Venus and Saturn are in conjunction May 6 also. The time of conjunction, right ascension, occurs after sunrise, but at the time Venus rises, 3h. 9m. morning, they will have nearly the same right ascension, and Venus will be 1° 15′ north of Saturn.

SATELLITES OF JUPITER.

I. Begins a transit May 7, 3h. 39m. morning. Reappears from an occultation May 8, 3h. 10m. morning.

II. Reappears from a transit May 7, 3h. 59m. morning.

IV. Reappears from an occultation May 8, 4h. 0m. mo.

Astronomical Notes.

OBSERVATORY OF VASSAR COLLEGE.

The computations in the following notes are by students of Vassar College. Although merely approximate, they are sufficiently accurate to enable the observer to find the planets.

M. M.

Position of Planets for May, 1878.

Mercury.

On May 1 Mercury rises at 5h. 15m. A.M., and sets at 7h. 36m. P. M.

The transit of Mercury across the sun's disk occurs on May 6. Instructions for observing this phenomenon, which will be visible all over the United States, have been issued from the National Observatory. The planet will come between the earth and the sun, and will enter upon the sun's disk as a small, round, black spot (the diameter of Mercury is 12″, that of the sun 1906″) at about 4 minutes past 10 A.M., Washington time. It will remain upon the face of the sun more than seven hours. The principal interest to astronomers will be the expectation of obtaining accurate observations of the position of Mercury, in order to investigate the correctness of Leverrier's calculations of disturbing bodies between Mercury and the sun.

Mercury having passed across the sun will be west of it, and will rise before the sun. On May 31 it will rise at 3h. 34m. A.M.

Venus.

Venus will be very beautiful in the morning hours throughout the month. It will be at its greatest western elongation May 1, when it will rise at 3h. 13m. A.M., come to meridian a few minutes after 9 A.M., and set at about 3 P.M. It will easily be seen at meridian passage, at an altitude in this latitude of 46°. On May 31 Venus rises at 2h. 35m. A.M., and sets at 3h. 33m. P.M.

Mars.

On May 1 Mars rises at 7h. 33m. A.M., and sets at 10h. 46m. P.M. On May 31 Mars rises at 7h. 1m. A.M., and sets at 10h. 6m. P.M.

Mars passes by μ Geminorum and above it on May 11, and on the 31st is above and a little west of δ Geminorum.

Jupiter.

Morning observers will rejoice in the earlier rising of Jupiter, and although it is very far south, it will be very conspicuous in May. It rises on the 1st at 1h. 10m. A. M., and sets at 10h. 46m. A.M. On May 21 Jupiter and the moon will rise at the same time. On May 31 Jupiter rises at 11h. 16m. P.M., and sets at 8h. 48m. of the next day.

Saturn.

On May 1 Saturn rises at 3h. 30m. A.M., and sets at 3h. 12m. P.M. On May 31 Saturn rises at 1h. 38m. A.M., and sets at 1h. 28m. P.M.

Uranus.

On May 1 Uranus rises 22m. after noon and sets at 2h. 3m. the next morning. On the 31st Uranus rises at 10h. 26m. A.M., and sets at 0h. 6m. A.M. the next day. Uranus having passed above Regulus and toward the west, is slowly moving in the other direction, approaching Regulus again, but on the 31st is more than a degree above it, and to the west of it 2°.

Neptune.

Neptune rises on May 31 at 3h. 4m. A.M. It is so near the sun in its right ascension as to render it invisible.

PITCHES OF ENGLISH GAS PIPE THREADS.

Dia. of pipe in inches,	1/8,	1/4,	3/8,	1/2,	3/4,	1,	1 1/4,	1 1/2,	1 3/4,	2.
No. of threads per inch,	28,	19,	19,	14,	14,	11,	11,	11,	11,	11.

The Keely Motor.

The Keely motor deception seems at last to be nearly exploded, and the secret of the means by which its inventor obtained his enormous pressure has been discovered. Mr. J. B. Knight, Secretary of the Franklin Institute, of Philadelphia, was recently allowed an opportunity to make a partial investigation of the machine, but when he asked the privilege of testing the gauge which recorded the pressure, he was refused. Professors Wm. D. Marks and George F. Barker, of the University of Pennsylvania, were afterwards invited to make a thorough study of the motor, and the results of their study are given to the public in a letter to the Philadelphia *Ledger* of April 6. They noticed a heavy wrought iron tube lying in front of the machine, but not connected with it, but just before the experiments it was connected. They at once suspected that in this tube lay the secret of the wonderful force, and that it contained compressed air secretly stored in it previous to their arrival. We give the conclusion to their report in their own words:

"At the close of the experiments, one of the writers said to Mr. Collier that he must consider the machine a fraud, unless it could be demonstrated beyond a doubt that compressed air was not stored in the wrought iron tube, and requested that the cocks in the end should be unscrewed; this Mr. Collier positively refused to do, stating that the tube was 'sensitized' (we do not know what he meant by 'sensitized'), and would require three or four hours' work to 'reinstate' it if the atmosphere was admitted. How puerile such an excuse was the writers leave for others to judge.

"On requesting Mr. Keely to operate the machine, without using the wrought iron tube, he admitted that he was unable to do so.

"On every occasion at which the writers have been present no one has been allowed to operate the machine but Mr. Keely himself, and none have been permitted to make any tests of any sort, or do more than look on.

"To attempt to apply the known laws of physics or mechanics to this machine without every facility being afforded for investigation, would be idle. An analysis of the so-called vapor by Dr. C. M. Cresson, revealed nothing more than common air, as stated by Mr. Keely himself. We observed in one part of Mr. Keely's shop a hydraulic screw pump, quite capable of producing pressures greater than ten thousand pounds per square inch, thus affording him the means of charging the tube so frequently mentioned above."

Our own opinion on the Keely motor is that it has been a success, not as a machine for producing force, but as a machine for swindling people out of their money.—*American Manufacturer.*

American Anthracite for Europe.

The Philadelphia and Reading Railway Company have entered upon an enterprise which, if successful, must prove of great advantage to Eastern Pennsylvania. It is nothing less than to create a European market for American anthracite, a variety of coal practically unknown in Europe. To this end, the company's new steam collier, the Pottsville, sailed from Philadelphia April 4, for Havre, laden with the products of the Schuylkill mines, and apparatus for burning them, for the purpose of illustrating at the Paris Exhibition the advantages of this clean, hard coal for domestic and manufacturing uses. Samples of anthracite of all sizes, from pea coal to a single mass weighing 16,000 lbs., will be exhibited by this company, together with maps, drawings, plans, etc., showing the vast facilities for shipping the coal. For showing practically the use of anthracite in this country, the Pottsville carried a variety of cooking and heating stoves for the exhibition, and also one of the company's refuse burning locomotives. This engine was built by the company for a fast freight locomotive, its peculiarity being a furnace designed for burning coal waste. The furnace grate, of sixty-five square feet, is composed of water tubes and intervening cast iron bars separated only three sixteenths of an inch. The engine steams freely with coal dirt fuel, which can be had at the mines so cheaply that this item of cost with one of these engines hauling coal trains is said to be only three cents a mile. The same grate is said to burn larger sizes of coal as well as coal dust, and with great economy. After the exhibition the engine is to be tendered to some European railway for a trial of its advantages there.

Type-Setting in Japan.

The advantages of alphabetic writing are nowhere more conspicuously shown than in a large printing office. The compositor stands within easy reach of every character he may have need of, and a boy can learn the position of each in the case in a few hours. It is quite another matter where each word has a distinct character, as in China and Japan. A correspondent describing the office of a Japanese paper says that a full font of Japanese type comprises 50,000 characters, of which 3,000 are in constant use, and for 2,000 more there are frequent calls. The type is disposed about the composing room on racks, like those in a reading room, and the compositors wander up and down the isles setting type and taking exercise at once. With so many characters it is no wonder that Japanese proofreaders have to be men of intelligence and high scholarship.

The impossibility of telegraphing single-character words has kept this great instrument of civilization in foreign hands, and made it practically useless for the natives of China and Japan. To these the telephone is an especial blessing, which they are not slow to appreciate.

NEW YORK ACADEMY OF SCIENCES.

At a meeting of the Academy held Monday evening, April 1, Mr. I. C. Russell read a paper on

THE INTRUSIVE NATURE OF THE TRIASSIC TRAP SHEETS OF NEW JERSEY.

The author stated that although the trap sheets which traverse the triassic rocks of New Jersey and Connecticut are usually regarded as dikes of igneous rocks, yet proof of their intrusive nature is rarely given; and, as the igneous origin of these rocks had been questioned by some persons, he called the attention of the Academy to a locality where proof is positively shown that these sheets of trap were really forced out in a molten condition between the layers of sedimentary rocks. The trap ridges of New Jersey have a general north and south direction, usually conformable with the strike of the associated sandstones and shales which compose the great bulk of the triassic formation. The trap rocks also seem to be usually conformable in dip with the stratified rocks above and below them. For this reason, and also on account of the rare occurrence of the exposure of a junction of the trap with the stratified rocks overlying them—owing to the removal of the latter by denudation and to the line of contact being hidden by drift and vegetation—the supposition has obtained that the trap sheets were not intrusive, but were formed cotemporaneously with the shales and sandstones as a bed or stratum of igneous rock, spread out in a molten condition on the bottom of a shallow sea in which the stratified rocks were being deposited. He proposed to consider, then, (1) whether the plutonic rocks of the triassic were spread out in the form of a sheet of molten matter, and then cooled and consolidated before the rocks that rest upon them were deposited, both therefore being of the same geological period; or (2) whether the traps were forced out in a fused state among the sedimentary layers, after consolidation of the latter, which would make them more recent than either the over or underlying rocks.

To decide these questions he made an examination of the trap ridge, known as the First Newark Mountain, for some twenty miles of its course. He hoped through this examination to learn, in reference to the history of this mountain, (1) whether the sedimentary rocks that repose upon the igneous ones have been changed from their normal condition by the action of heat at the surface of contact; and (2) whether the trap sheets seem in all cases to be conformable in bedding with the stratified rocks with which they are associated. It is not difficult to find the junction of these igneous rocks with the shales and sandstones that underlie them; and in all cases the latter are found highly altered, and show plainly that they have been exposed to intense heat. This change may be observed at a number of places on the western shore of the Hudson beneath the trap rock forming the Palisades; in some instances the sandstones here have been metamorphosed into a compact vitreous quartzite. These observations very clearly show that the triassic traps were once in a highly heated, and probably molten, condition; and this is, moreover, shown by their crystalline structure. If these rocks had cooled and consolidated before the overlying shales and sandstones were deposited, the latter of course would show no such alteration as that we find in the underlying strata. As before mentioned, however, it is difficult to obtain proof of such alteration in the stratified rock above the trap. After many long excursions in hopes of finding an exposure, the author had been successful in but a single instance, and this was on the western slope of the First Newark Mountain, directly west of Westfield and near the little village of Feltville; at this point the desired junction is very plainly shown.

Here, in the sides of a deep ravine, which has been cut out by a small brook, the stratified rocks are well exposed. The trap rock, which appears in the bed of the stream, in some places presents its usual characteristics of a hard, bluish, crystalline rock. In other places it swells up into bosses and rounded masses, which penetrate the overlying rocks. The outside of these masses presents a scoriaceous or slag-like appearance; in the interior the cavities are filled with infiltrated minerals. The shales resting directly on these igneous rocks have, in many places, been disturbed from their normal position and greatly altered in texture and color. For the first two or three feet above the trap the shales have been so greatly metamorphosed that they are scarcely distinguishable from the trap itself. At a distance of six or eight feet above the traps the shales are still very much altered and filled with small, spherical masses of a dark green mineral resembling epidote. Midway up the ravine (which is thirty feet deep) the shales present somewhat their usual reddish appearance, but are filled with a great number of irregular cavities formed by the expansion of vapors while in a semi-plastic condition. At a distance of twenty-five or thirty feet above the trap, the shales and sandstones are changed but slightly, if at all, from their normal condition. A bed of limestone, from two to three feet in thickness, is here interstratified with the shales and the sandstones—a rare occurrence in the triassic formation of New Jersey—and where it approaches the trap it is considerably altered and forms a mass of semi-crystallized carbonate of lime. Near the junction of the metamorphosed shales and the igneous rocks beneath, the author found in a number of places a peculiar rock, composed of angular greenish fragments, bound together by a reddish cement, forming a typical breccia. This rock, in some places, is two feet or more in thickness; at other times it fills the spaces between concentric masses of igneous rock or metamorphosed shale. This interesting material seems to have a history somewhat similar to that of the "friction breccias" mentioned by Von Cotta as occurring at the margins of eruptive igneous rocks and formed at the time of their eruption. The section at Feltville furnishes indisputable evidence that the igneous rocks of the First Newark Mountain were intruded in a molten state between the layers of stratified rocks subsequent to their consolidation; and, from analogy, this conclusion should be extended to embrace all the trap ridges of New Jersey.

The distinctness with which this one question relating to the triassic trap sheets has been answered seems by contrast to make other questions in their history only more obscure. We cannot now determine in what age, after the consolidation of the triassic sedimentary rocks, the outbursts of trap occurred; nor whether the several trap ridges that traverse the triassic were formed at one time. It may be that one is thousands of years older than its neighbor.

Mr. Russell's valuable paper was illustrated by a complete series of triassic rocks from the locality at which his observations were made.

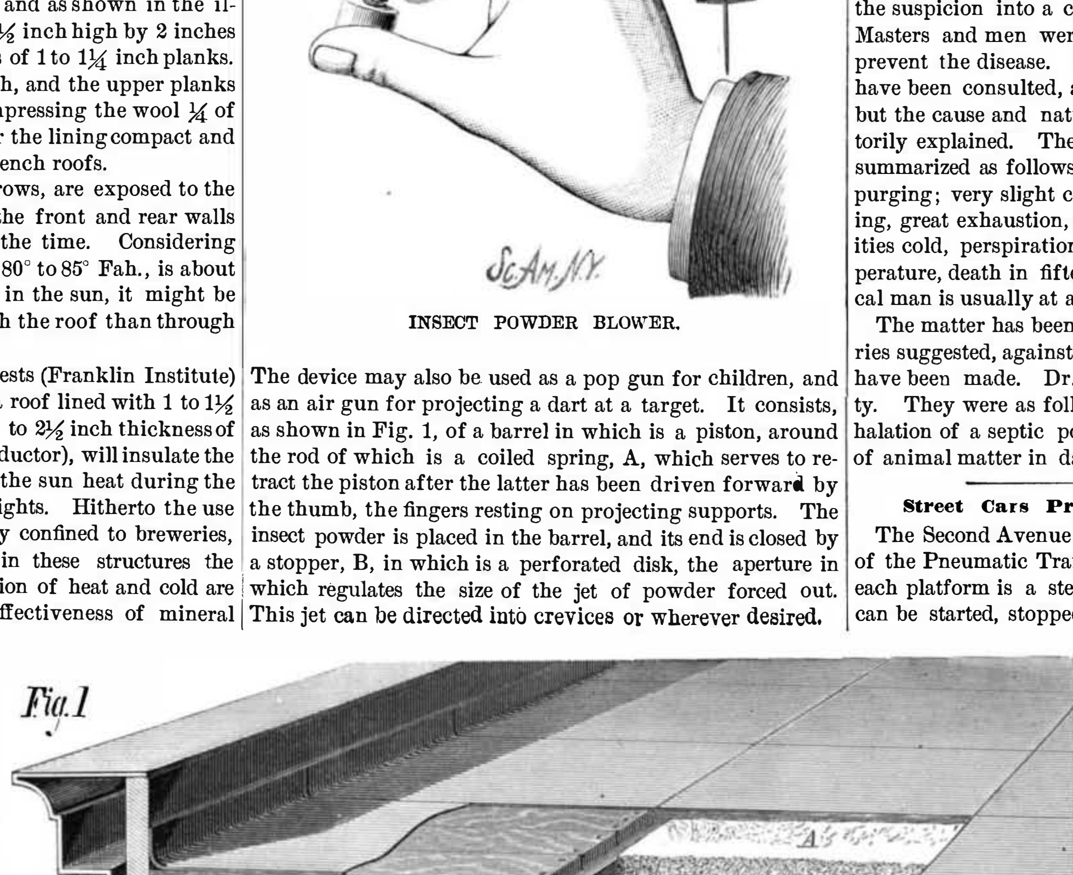
LINING ROOFS WITH MINERAL WOOL.

The advantages of the new application of mineral wool herewith illustrated are claimed to be as follows: The temperature in dwellings, etc., is insulated; the roofs are rendered practically fireproof as regards the spread of fire from neighboring structures, and the material not being liable to decay or rot, on account of moisture, dampness, etc., preserves the woodwork of the roof. It is further claimed of the cheapest grade of mineral wool to be used for this purpose that its non-conducting or insulating quality is equal to that of hair felt at even thickness, and superior to cements, mortars, etc. It weighs 28 pounds per cubic foot, or 3½ pounds per square foot over all, and as shown in the illustration is spread between studs 1½ inch high by 2 inches wide, and between two roofing floors of 1 to 1¼ inch planks. The wool, A, is leveled 1¾ inch high, and the upper planks are nailed on the studs, thereby compressing the wool ¼ of an inch, which is sufficient to render the lining compact and to prevent its settling in gable or French roofs.

Ordinary city dwellings, built in rows, are exposed to the rays of the sun on three surfaces, the front and rear walls alternately, and the roof nearly all the time. Considering that the temperature in the shade at 80° to 85° Fah., is about equivalent to from 125° to 135° Fah. in the sun, it might be asserted that more heat goes through the roof than through the walls.

We are informed that scientific tests (Franklin Institute) and practical experience show that a roof lined with 1 to 1½ inch hairfelt or mineral wool, and 2 to 2½ inch thickness of wood (which itself is a good non-conductor), will insulate the temperature sufficiently to ward off the sun heat during the day or the extreme cold of winter nights. Hitherto the use of mineral wool for roofs was mostly confined to breweries, ice, and cold storage houses, as in these structures the questions of ventilation and insulation of heat and cold are of the utmost importance. The effectiveness of mineral wool for such purposes can now be attested to by quantities in actual use, representing in the aggregate a surface of over 300,000 square feet of 1 inch lining, though mostly used at 3 inch and 4 inch thickness for lining walls.

As to the security against fire from neighboring buildings the objection might be raised that apparently when the upper roofing planks are on fire the studs on which they are fastened and the other planks beneath them will also burn. On account of the wool between the studs no hot air can get beneath them, so that the studs are only exposed to the heat on top; and it is claimed they will only char, or at least be so slowly consumed as to give ample time for extinguishing the fire. Mineral wool being made from slag or scoria, at a heat of about 2,000° Fah., it is of course incombustible. For use on buildings it possesses the additional advantages of being (like felt) a non-conductor of sound, and it affords no abode to rats, mice, and vermin. The address of Mr. A. D. Elbers, who controls the sale and manufacture of mineral wool (made at Greenwood Station on the Erie Railway), will be found in our advertising columns.



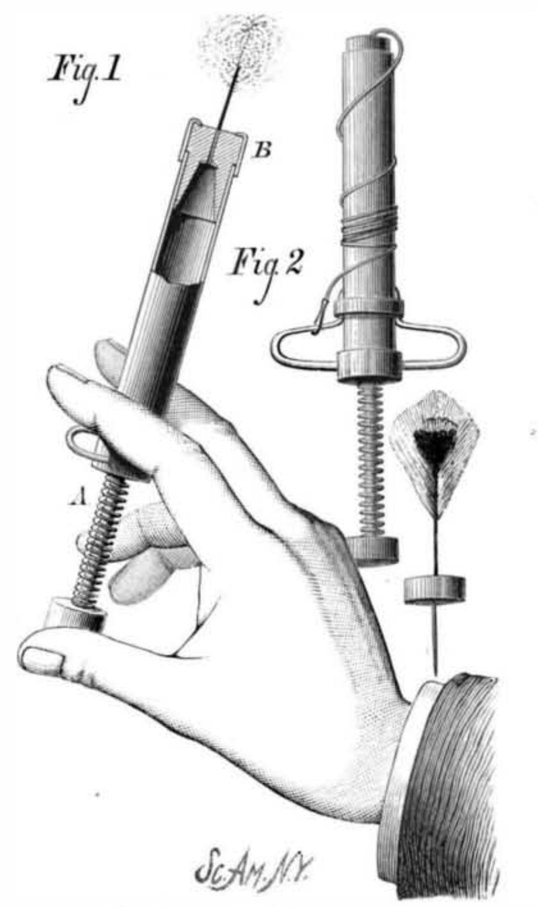
ROOF LINED WITH MINERAL WOOL.

Antidotes to Arsenic.

According to the *Répertoire de Pharmacie*, Rouyer has discovered that, although the freshly precipitated sesquihydrate of iron is an antidote for arsenious acid, it has no effect in counteracting the action of arsenite of soda or of arsenite of potassa (Fowler's solution), but that a mixture of a solution of sesquichloride of iron and the oxide of magnesium will neutralize the effect of these salts, as well as those of arsenious acid itself, and hence this mixture is always preferable in cases of poisoning by arsenic. The officinal solution of sesquichloride of iron should first be administered, and fifteen minutes afterwards the magnesia given in the proportion of 70 grains of the latter to 18 minims of the former. In an hour after the administration of the antidote a cathartic should be given. Lemonade and other acid drinks should be avoided during the treatment, since the compounds formed by the union are insoluble.

IMPROVED INSECT POWDER BLOWER.

The invention herewith illustrated is a new insect powder blower, by which the powder is distributed at will in greater or smaller quantities, and in a minute jet wherever desired.



INSECT POWDER BLOWER.

The device may also be used as a pop gun for children, and as an air gun for projecting a dart at a target. It consists, as shown in Fig. 1, of a barrel in which is a piston, around the rod of which is a coiled spring, A, which serves to retract the piston after the latter has been driven forward by the thumb, the fingers resting on projecting supports. The insect powder is placed in the barrel, and its end is closed by a stopper, B, in which is a perforated disk, the aperture in which regulates the size of the jet of powder forced out. This jet can be directed into crevices or wherever desired.

The arrangement of the device for a pop gun is shown in Fig. 2, the cork being inserted in the open end of the barrel, and forced out by sudden pressure of the piston. The feathered dart used is represented in Fig. 3. Patented through the Scientific American Patent Agency, March 5, 1878. For further particulars address the inventor, Mr. Michael Mark, New York city, N. Y.

Keep Your Mouth Shut.

At the Royal Institution, London, recently, Professor Garrod lectured on the protoplasmic theory of life, and in speaking of respiration drew attention to some few facts of practical importance which, though well known to physiologists, are too often disregarded by the public. The relative time occupied in inspiration and expiration is such that the carbonic acid breathed out to a distance is out of the way before the next inspiration, the air for which is drawn in from the immediate neighborhood of the nostrils. The distance to which breath is exhaled through the nostrils is well illustrated by smoking through the nose. During the day our nostrils are kept clear of interference, as we sit or walk; but at night bed clothing is apt to get so arranged as to retard the current of carbonic acid breathed out, and some of it is thus a second time inhaled, instead of the incurrent being, as it should be, of pure air. Another practical point mentioned was the importance of keeping the mouth closed and of breathing through the nose in cold weather. Air should not reach the lungs at a temperature much below that of the blood, and air is much more warmed in passing through the nose passages than in going directly from the mouth. In speaking of the evolution of carbonic acid, Professor Garrod mentioned a point which, he thought, had not received due recognition, which was that the "protoplasmic" vitality of the body led to the oxidation of pabulum supplied and the consequent formation of carbonic acid, just as muscular work, whether voluntary or not, produced a similar result. Pettenkoffer's experiments with men were illustrated on a small scale, with a tame white mouse, in a glass vessel duly supplied with food, and a current of air so arranged that the carbonic acid breathed out by the mouse was collected in lime water, so that the amount in a given time, and varying with activity or rest, could be estimated.

New Disease among Wool Sorters.

Dr. Bell, of Bradford, England, has directed attention to a new disease among wool sorters, which has been developed since the introduction of mohair and alpaca into the trade. Sudden and unaccountable deaths took place among the workmen, which at length became so frequent as to convert the suspicion into a certainty that something was wrong. Masters and men were equally anxious to understand and prevent the disease. Eminent medical and scientific men have been consulted, and post mortem examinations made, but the cause and nature of the disease were not satisfactorily explained. The symptoms of a typical case might be summarized as follows: No rigor, thirst, pain, vomiting, nor purging; very slight cough; no expectoration; quick breathing, great exhaustion, weak rapid pulse, clear mind, extremities cold, perspiration clammy, gradually decreasing temperature, death in fifteen to twenty-four hours. The medical man is usually at a loss to account for death.

The matter has been fully discussed and a variety of theories suggested, against which an equal number of objections have been made. Dr. Bell's views met with some unanimity. They were as follows: he attributed the evil to the inhalation of a septic poison produced by the decomposition of animal matter in damaged bales, producing septicæmia.

Street Cars Propelled by Compressed Air.

The Second Avenue Railroad, of New York city, has one of the Pneumatic Tramway Engine Company's cars. Upon each platform is a steel lever, by means of which the car can be started, stopped, or its direction reversed. The car is of the same general model as that of ordinary street cars. It has six tubular air receivers situated under the floor of the car. The air is compressed by an engine which is standing at the side of the depot, and is introduced by a rubber hose into these receivers. That air passes through an engine situated between the axles, and propels the car. Sufficient air to enable the car to make the entire circuit of Manhattan Island, if necessary, can be stored at one time in the receivers.

The experiments made have proved completely satisfactory. The car lately ran from 63d to 95th street and back in about twenty minutes, with two or three stoppages. It is claimed for the car thus inspected that it can be stopped more readily than the horse cars, and that its rate of speed can be increased to thirty miles per hour, while it can make nine miles per hour and still not appear to go faster than the horse cars. The car which was run is only a model, and it takes about four hours to charge its receivers with air, but machinery has been ordered which will perform the work in less than a minute.

One of these air engines, it is said, can easily draw a whole train of ordinary street cars. A company composed of twenty-five capitalists has been formed to manufacture cars upon the above model. It has already received an order for five cars from the Second Avenue Company. These will be used on the upper part of the Second Avenue route.

Spiders' Webs.—Leuwenhoek has computed that one hundred of the single threads of a full grown spider are not equal to the diameter of the hair of the human beard; and consequently, if the threads and hair be both round, ten thousand such threads are not larger than such a hair. He calculates that 4,000,000 of a young spider's threads, which are much finer than those of full grown spiders, are not so large as the single human hair.