in all. The cost of the smaller experimental lamps is £19 1*s.* each per year, and of the larger £41 2*s.* 6*d.*, or £777 2*s.* 6*d.* in all. The new system, therefore, is nearly three times more costly than the old. The general result, therefore, is that the new system gives nearly 4½ times as much light as that in general use, and costs about three times as much. It should be added that the experiment is being conducted at the sole cost of the company.

Correspondence.

An Invention Called For.

To the Editor of the Scientific American:

There is one invention which is very much needed by the farmers of America, one which would add millions to their income, millions to the commerce of our country, and one which, if it can be invented and successfully operated, will make the inventor a millionaire. It is some kind of a machine by which the loss in the wheat crop will be reduced to, say, one fifth of the crop.

I will give you an idea of the loss in the crop by stating an experiment which I have tried this summer to test the loss. A neighbor had a field of 85 acres near my house, which was judged to make 10 to 20 busbels per acre. When fully ripe I selected one square yard, which I was sure was less than an average of the field, cut, dried, and rubbed it out very carefully. It weighed 6 oz. Calculating from that datum, the field made 2,571 bushels. When the crop was cut it was saved as clean as is usual, and was as cleanly thrashed as any I ever saw; and yet he only got 1,050 bushels, which shows a clear loss of 1,521 bushels; in other words, he saved about two fifths and lost three fifths of the crop.

I have never known more than one half of a crop saved even by the most careful management. It seems to me that one fifth, or 500 bushels, in 2,500 would be a beavy loss, but when it is 1,500 in a crop of 2,500, it is unbearable.

I think if you will present this subject, through the SCIENTIFIC AMERICAN, to the inventive geniuses of our country, that some of them will probably invent machinery by which tbis tremendous loss will be at least greatly reduced. It may be proper to say that the wheat was cut with cradles, and cut very clean, the field thoroughly raked, and it was thrashed by an A No. 1 steam thrasher. Will the farmers who see this try similar experiments next harvest and note their losses?

Very respectfully,
F. W. CONNOR.

King George Co., Va., July 29, 1879.

[The foregoing is suggestive, to say the least; and we should be glad to hear of further experiments to determine the amount and the occasion of the discrepancy described. The loss of ripe grain by the depredation of birds, squirrels, rats, mice, and other vermin, is unquestionably considerable. There is a further loss by wastage in the process of harvesting, especially when any portion of the crop is over-ripe, due to tardy barvesting or to irregular ripening. But the assertion that three fifths of an entire crop—the actual returns of which exceeded the farmer's expectation—should be lost in harvesting, or that more than half our annual wheat crops are regularly lost that way, is simply incredible. We fear—no, not that; we are glad to believe—that our correspondent has but added another illustration of the too common habit of drawing sweeping conclusions from slender observation. One square yard is too small an area on which to base a judgment of the yield of over 400,000 square yards; as a test for the probable loss on millions of acres its value is inappreciable.—EDS.]

The Inductive Action of Lightning.—A Note from Professor Mayer.

To the Editor of the Scientific American:

The following account of experiments on the inductive actions of lightning, may be interesting to your readers, when viewed in connection with the remarkable experiments of Mr. George M. Hopkins, which were described in the July 19 number of the SCIENTIFIC AMERICAN, under the title "The Telephone as a Lightning Indicator."

These experiments of mine were made at my mother's residence, in the northwestern portion of the city of Baltimore, during the summer of 1863. The account of them here given is taken from a review of Professor Rood's investigations on the time of duration of the electric spark, written by me for the New York *Evening Post* of September 8, 1871.

Astonishing as is the fact of the concentration of the power of a lightning flash into such a minute interval, yet, as wonderful is the extent of the earth's surface affected by it; as will be seen from the following experiments of the writer, never before published: A galvanometer consists of a delicately suspended magnetic needle surrounded by a coil of copper wire, through which a current of electricity can pass; whenever this passage takes place the needle rapidly turns around its point of suspension. This being understood, I connected one end of the wire coil of the galvanometer with the water pipes of Baltimore, while the other end of the wire coil was joined to a gas pipe of the house which is situate in the northwestern part of the city. Thus a vast system of metallic wires stretched away three miles to the northwest, to the reservoir, and also extended to the gas works, distant two to three miles to the southeast.

A thunder storm was raging at the time, at so great a distance in the north that only the illumination of the clouds told when a flash occurred. Yet, whenever that flash took place, the needle of the galvanometer was instantly deflected through 10 to 20 degrees. The two occurrences were simultaneous, apparently, for I could detect no difference in the instant of their manifestation. Indeed, so sure an indicator of the flash was the galvanometer, that when I shut myself up in a dark room, signaling to an observer of the storm when the needle moved, and receiving from him a signal when a flash of lightning occurred, our signals were simultaneous. The next day it was ascertained that the storm was twelve miles distant to the north; therefore, at least five hundred square miles of the earth's surface had its electrical condition changed at each flash of the lightning.

ALFRED M. MAYER.

South Orange, N. J.

Swift's Comet of 1879.

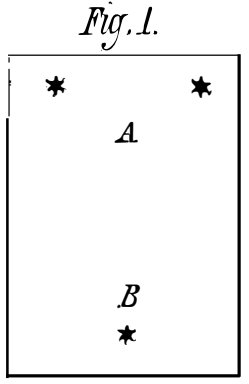
To the Editor of the Scientific American:

It has been my pleasure to obtain several excellent observations of Dr. Swift's comet of 1879.

Observations have been made with a Newtonian reflecting telescope of 5 inches aperture and 50 inches focal length, with B and C ordinary Huyghenian eyepieces, giving powers of 40 and 60 diameters respectively. One of the most interesting observations was made on the night of the 16th and 17th inst., when the comet was between three and four degrees to the left and slightly upward (at midnight) from Polaris or the Pole Star. Although a faint, misty object it was nevertheless quite conspicuous and unmistakable. For a comet it bears magnifying well, as it was much more satisfactorily seen with a power of 60 than 40 diameters. Later in the evening I applied a "solid" E eyepiece, giving a magnifying power of 140 diameters. This eyepiece, owing to the absence of reflections, which take place in the ordinary negative eyepiece, gives an intensely dark field, the sky appearing an almost jet black, and under this power the nucleus was quite bright and sparkling, although much of the outer, more hazy part was lost. The comet was also visible in a reflector of only two inches aperture, with powers of 30 and 45; and in clear weatber I think no one could fail to see it with this aperture if possessed with keen eyesight, although I consider it a severe test with ordinary eyepieces.

During the three hours in which I had the comet under observation (with only occasional rests to render the eye more sensitive to details) I had a most beautiful and awe-inspiring view of its motion among the stars. The observations extended from 10 o'clock P.M. to 1 o'clock A.M. When first seen it formed, with three faint stars, a rather condensed Y, the comet being at the center or fork, but at 1 o'clock it had moved to tbe foot of the same, thus: A (Fig. 1) shows its first position and B at the close of observations. Tbis was the inverted or telescopic appearance. During its passage from A to B the comet passed over a very faint star, which, although somewhat dimmed thereby, could still be seen through the hazy body of the comet. On the morning of the 23d inst. and this morning very interesting observations were made from about midnight until 1 o'clock. It has moved some distance from its position first referred to, and is now on a line drawn from the Pole Star to Beta Ursa Minor, and pointed at by Zeta and Eta of the same constellation (see Fig. 2). C shows the present position of the comet. It was first discovered 5° north

Fig. 1.



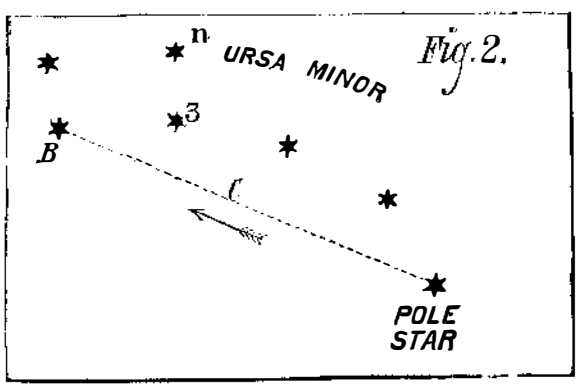


Fig. 2.

of the Great Cluster in Perseus, moving toward the north celestial pole of the heavens, over which it almost directly passed between the 13th and 14th of the present month. Its direction of motion is indicated by the dotted line and arrow in Fig. 2. It is moving a little more than 1 degree daily, and by taking C for its present position (25th of July) any reader with moderate telescopic aid and careful search may find it.

It is somewhat oval in form and with slight condensation, which to me does not appear central but nearer the forward or preceding limb. It is also my impression that under large apertures like the Washington telescope a somewhat blunted tail must be visible, the same cut away in the center, in other words double.

WILLIAM ROBERT BROOKS.

Red House Observatory,
Phelps, N. Y., July 25, 1879.

ELECTRICAL LETTER BOXES.—Among the recent applications of electricity is an attachment to street letter boxes, so arranged that if an attempt is made to rob the box an alarm will be instantly sounded at the nearest police station.

MISCELLANEOUS INVENTIONS.

Mr. Edwin N. Cowdery, of Kalamazoo, Mich., has invented a windmill having its wheel and vane hung upon horizontal trunnions, so that the wheel will be balanced normally by the vane, and may be swung to present the edge of the wheel more or less to the wind. A weighted arm is connected to the vane-staff so as to move with the staff and wbeel, and balance the parts in whatever position they may be turned by the wind.

A device for preventing saws when they are in motion from deviating from their proper course, and thereby producing boards of irregular thickness, has been patented by Messrs. 1. N. Kendall, of Buckingham, and R. Hall, of Gatineau Mills, Quebec, Canada.

An improved cigar-box has been patented by Mr. Charles Heylmann, of Chicago, Ill. This invention relates to an improved construction of cigar-boxes, by which the cigars may be more advantageously exhibited for retailing, and the boxes arranged without any loss of space or inconvenience in the show-case.

Mr. William H. Allen, of No. 18 West 11th Street, New York city, has patented an improved automatic grain weigher and register for weighing grain, flour, and other similar substances as they flow from a spout into a bopper or receiver. The apparatus is so constructed as to deliver the substance in exact and uniform quantities and accurately register the quantity delivered. Tbe invention consists in an arrangement of an open bottomed suspended vessel having a pivoted partition and supported upon a scale beam of peculiar construction. The relation of the supply spout and pivoted partition is such that tbe latter is held in position by the former until the vessel contains the required amount, when the downward movement of the vessel releases the pivoted partition, the grain escapes, and the recording mechanism is operated. The parts automatically regain their normal position and the vessel again fills and discharges.

Mr. Emanuel J. Trum, of Brooklyn, N. Y., has patented an improved calendar, which will display two successive months and days of the week in their proper order opposite figures indicating the days of the montb. The invention consists in placing the figures of the calendar on a card, and above and below these strips of paper or card, on which are printed the month, year, and days of the week, one strip indicating the month last past and the other the current month.

Mr. William Wilmington, of Toledo, Ohio, has patented improvements in the moulds used in casting car wheels. The invention consists in inclosing the outer periphery and a portion of the bottom of the chill in a suitable ring, while a portion of the top of the chill is embraced by the bottom of the cope, provided with mechanical devices that will retain the chill in place when moulding the wheel, and at a later period will permit the chill to expand freely during the operation of casting.

Mr. Henry R. Robbins, of Baltimore, Md., has patented an improved letter box of the kind ordinarily located upon lamp-posts, which indicates the time of the collection of the mails throughout the day, provides an increased security for the letters, and keeps the letters and papers separate from each other.

Mr. Zelotes McKinley, of Camden, Mich., has invented an improvement in the class of washboilers constructed so that when placed over a fire a circulation of water is induced through the clothes, the hot water from below being raised by the steam and poured over the clothes in a stream or cascade to again find its way back to the chamber in the bottom of the boiler. The invention consists in the peculiar construction of the false bottom of the boiler.

An improvement in the class of middlings purifiers, in which an air blast passes through a sieve or screen for the purpose of carrying off the dust, fuzz, and light particles of bran, has been patented by Mr. Jacob Fitz, of Hanover, Pa. It relates to the construction and arrangement of parts, which cannot be readily described without an engraving.

A device adapted for attachment to a churn for the purpose of catching the cream that escapes through tbe dash opening and returning it to the churn, has been patented by Mr. Homer A. Noe, of Republic, Mo. The invention consists in a trapping device that is placed upon the dash rod and rests on the churn cover.

Mr. Fredrique R. Lewis, of Troy, N. Y., has invented an improvement in water coolers, wbich consists in furnishing a water cooler with a central water tube or chamber, the upper end of which is carried to the side wall of the cooler, and communicates through an aperture in the inside lining with a box provided with a filter and connected with a water supply pipe. The space between the walls of the cooler and the water chamber receives the ice. The water passes from the supply pipe through the filter to the water chamber, is cooled by the surrounding ice, and drawn off through a faucet in the bottom.

Mr. August Witte, of Kansas City, Mo., has invented an improved device for holding a door open, which consists in the combination of a base plate provided with lugs, a pawl provided with an arm and a hook, and a catch-plate provided with the flange, the parts being arranged so that the device may be readily operated by the foot.

In an improvement in extension stovepipes, patented by Mr. Robert R. Pattison, of Terre Haute, Ind., the inventor makes use of pipe in lengtbs, fitted together to move telescopically upon each other, and fitted with a spring catch of peculiar construction, whereby the pipes are held securely in any position to which they are adjusted.