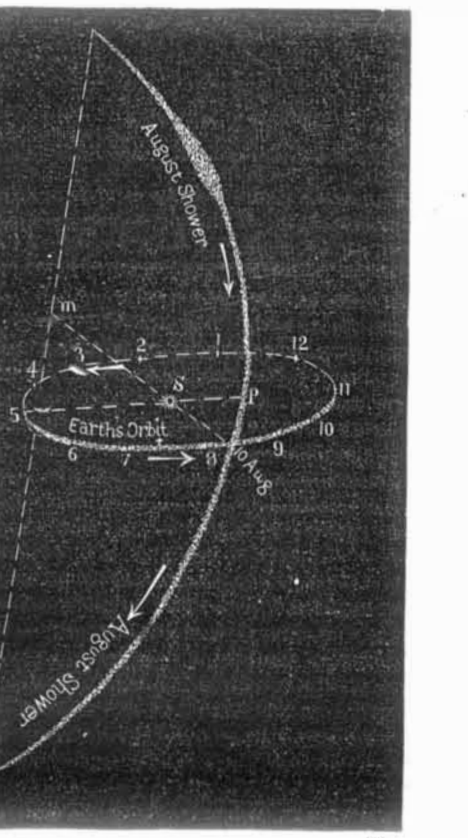
THE ANNUAL AUGUST SHOWER OF METEORS.

It is now generally received and placed almost beyond doubt, by the recent observations of Schiaparelli, Le Verrier, Weiss, and others, that meteors, for the most part small but weighing occasionally many tuns, are fragmentary masses, revolving, like the planets, round the sun, which in their course approach the earth, and, drawn by its attraction into our atmosphere, are set on fire by the heat generated through the resistance offered by the compressed air.

Their chief constituent is metallic iron, mixed with various silicious compounds; in combination with iron, nickel is always found, and sometimes also cobalt, copper, tin, and chromium.

The hight at which meteors appear is very various, and ranges chiefly between the limits of 46 and 92 miles; the mean may be taken at 66 miles. The speed at which they travel is also various, generally about half as fast again as that of the earth's motion round the sun, or about 26 miles in a second; the maximum and minimum differ greatly from this amount, the velocity of some meteors being estimated at 14 miles, and that of others at 107 miles in a second.



When a dark meteorite of this kind, having a velocity of 1,660 miles per minute, encounters the earth, flying through space at a mean rate of 1,140 miles per minute, and when through the earth's attraction its velocity is further increased 230 miles per minute, this body meets with such a degree of resistance, even in the highest and most rarefied state of our atmosphere, that it is impeded in its course, and loses in a very short time a considerable part of its momentum. By this encounter there follows a phenomenon, which always takes place when the motion of a body is interrupted, designated by the expression "the conversion of the motion of the mass into molecular action or heat;" it is a law without exception that, where the external motion of the mass is diminished, an inner action among its particles, or heat, is set up in its place as an equivalent, and it may be easily supposed that, even in the highest and most rarefied strata of the earth's atmosphere, the velocity of the meteorite would be rapidly diminished by its opposing action, so that shortly after entering our atmosphere the vibration of the inner particles would become accelerated to such a degree as to raise them to a white heat, when they would either become partially fused, or, if the meteorite were sufficiently small, it would be dissipated into vapor, and leave a luminous track behind it of glowing vapors.

As this heat originates form the motion of the meteor being impeded or interrupted by the resistance of the air, and as this motion or momentum is exclusively dependent on the speed of the meteor as well as upon its mass, it is possible, when the rate of motion has been ascertained by direct observation, to determine the mass. Professor Alexander Herschel has calculated by this means that those meteors of the 9th and 10th of August, 1863, which equaled the brilliancy of Venus and Jupiter, must have possessed a mass of from five to eight pounds, while those which were only as bright as stars of the second or third magnitude would not be more than about ninety grains in weight. As the greater number of meteors are less bright than stars of the second magnitude, the faint meteors must weigh only a few grains, for, according to Professor Herschel's computation, the five meteors observed on the 12th of November, 1865, some of which surpassed in brilliancy stars of the first magnitude, had not an average weight of more than five grains; and Schiaparelli estimated, from other phenomena, the weight of a meteor to be about fifteen grains. The mass, however, of the meteoric stones which fall to the earth is considerably greater, whether they consist of one single piece, such as the celebrated ironstone discovered by Pallas in Siberia, which weighed about 2,000 pounds, or of a cloud composed of many small bodies which enter the earth's atmosphere in parallel paths, as shown in the engraving and which, from a simultaneous ignition and descent upon the earth, present the appearance of a large meteor bursting into several smaller pieces. Such a shower of stones, accompanied by a bright light and loud explosion, occurred at L'Aigle, in Normandy, on the 26th of April, 1803, when the number of stones found in a space of 14 square miles exceeded 2,000. In the meteoric shower that fell at Knyahinga, in Hungary, on the 9th of June, 1866, the principal stone weighed about 800 pounds, and was accompanied by about a thousand smaller stones, which were strewn over an area of 9 miles in length by 3½ broad.

The meteor shower of the 10th of August, the radiant point of which is situated in the constellation *Perseus* takes place nearly every year, with varying splendor; we may therefore conclude that the small meteors composing this group form a ring round the sun, and the earth every 10th of August is at the spot where this ring intersects our orbit, also that the ring of meteors is not equally dense in all parts; here and there these small bodies must be very thinly scattered, and in some places even altogether wanting.

The diagram shows a very small part of the elliptic orbit which this meteoric mass describes round the sun, S. The earth encounters this orbit on the 10th of August, and goes straight through the ring of meteors which ignite in our atmosphere, and are visible as shooting stars. The line, *m*, is the line of intersection of the earth's orbit and that of the meteors; the line, P S, shows the direction of the major axis of their orbit. This axis is fifty times greater than the mean diameter of the earth's orbit; the orbit of the meteors is inclined to that of the earth at an angle of 64° 3', and their motion is retrograde, or contrary to that of the earth.

The November shower is not observed to take place every year on the 12th or 13th of that month, but it is found that every 32 years an extraordinary shower occurs on those days, proceeding from a point in the constellation *Leo*. The meteors composing this shower, unlike the August one, are not distributed along the whole course of their orbit, so as to form a ring entirely filled with meteoric particles, but constitute a dense cloud, of an elongated form, which completes its revolution round the sun in 33 years, and crosses the earth's path at that point where the earth is every 13th of November.

Schiaparelli shows in a striking manner that, as a comet is not a solid mass but consists of particles, each possessing an independent motion, the head or nucleus nearer the sun must necessarily complete its orbit in less time than the more distant portions of the tail. The tail will therefore lag behind the nucleus in the course of the comet's revolution, and the comet, being more and more elongated, will at last be either partially or entirely resolved into a ring of meteors. In this way the whole path of the comet becomes strewn with portions of its mass, with those small, dark, meteoric bodies which, when penetrating the earth's atmosphere, become luminous, and appear as falling stars.

Schiaparelli has, in fact, discovered so close a resemblance between the path of the August meteors and that of the comet of 1863, No. III, that there cannot be any doubt as to their complete identity. The meteors to which we owe the annual display of falling stars on the 10th of August are not distributed equally along the whole course of their orbit; it is still possible to distinguish the agglomeration, of meteoric particles which originally formed the cometary nucleus, from the other less dense parts of the comet; thus, in the year 1862, the denser portion of this ring of meteors through which the earth passes annually on the 10th of August, and which causes the display of falling stars, was seen in the form of a comet, with head and tail as the densest parts, approaching the sun and earth in the course of that month. The difference between the comet's nucleus and its tail that has now been formed into a ring consists in that, while the denser meteoric mass forming the head approaches so near the earth once in every 120 years as to be visible in the reflected light of the sun, the more widely scattered portion of the tail composing the ring remains invisible, even though the earth passes through it annually on the 10th of August. Only fragments of this ring, composed of dark meteoric particles, become visible as shooting stars when they penetrate our atmosphere by the attraction of the earth, and ignite by the compression of the air.

Calculation shows that this ring of meteors is about 10,948 millions of miles in its greatest diameter. As the meteoric shower of the 10th of August lasts about six hours, and the earth travels at the rate of eighteen miles in a second, it follows that the breadth of this ring, at the place where it crosses it, is 4,043,350 miles.—*Dr. H. Schellen, in Spectrum Analysis.*

Steam Power in Carriage Building.

In New York city, only four carriage factories employ steam power for running machinery; and we have good reasons for believing that it pays the proprietors well—indeed so well that they would not dispense with it for many times the cost of the investment. Now, as it pays well in these four factories, why would it not pay in all other large factories?

A ten horse engine, with boiler and the following most common machinery: a cross cut saw, a rip saw, a band saw, a planer, a mortising machine, and a shaper, or variety molding machine, will cost, with shafts and belting, all up and ready for use, about $5,000; and the daily expenses, including fuel, engineer's wages, oil, etc., about $5. Now, what benefit would be derived therefrom? Every wood worker spends, we have been told, about one eighth of his time daily by such sawing as could be done by machine saws in less than ten minutes. By the shaping machine, it is but fair to estimate a similar saving of time; and the planer and mortiser would, we think, average more. Where a dozen mechanics are working, the said machinery will give a saving of three hours per man, or equal to three tenths of their wages, in the aggregate about $15 per day. We think that the saving would be far greater under an efficient foreman, which the system requires, as he can systematize the work so that he gives each workman the materials after they have been cut, shaped, and dressed by the machinery, and are nearly ready for connecting and finishing. If the foreman is unused to machinery, it will, of course, take him some time to use it expeditiously; but if he is a smart man, which a foreman always ought to be, he will soon master the difficulties. Experience has taught us that it is best from the start to hire a man used to run wood working machinery, as thereby a saving in time and expenses is immediately effected; while in the absence of a skillful machine hand, the erection of machinery driven by steam power generally results in a loss of money and materials the first year.

Of course wood working machinery pays best where several sets of work of the same shape are made. It needs not much penetration to understand that a dozen carriage bodies of one pattern can, by help of machinery, be made as cheaply as three bodies of different patterns. Nevertheless, we believe that, even in those shops where every carriage body has a shape of its own, wood working machinery will pay. The saws, for instance, are always handy assistants, no matter what work the maker is building.

In the smith shop, steam power is useful and labor-saving in a thousand ways. The old fashioned bellows may be discarded, trip hammers erected, and almost one half of the hands dispensed with.

In the paint shop and varnish room, steam can always be used advantageously, as thereby a uniform temperature, so desirable for their work, may be maintained.

Even in a trimming shop, steam power can be made available, for moving machinery, for cutting leather, skin, buckram, etc., and for driving sewing machines and other machinery. In fact, any establishment which has commenced to use steam power will soon learn that it is a general benefactor. The grindstones will always turn at a single movement of the hand, superior glueing, bending and veneering apparatus are within command, and a general elevation is always discernible where the steam engine is running. The constant movement around the mechanic awakens his speculative faculties. His mind will be turned in a direction that will gradually develop his mechanical ideas; and the result will be new mechanical devices, which will execute a certain amount of labor, stimulate him to greater achievements, and be a great use and benefit to him.

All mechanics cannot be Watts, Fultons, Morses, or Howes, but all should aim to be, and the more familiar they are with labor-saving machinery, the sooner will their latent genius come forth.—*The Hub.*

Use of Fruit.

Instead of standing in fear of a generous consumption of ripe fruit, one should regard it as decidedly conducive to health. The very diseases, says the *Country Gentleman*, commonly assumed to have their origin in the free use of all kinds of berries, apples, peaches, cherries, pears, and melons, have been quite as prevalent, if not equally destructive, in seasons of scarcity. There are so many erroneous notions entertained of the bad effect of fruit that it is quite time a counteracting impression should be promulgated, having its foundation in common sense and based on the common observation of the intelligent. No one ever lived longer, or freer from the attacks of disease, by discarding the delicious fruits of our country. On the contrary, they are very essential to the preservation of health, and are therefore given to us at the time when the condition of the body, operated upon by deteriorating causes not always comprehended, requires their grateful, renovating influences. Unripe fruit may cause illness, but fresh, ripe fruit is always healthful.

New Photographic Method.

M. Fargier, whom the editor of the *Moniteur* tells us was the first to render carbon printing practicable, is again in the field with a new carbon process. Some specimens were exhibited, and the following details communicated, at the last meeting of the French Photographic Society. The method seems to possess considerable novelty and interest. It is as follows:

A certain saline solution, the nature of which is for the present a secret, is prepared and put into a dish. Upon this bath a common sheet of paper is floated, then dried and exposed to light under a negative. The image comes out by degrees, and you can watch its progress. When sufficiently printed, this image is laid upon a bath of blackened gelatin, like that which is used for the preparation of pigment papers. The pigment only attaches itself to those parts which have been acted on by light. The paper is then washed in warm water, and the print is finished.

Channel Railway Ferry.

The Parliamentary Committee has rejected the bill authorizing the construction of a new channel railway ferry between France and England. At present passengers are carried across the English Channel, 29 miles, in small steamers not so large as some of our river ferry boats.

Mr. John Fowler, C. E., Engineer of the London Underground Railways, is the projector of the new channel ferry, and his scheme involves the employment of large steamers, 450 feet in length, on which the passenger cars are to be carried across. A train of sixteen cars containing 336 passengers is to be carried, the cars being raised from and lowered to the decks to the steamers by hydraulic elevators.