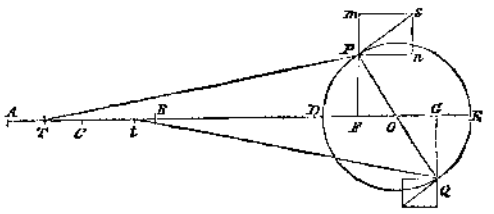
CRANK MOTION.

MESSRS. EDITORS:—Permit me to say a few words more on the crank motion. Although my last communication was misunderstood, I would have allowed the matter to pass unnoticed but for a communication from Q. E. D., that appeared in your journal of Sept. 29. Let A B be the range of the slides, and C a point in the center between A and B; I contend that I answered the question of "A Mechanic" when I proved that the triangle, T P O, was isosceles, only when the cross-



head, T, was at C; and hence, in this position, the angle, P O D, could not be a right angle. "A Mechanic" admitted and had observed the fact, that when T was at C, P had not moved over half the semi-circle, D P E, but did not know the reason why. When an engine is doing its maximum work, the motion of the crank, O P, is nearly uniform; and I will presently demonstrate that the velocity of the point, P, multiplied by the natural sine of the angle, P O D, gives the velocity of the point, T. I do not remember this fact to be stated by any writer on mechanics. For example: let O P=14 inches, P T=55, the angle, P O D=52°, and the velocity of point, P, 30 inches per second.

Natural sine of 52°=.788, nearly;

.788×30=23.640.

Hence, the velocity of the point, T, in this position is nearly equal 23 2-3 inches per second when the velocity of the point, P, is 36 inches per second; while the distance of the point, T, from the point, A, is 6.51 inches, and the distance, D F=5.38 inches; yet when T was at A, P was at D. When T is 15.812 inches from A, in the example before us, it is moving with its maximum velocity; T has not attained its maximum velocity when it arrives at the center, C. Hence, when the rule above given is understood, the velocity and position of T is readily found when the position and velocity of P is given. The problem may present itself in another form, namely: given the position of the point, T, and the velocity of P, to find the velocity of T.

Let A T=9, and the velocity of P (50 feet) a second; required the velocity of T. At this point, T O=60, O P=14, and T P=55; the three sides of the triangle, T P O, being given, the angle, T O P, is readily found to be 62° 41′. Natural sine of 62° 41′ = .888, nearly; hence, .888 × 50 = 44.400 feet, the velocity of T when 9 inches from A. The rule here applied may be demonstrated thus: Let P *m s n* be a mathematical point at the point, P, and P *s* a tangent to the circle representing *dv*, the differential of the velocity of P in the direction of the tangent, and P *n*= *sy*, the velocity of the point, P, in the direction of the slides. In fact, although the parallelogram of velocities P *m s n* is without magnitude, it has a different form at every point on the circumference of the circle (see "Byrne's Calculus of Form"); yet, in every position, the triangles, P *n s* and P F O, are similar:—

∴ Velocity of P : velocity of T : : *dv* : *dy*,
: : O P : P F;
But O P : P F : : radius : sine P O F.
∴ Velocity of P : velocity of T : : 1 : sine P O F.
∴ Velocity of P × sine P O F=velocity of T.

The same reasoning is applicable to the motion of the crank at any other point, Q. What I state, I demonstrate mathematically, subject to no abatement. The mere words of Q. E. D., and the use of his terms "sum" and "difference," are well calculated to lead people astray; such arguments can never lead to a conclusion by which the comparative velocities of the two points, P and T, may be calculated.

Let *t* B=A T=9 inches; then *t* O=64 inches; *t* Q =55, and O Q=14. In this case, the angle G O Q= 76° 24′—the natural sine of which is .972, nearly; therefore the velocity of the crosshead, when at *t* = .972×50=48.6 feet per second; while at T, in the example I have taken, the velocity is only 44.4 feet per second; and yet A T=B *t*=9 inches. The principles demonstrated and applied in this particular example are easily rendered general and made to suit any case, and the ratio of the velocities of P to T is not found by a sum or difference, but by a multiplication, and the multiplier is the sine of the angle D O P. When the velocity of T is given, the velocity of P is found by dividing the velocity of T by the sine of the angle D O P.

OLIVER BYRNE.

Jersey City, N. J., Oct. 15, 1850.

AMERICAN ENGINEERS' ASSOCIATION.

On Wednesday evening, Oct. 3d, the usual monthly meeting of this association was held at its room, No. 24 Cooper Institute, this city—Henry E. Rhoeden, chairman *pro tem*; John C. Merriam, secretary.

After the disposition of their usual miscellaneous business, the following gentlemen were proposed for election as members of the society:—Wm. Russel, Edward Storrer, Wm. Gee, George Gee, Chas. Nelson, Theo. Allen, Alfred Sims, Wm. Sparks, J. F. Holmes, A. M. Cummings, Horatio Allen, William E. Everitt, W. Lee, S. D. Larned, George Monell, John Ozza and John Powers.

The election of those proposed at the meeting of the 5th of September was not proceeded with, owing to the absence of every member of the Committee on Elections. To us, this would seem to be a very important committee, and their absence, beside retarding the healthy progress of the association, might engender an unfriendly feeling toward the body in the mind of some sensitive person thus neglected.

The association then proceeded to consider the subjoined

NEW INVENTION.

Improved Car Brake.—The Secretary exhibited an improved automatic car brake, invented by a Mr. Perkins. The essential novelties of this essay are, that the brakes, when applied to a train, are thrown into action automatically, by the engineer's simply checking the speed of the locomotive, whereby he exercises complete and instantaneous control over the train; and yet the brakes are liberated and set for proper action by simply putting the train in motion, either to go forward or backward.

This invention was duly referred to the Committee on Science and New Inventions.

It was resolved by the members that, after this date, they would give up room No. 25, held by them for the purpose of weekly re-unions, and in future hold, upon Wednesday evening of each week, an informal meeting in their large room, No. 24. This action was necessitated, from the fact that it would enable them to proceed at a much less expense than hitherto.

The association was notified by Mr. Merriam that, at the next regular monthly meeting, he would offer an amendment to the constitution, to the effect that, at their weekly re-unions, proposals for membership be declared in order, action of election as heretofore.

An invitation was extended to the society to visit the gas works of Messrs. Richard Smith & Co., this city.—Accepted.

At this juncture, Mr. Lewis Koch, engineer, read a paper on the "Expansion of Steam."

THE FASTEST STEAMBOAT RUNNING ON RECORD.

On the 13th inst., the steamboat *Daniel Drew* made the trip between New York and Albany in six hours and fifty minutes, with five landings and against a head wind. The distance on the Hudson river route between the two places is considered to be 150 miles; and if we allow ten minutes for each of the landings—they having to be made on both sides of the river—the actual running time will be six hours, and the average speed 25 miles per hour. This is equal to locomotive running, and the fastest ocean steamers, in the calmest weather, do not come within eight miles per hour of this figure. See details of this steamboat on page 374, Vol. II. (present series) of the SCIENTIFIC AMERICAN.

THE ART OF AGRICULTURE.—A great deal has been written and said about the science and art of agriculture, but for practical guidance the whole thing is in a nut shell. It consists in these two rules—make the land rich, and keep the weeds down. If any person who tries to raise any plant will follow these two rules he will succeed, and if he does not follow them he will not succeed.

PHOTOGRAPH O BOSTON FROM A BALLOON.

The experiment of photographing the city and its environs, undertaken on Saturday by Mr. Black, of the firm of Black & Batchelder, assisted by Mr. King, the aeronaut, was attended with the most satisfactory results. The idea that it was possible to get photographic pictures of the earth first occured to Dr. W. H. Helme, of Providence, who, having interested Mr. Black on the subject, the two made an ascension from Providence a few weeks since, to make a trial in the "high art." Then, as on Saturdey, the balloon *Queen of the Air* furnished by Messrs. King & Allen, was confined by a cable at an elevation of 1,200 feet. Several views were taken, but these preliminary experiments proved sunlight indispensable to complete success. Of the two trial pictures obtained over Providence, the buildings in one were sharply defined while the other was blurred by motion. The plate of the first "negative" having been spoiled in the process of finishing, the photographs are of but little value save as curiosities of the art.

The last experiment, however, made on Saturday, furnishes the most conclusive evidence that photography can be applied under favorable circumstonces to the production of birds'-eye views of towns and cities, harbors, lakes and water-courses. Six plates were used, only two of which, however, received satisfactory impressions. The area brought within the field of the camera in two pictures, is bounded by Brattle-street on the north, the harbor on the east, Summer-street on the south, and Park-street on the west, forming a view at once novel and picturesque, of the entire business portion of the city. The impression which is received in looking at the pictures is similar to that experienced by the aeronauts themselves. The wider streets of the city—in their tortuous windings—seem like mere alleys, dark and narrow, while the alleys themselves are scarcely distinguishable in the midst of the high walls. The public buildings, churches, and long blocks of storehouses look like the toy village of a child, while the shipping at the wharves and sailing craft in the harbor look no bigger than the miniature vessels on the Frog Pond. And yet the buildings are sharply defined, especially where the sun fell upon them in full force.

The City Hall and Court-house, Faneuil Hall, Quincy market, and the intermediate buildings seen in the center of one picture are finely marked, while on the periphery of the photograph, Park-street church, the *Journal* office, Old South church, Custom House, Scollay's Building, and the wharves are thrown into a dark shade. The white sails of a vessel lying in dock, and one of the East Boston ferry boats on her passage, loom up out of the darkness. In the picture of the city above Water-street the Old South is more strongly defined, a sign, "clothing-house," on a store in Milk-street, being clearly marked, while the splendid granite warehouses in Franklin, Pearl, and other streets are truthfully depicted. Trinity church, the Music-hall, one of the Portland steamboats and a vessel under sail in the harbor, are seen in partial obscurity on the outer circle of the photograph. Seen through a magnifying glass, the corners and projecting points of the pictureare tinged with the colors of the rainbow, producing a very beautiful impression. The photographs will probably be reduced to a size adapted to the stereoscope.—*Boston Journal.*

THE MAUVE DYE.

The beautiful red and purple silks which are now so fashionable throughout the civilized world, are colored with a substance which is extracted from coal tar. On page 98 of our last volume, we published a translation from a French periodical, giving a full account of the mode of obtaining this coloring matter from the waste tar. In that article, the price in Paris of pure aniline violet, in powder, was stated to be from $245 to $326 per pound. The enormous value of this substance is owing to the fact that it not only produces a great variety of red and purple shades of exceeding delicacy and brilliancy, but these colors are also remarkably permanent. By the advertisement of Charles A. Seely, in another column, it will be seen that the manufacture of this coloring matter is now carried on in this city; and as Mr. Seely is one of our most thorough theoretical and practical chemists, he is one of the few men in the community competent to conduct the delicate manipulations required in the manufacture of this beautiful dye.