Correspondence.

The Migration of Locusts.

To the Editor of the SCIENTIFIC AMERICAN:

In the SCIENTIFIC AMERICAN of April 1 there is an article on the "Migration of Insects" by Prof. C. F. Holder. He tells of observing yellow butterflies thinly scattered over a good many square miles, all moving in one direction.

I have lived in the West and been familiar with the Kansas grasshoppers ever since 1857. I have seen them here in Denver; but most of my observations were in the vicinity of the Missouri River, in four different States—Nebraska, Kansas, Missouri, and Iowa. I believe they are not guided in the direction they move in their flights by any mysterious instinct, but are merely wafted away by the wind. In the fall they deposit their eggs in the ground wherever they happen to be at the time. These hatch on warm days the next spring. The earliest ones are generally killed by frosts. The young insects grow rapidly and hop about in search of food. They moult several times, and early in summer their wings appear. They then begin to fly. On cold or damp days, and especially when it rains, they stay near the ground, shielding themselves on the under side of leaves, fence rails, the eaves of houses, etc. But when the days are clear and warm, after filling themselves with grass, they will rise in the air about nine or ten in the morning, and flutter about, going to the right and left, up and down, but gradually ascending higher and higher till they are out of sight. If there is any breeze, and there almost always is, they will be carried off wherever the wind blows. Toward evening, getting tired and hungry, they descend to the ground, sometimes a hundred miles from where they started in the morning, and woe to the vegetation where they alight!

In appearance they resemble the common grasshopper, but have much longer and more powerful wings, and are able to remain in the air six or eight hours at a time. T. R. FISHER.

Denver, Col., April 12.

Action of Ice in Rivers.

To the Editor of the SCIENTIFIC AMERICAN:

In your issue of April 1, page 196, you give space to the statement of a traveler in Siberia, with reference to the bursting of the ice on the rivers there. It is not at all necessary to travel in Siberia to witness this phenomenon, as it is of quite common occurrence in this country, in the colder climates, on streams with rapid currents, and is particularly common on the middle and upper Missouri, as the old settlers along that stream will testify, and among whom these occurrences are familiarly known as "blow-outs."

As this Siberian traveler states, these "blow-outs" occur as a rule during severe weather only, at times when what are commonly known as "air holes" are frozen over. At such times on these northern streams, and particularly so on the Missouri River, with its immense volume of water and eight-mile or nine-mile current, these "blow-outs" are of very frequent occurrence, and are more remarkable than those described by the Siberian traveler, owing to the much greater thickness of ice blown out. I recall very vividly my own observations of the results of one of these "blow-outs" in particular, which will serve to describe them in general. In the month of January, 1893, I was engaged in teaming on the Missouri River one hundred miles above Yankton, South Dakota, hauling green cord wood down the frozen channel of the river for a distance of several miles, to a Missouri River ranch. During one noon hour a heavy report that could have been heard for miles, resembling the boom of heavy artillery or heavy thunder, was noted, and at the dinner table it was remarked that "there is another big blow-out on the river."

Upon my return trip, about three miles from the ranch, I was somewhat surprised to find the ice blown out directly in the roadway where some two hours before I had drawn a load of perhaps five tons weight. The space blown out would amount to perhaps one hundred feet square, with ragged edges and, of course, of irregular shape. The tremendous pressure necessary to accomplish this result may be judged from the fact that at this point the ice averaged twenty-six inches in thickness, solid, clear ice. Huge blocks of this ice several feet square were thrown to a distance of two hundred to three hundred feet, while smaller pieces and fragments were strewn to a distance of one thousand feet or more. Such were my observations of one of the "blow-outs" which, during long-continued severe winter weather, are of common occurrence on the upper Missouri, where the minimum thickness of ice is seldom, if ever, below fifteen inches, and ranging from that to three feet, averaging ordinarily about two feet.

While undoubtedly true, as the traveler states, that the prime cause of these "blow-outs" is the hydraulic pressure of the water, the fact that I found that little or no water had flowed over the edges upon the surrounding ice, and that the expansion of water under pressure would hardly be sufficient to throw the ice fragments to such distances, together with other observations, led me to the conclusion that the agency directly applied is compressed air. When intensely cold weather closes the "air holes," or safety valves, on these rapid streams, the ice under pressure naturally begins to rise slightly at the weaker points. This forms an air pocket, and the air, being carried underneath by the swift current, as a matter of course, rises and accumulates rapidly in these pockets. The ice is raised higher and higher as the volume of air increases, until, with the swiftly moving current, confined perhaps for miles above, acting as a compressor, the bursting point is reached, with the results before stated. The pressure is relieved, and another "blow-out" is not likely to occur in a distance of several miles, at least not so long as this one remains open. What the bursting pressure is under the conditions given in the foregoing can undoubtedly be quite accurately estimated by some of the readers of the SCIENTIFIC AMERICAN. A READER.

Pentwater, Mich., April 4, 1899.

The Zickler Wireless Telegraphy.

To the Editor of the SCIENTIFIC AMERICAN:

I note in your issue of April 15, 1899, an article on a new system of wireless telegraphy, invented by Prof. Zickler.

It may interest you to know that this method of telegraphing by ultra-violet rays was invented by me more than ten years ago, in 1889. I used, however, a receiver almost infinitely more sensitive than that used by Prof. Zickler, i. e., the human eye, which is affected by an amount of energy which would be absolutely without action on a vacuum tube. The transmitter was the same as that described in your article, but the receiver was a circular dish of a fluorescent substance placed in a shallow vessel, with a reflector placed slightly above it in such a way as to focus the rays on the surface of the solution, or fluorescent glass. All visible rays were stopped out from the projector, however, but the receiver could tell at once from what direction the message was coming by looking at the direction of the fluorescent spot.

The reason why this system was never put on the market was one which Prof. Zickler will find when he has proceeded further. This is that the ultra-violet rays are very rapidly absorbed, especially over the waters of a harbor at nightfall, when there is any fog in the air.

This falling off is very rapid, and I have no hesitation in saying that I do not believe that Prof. Zickler has succeeded in actuating a vacuum tube at the distance of one mile by means of ultra-violet light. If he gets beyond 300 yards, I shall be surprised. Even with the eye I believe the limit to be about two miles, though possibly if I had had better apparatus I might have reached five or ten.

I therefore abandoned the ultra-violet light method for an infra-red one, which is much more promising, but of the practical use of which I am rather skeptical.

REGINALD A. FESSENDEN, M.A.I.E.E.,
Professor of Electrical Engineering.
Western University of Pennsylvania, Allegheny, Pa.

The Sixth Annual Reception of the New York Academy of Sciences.

The annual exhibition of progress in science occurred on April 19 and 20, at the Natural History Museum, and was well attended. One large hall of the museum had been set apart for the exhibits, which were arranged on temporary tables.

Entering the hall, the first subject noticed was astronomy. Hung on the wall were splendid enlarged photographs of the moon, taken with the Paris equatorial coudé, by Loewy and Puiseaux. Photographs of new stars, of meteors, of solar eclipses, and of the new satellite of Saturn, were of much interest. A firm in Cleveland, O., exhibited new telescopic gun sights, a sextant, and an improved 2-inch alt-azimuth telescope. Glass positives were exhibited by Prof. J. S. Ames, of the Johns Hopkins University, showing spectroscopic proof of iron in the sun.

In the botany section several interesting specimens were shown. Mrs. E. G. Britton had an exhibit of "Mosses New to the Eastern United States." Apparatus was shown for determining root pressure.

The section of chemistry covered numerous new compounds. Artificial coffee beans were shown. There was also an interesting specimen of tellurium extracted by sugar and examples of explosive compounds and specimens showing the effects of explosions on metals.

In electricity there were but one or two exhibits, the most important being a new incandescent lamp photometer by Queen & Company. The lamp to be tested is compared with a standard lamp and during the comparison is rotated so that all positions of the film may be tested.

The section of experimental psychology exhibited apparatus for the study of accuracy of movement, the study of binocular rivalry, and a simple photometer for measuring light intensities in schools by G. E. Johnson. This consisted of a horizontal disk having figures on its surface and perforations adjoining each other on its periphery.

Directly above the periphery is a pneumatic tube through which currents of air are projected, and, as the disk is revolved, pass through the perforations, causing a sound to be made relative to the speed of rotation. If the disk is rotated to produce the same sound and the intensity of light is such that the figures on the disk appear to blend together, then they harmonize, and one degree of light intensity is obtained from which comparisons with other degrees of light intensity can be found, by varying the speed of the disk. It was quite an interesting device and very simple.

In the section of physics there was, perhaps, the most interesting apparatus. We noticed the new form of stremmatograph, having a recording tape and arranged to obtain the strains under both rails for high speed trains. With this were also photographs of very rapid exposures (of one hundredth to one thousandth of a second) to show the position of the car wheels over the track at the point where the stremmatograph was located. Another apparatus was an improved Wehnelt's electrolytic interrupter designed by F. L. Tufts. This is arranged to operate in connection with a key and an induction coil and made quite a loud noise. In the construction of the conducting tube the use of mercury is omitted. The wire with the platinum point is carried directly through the tube to the bottom, where it is sealed, allowing the platinum point to project into the solution. The first glass tube is inclosed in another open glass tube. This, he claimed, gives better protection to the wire.

Prof. W. C. Peckham had an apparatus for showing the effect of an alternating current upon an incandescent lamp, and produced with it the same nodes and loop as in Meldes' experiments. The lamp was placed in front of an electromagnet and rotated in various positions. A lens projected the vibrations, greatly enlarged, upon a screen where they may be readily observed.

In the zoological section there was a large display of microscopes, all set to illustrate various preparations of crustacea and the breathing apparatus of fishes and other minute living organisms. In the section of geology and geography were some interesting topographical maps, one of which, the Yellowstone National Park (very large) has been prepared for the Paris Exposition of 1900 by the United States Geological Survey, at Washington. There were many large minerals and stones exhibited in the department of mineralogy, and in the section of paleontology were numerous exhibits of fish remains and the remains of large animals.

The exhibition was not as large or diversified as in former years, but contained features of much interest.

Fire Precautions in Paris.

In Paris theaters all but the electric light is forbidden and smoking is prohibited, except in the public smoking room, but a small fire was started recently in the Theatre Française by a cigarette which rolled through a grating in the sidewalk. This has caused officials to be even more strict than before. The comparative infrequency of fires in Paris is largely owing to the careful habits of the people and the excellent fire regulations regarding heating apparatus. When houses are built in Paris, the floors are invariably laid on brick and tiles; for, of course, the houses in Paris, with a few rare exceptions, are all what we term flats or apartment houses. The usual manner of building permits all the windows and balconies on the block to be on the same level, so that escape from one to the other is comparatively easy. This makes a uniformity which gives a very impressive character to the street architecture. The city authorities are now making precautionary fire regulations for hotels, including fire extinguishing apparatus, fireproof staircases, etc. It is very wise to adopt fire regulations at this time, when many hotels will be put up to accommodate visitors to the Exposition, next year.

The Manila Refrigerating Plant.

Further particulars regarding the refrigerating plant for Manila are now available. The approved plans of the War Department call for the erection of a large building to be equipped at a cost of $195,000, and the total cost of the plant will be about $300,000. What is known as the "direct expansion" system will be used. The low temperature will be obtained by the use of ammonia in coils of pipe in the various refrigerating rooms. It is believed that calcined pumice will be the material decided upon for insulation purposes, for materials which are used in temperate climates are of little value in the tropics. It is calculated that 1,200 tons of beef, 200 tons of mutton, 50 tons of butter, 100 tons of vegetables, and 100 tons of salt products can be stored. There will also be a "defrosting" plant for thawing out the meat before it is delivered to the commissary officers. Insulated boats will also be needed to ply between the supply steamers in the harbor and the shore.