Correspondence.

Do Birds Eat Acorns?

To the Editor of the Scientific American:

In your issue of October 22 a letter from Dr. Gibbs, copied from *Science*, says that the woodpecker and bluejay eat acorns. I think, on closer observation, he will find he was mistaken.—perhaps in regard to all the birds named. The pigeon and dove I am not acquainted with.

It is well known that almost all fruits and nuts contain worms; those are what the birds want.

The red linnet (a seed-eating bird) resorts to the ash tree in the month of September, and to an ordinary observer would appear to be eating the ash seeds; but it is not so, as numbers of the seeds contain small worms, which the birds find a juicy, fat morsel, and never break a sound seed, but drop it immediately when they find it solid. The seeds containing worms are soft.

The gray squirrel, genuine nut cracker and eater, cracks the acorn for the same toothsome morsel, and leaves that part of it which is not eaten by the worm. I have seen this within the present month.

MATTHEW NIAL.

Troy, N. Y., November 17, 1892.

Good Prairie Roads Wanted.

To the Editor of the Scientific American:

Good roads on the prairie is a subject of great and growing importance.

The prairie roads are the *best*, when smooth and dry—better than the average city pavements.

I mean the black gumbo prairie mud, that will roll up and stall a four-horse team to an empty wagon at one time of year, and will at another time be hard as rock (almost), and smooth and free from dust.

Now what can be put on the road that will combine with the mud, or with the dry, hard surface to make it proof against frost and rain?

Or can some one make a solution of lime with other stuff that will petrify the surface to such extent as to make it less sticky, if not altogether free from the effects of rain and spring thaws? Perhaps the clay at a depth of three or four feet from the surface would be better material for preparation for the surface of the road than the black earth.

Or will some one make a fiery furnace that can be moved along, leaving a melting mass of this same tender clay; that is, the clay to be fed in at the top of the furnace, and coal lower down, an engine attached to elevate the clay, blow the fire, wind a cable, to move furnace and discharge the vitrified clay in the lower part of the furnace into a prepared bed in the surface of roadway.

Or shall this furnace and engine make some good vitrified bricks, at suitable places along the road, to be put in place by convict labor?

Or shall we take a plow and grader and make a shallow V-shaped ditch in the middle of the road, then dig in the middle and lay tile for drainage, cover with earth to protect, then fill the V-shaped ditch with broken rock, taken from the great Chicago sewer?

Now who can make good permanent roads for the least money? That is the rub, the money. Any one may have good roads for big money. And there is big money for some one for good roads.

Virginia, Ill. J. A. CUNNINGHAM.

Tight Rope and Slack Rope Walking.

To the Editor of the Scientific American:

Having read the opinion of Robert A. Hatcher as to what keeps a bicycle upright, in your issue of November 19, which I believe is correct, I thought it would not be out of place for me to also enlighten some of your readers as how it is for a person to keep upright on either a slack wire or a tight rope. I will here state that I have been a professional on the slack wire, and have also had the pleasure of walking on a tight rope. Now it would seem natural to suppose that a slack wire performer should also be able to walk on a tight rope, and that a tight rope walker should also find little difficulty in walking on a slack wire. But this don't happen to be the case, because the slack wire and the tight rope are the extremes to each other, and an altogether different means must be adopted in order to keep an equilibrium.

In the first place, the slack wire sways and the tight wire or rope does not, or should not; therefore, on the tight rope, in order to prevent it from swaying, guy lines are generally employed. Now, as our friend Mr. Hatcher says that the bicycle requires more space when in motion than the actual thickness of the tires, even if the rider wants to keep in a perfectly straight line, the same holds good for the slack wire performer. To the eye it appears that he is just walking on a wire about three-sixteenths inch in diameter, and finds that sufficient space to travel in. Now, if you were to stand under him while he is on the wire, you would discover that, instead of using only three-sixteenths of an inch space, it would not be long before you would be convinced that the performer requires from four to ten, and sometimes fourteen, inches in order to travel and keep his balance. In order to walk the slack wire the extended arms are a great service, and when the arms are folded or employed by performing a trick or juggling, then generally one of the legs is extended to perform the function which the arms did. Now, in order to keep an equilibrium, the wire under the performer is continually changing its position. If the performer feels that he is losing his balance, a skillful move will throw the wire under him, and the extended leg or arms help to facilitate throwing or swaying the wire directly on the line of the center of gravity. A slack wire performer would not be able to make three steps on a tight wire without considerable practice, for the reason that he has learned to throw the foundation he is standing on always immediately under him, and on the tight rope or wire this cannot be done, and, instead, he must depend on centering his body directly over the rope, just as it is necessary when walking on a railroad track.

It may somewhat surprise some of the readers to learn that a slack wire walker cannot, or can do very little, track walking, because it comes so natural to him to throw what he is standing on directly under him, and if it does not answer he must step off. The tight rope walker depends nearly altogether on his balancing pole. He stands upright, and when he finds he is apt to come off, or lose his balance on one side, he immediately runs more of his pole to the opposite side to gain an equilibrium, and if you were to observe closely, you would also notice that although he only occupies the space equal to the thickness of the rope, yet the pole is continually being moved from one side to the other, from six to twenty inches. Some of the more skilled do it with so much grace that it is hardly perceptible if not looked for. It is just as difficult for a tight rope walker to balance himself on a slack wire (if he never tried or practiced it) as any one of your readers that never tried it, because he is dependent on a firm foundation and balances on it, while the slack wire performer continually draws the foundation under him.

JOHN G. VON HOFE.

New York City, November, 1892.

How Photo Solio Paper and Films are Made.

The Eastman Company, of Rochester, N. Y., of Kodak fame, have established in England a great factory, covering seven acres, for the manufacture of their celebrated sensitive photographic paper and sensitive celluloid films. A correspondent of the *British Journal of Photography* describes as follows a visit to the company's factory at Wealdstone, Harrow. The title of the concern is the Eastman Photographic Materials Company.

In the Solio coating rooms are to be found huge rolls of paper, specially manufactured for this purpose. One of these rolls is lifted up to its suitable support, and having been unrolled to a sufficient extent, its end is brought under the domination of silver-coated rollers, and caused to pass across the surface of the gelatine emulsion with which it is to be coated. The machinery is then started, and the paper is coated, equalized, festooned for drying, dried, and finally brought out at the other end of the drying room in a state of perfect dryness, without having once been touched by the hand.

The mechanism by which all this is effected is of the most remarkable kind, seeming as if, when once started, it did all the thinking that was necessary, from the immersion in the emulsion up to the stage at which an attendant, with hands incased in white gloves, supplied it to another machine, by which, and with the aid of automatic guillotines, it eventually was presented as flat, cut-up sheets of various sizes, ready for transference to another department.

The Solio paper which we saw coated was twenty-four inches wide, and it was coated at the rate of about fifteen feet per minute, a *mile and a half* being the present output per day. It is all dried, cut up, and packed the same day as made, and is shipped off.

In the examining and packing room we saw a whole regiment of young ladies, deftly submitting each sheet, small and great, to an electric light lantern, faced with yellow glass, by which the slightest speck or imperfection, if such existed, could be at once seen. During our visit to this department no sheet was observed to come under the ban, but we were told that all such, when discovered, are summarily rejected and subjected to a further retrimming, in which the portion containing even the tiniest of spots is relegated to the waste room.

Mr. J. B. B. Wellington, the chief of the factory, who acted as our guide, informed us that they insisted from first to last on the sensitized paper or films never being touched by the ungloved fingers, as it was a well known fact that the exudation from even the cleanest hands set up an action on the sensitive surfaces which, sooner or later, proved detrimental, and hence the insistence upon the employment of gloves in all departments involving contact with such delicate surfaces. The result of this was all that could be desired, as they never experienced any stain from this source.

The same care was taken in the incasing of the cut sheets into the envelopes in which they are sent out. These envelopes, for the retail consumer, contain, as is well known, a certain number of sheets, which, no matter how large or small the size, is sold at a smaller price per packet, based upon the area of the paper contained therein, so that a packet containing only a few sheets equals with a wonderful degree of precision another containing a large number of those of smaller dimensions. These envelopes are all made on the premises, being cut out by machinery and closed by hand labor. In an adjoining room were being made the boxes in which the sensitive films for roller slides are packed. The great care taken in insuring uniformity and perfect equality throughout, coupled with that scrupulous cleanliness which was apparent at every stage, appeared to us to be a healthy outlook for the users of the productions.

Before leaving, we were privileged to examine the adjacent factory devoted to films, and in passing through some of the storage and chemical rooms we witnessed the whole operation of dissolving gelatine from a stock of three tons, which was on the premises at the time. The emulsion is mixed fifty gallons at a time in a tank, from which it is drawn by means of a four-way tap into reservoirs placed below.

What interested us probably more than all the rest was the preparation of the flexible films with which the firm's name is now so intimately associated. Twelve plate glass tables, each eighty feet long by three feet six inches wide, and occupying two floors of the factory, form the basis on which the celluloid is made. Eight men were in attendance in the conducting of this. First of all, each table was closely examined to see that it was absolutely clean; but, as if to render assurance doubly sure as regards this, a long plush brush, the width of the table, was placed in supports immediately in front and forming part of the coating machine, a reservoir in which was then filled with an oily-looking fluid by the attendants. This being done, and everything now being ready, a lever was pressed, and the steam engine did the rest, for the coating apparatus at once commenced to move with a uniform pace toward the far end of the table, leaving a beautifully even, but still fluid, film behind it. Arrived at the far end of its eighty feet of travel, the "button" was again pressed, and the engine was stopped for a few moments until the attendants had lifted the coating machine to the next table, where the reservoir was once more charged from vessels like those by which milk is sent to town per railway, after which all went on as before until the twelfth of the eighty-feet tables had been coated. When quite dry, and without any great delay, the celluloid was coated with emulsion in somewhat like manner, but in darkness so dense as to be almost painful, although relieved by a feeble glimmer of red light.

By special means, a difficulty occasionally encountered by some amateurs has here been entirely got rid of; we allude to the liability of a celluloid film when being stripped from glass giving an electric spark, and thus damaging the delicate bromide superstratum. The means adopted by the company for the prevention of this have proved quite effectual.

The Railway Telephone.

The Port Defiance, Tacoma and Edison Railway has in operation an appliance designed to prevent delays when an accident happens to any of the cars along the line, or when trouble of any kind occurs. The appliance is an ingenious telephone arrangement so connected with the main office that the conductor or motorman can telephone what the trouble is and all the details, so that arrangements can be made at the office to avoid delay of other cars on the line, thus discommoding patrons. Along the line between Point Defiance and Edison a telephone wire is strung, and there are special poles, down which proper wires run to an average man's height from the ground. Each car carries a telephone instrument, which can be connected with the wires and communication with the main office obtained. After notice of trouble is received the remaining cars on either side of the break can be operated by office orders through the telephone, and thus kept running on time. It would seem to be to the interest of almost every railway in the country to adopt such a telephone system.

Color Photography.

M. Lippmann has been pursuing with energy his investigations into color photography. He says that "on the layers of albumino-bromide of silver rendered orthochromatic by azaline and cyanina, I obtained very brilliant photographs of spectra. All the colors came out at once, even the red, without the interposition of colored screens, and after an exposure of from five to thirty seconds." He submitted photographs of stained glass windows, draperies, oranges, and a parrot, taken by electric light with five to ten minutes' exposure, in which the color is noticeable as well as the form.