Correspondence.

The Plague of Flies.

To the Editor of the Scientific American:

Mr. William Steele is not the only person in the country whose troubles from the encroachments of insects are sufficient to inspire a wish for the invention of some infernal machine to extirpate such pests as sand flies, fleas, etc. But it seems to me that the dissemination of Science and a better knowledge of entomology are what is most needed in this direction.

I have not seen a bedbug or a flea in my house for many years. If an army of them were to be brought in, mercury would speedily exterminate them, but I think cleanliness the best and perhaps the only preventive. The common house fly I do not molest, believing that it more than compensates for its trouble by clearing the atmosphere of effluvia and the animalcules which always arise from the putrefaction of decaying substances during warm weather. So, also, with the birds, which are quite numerous here during the summer; instead of shooting them, or setting up scarecrows to frighten them away, I throw out every possible inducement for them to build their nests in my fruit trees. The birds capture a large share of the insects in the larval state, and thus the millers are prevented from depositing eggs for a future crop of worms. As to the loss of fruit by the birds, the latter are always sure to be on hand in force in the season of ripe fruit, whether they come early enough to take the worms or not. For the residue of insects which infest my vegetable garden, I find that the laboratory of the chemist furnishes materials fatal to them all, among which white hellebore and cayenne pepper are of the most utility; the bug or worm which cannot find vegetation unflavored with these articles will seek its breakfast elsewhere, and leave my garden unmolested. A few drops of carbolic acid in a pint of water will clean house plants from lice in a very short time. If mosquitoes or other bloodsuckers infest our sleeping rooms at night, we uncork a bottle of the oil of pennyroyal, and these insects leave in great haste, nor will they return so long as the air in the rooms is loaded with the fumes of that aromatic herb. If rats enter the cellar, a little powdered potash, thrown into their holes or mixed with meal and scattered in their runways, never fails to drive them away. Cayenne pepper will keep the buttery and storeroom free from ants and cockroaches. If a mouse makes an entrance into any part of your dwelling, saturate a rag with cayenne in solution and stuff it into the hole, which can then be repaired with either wood or mortar. No rat or mouse will eat that rag for the purpose of opening communications with a depot of supplies. CHARLES THOMPSON.

St. Albans, Vt.

The Sun's Orbit and Rate of Motion.

To the Editor of the Scientific American:

In your issue of March 27, 1875, page 196, Mr. John Hepburn makes a singular oversight, in confounding the angular motion of the earth's pole with the linear motion of the sun and solar system in space, which he makes about 8,000,000 miles a year; whereas the calculations of our best standard astronomers make it at least 200,000,000 miles, and some make it more than three times as much. The time of the great revolution has been stated at from 10 to 30 millions of years, instead of 25,800; and the great orbit at least 240,000 times as large as that of Neptune, instead of 12 times.

For the benefit of your readers who are not acquainted with mathematical astronomy, I will give you simple illustrations of these two motions. Draw a small circle on paper, and make a spot in the center for the earth's orbit and place of the sun. Make a rude top, with a wheel, an inch in diameter. Let the pointed end of the axis project ½ inch. This axis and plane of the wheel will make nearly the same angles, with the plane of the paper on the table, as the earth's axis and equator with the ecliptic. Put the point of the axis on the circumference of the circle, keep it in the same place, and roll the wheel round on the paper. The axis describes a cone, pointing differently at each successive instant; and if the axis were extended to the ceiling overhead, or to the heavens, it would describe a circle there. If, while rolling the wheel round the pivot, you moved the pivot round the circumference of the circle on the paper, the axis would ascribe a like cone and circle. When you have rolled the wheel half way round, the axis will make an angle, with the line on which it was at the start, twice as large as the plane of the wheel makes with the plane of the paper, but all the time at the same angle with the plane of the paper. Similarly to this, the axis and pole of the earth describe a cone and circle in the heavens; but so slowly does the earth's axis vary from parallelism, that it takes 25,800 years to complete the circle. The linear motion of the sun in space may be aptly represented by carrying an orrery round the world. The contrast between the circle on the paper and the circle of the earth is no greater than that between the earth's yearly circuit round the sun, and the sun's great circuit round some inconceivably distant central sun.

Kankakee, Ill. S. N. MANNING

Kaolin in the United States.

To the Editor of the Scientific American:

In your recent article on "Porcelain Manufacture in New York," you tell us that the kaolin used is imported from England, and you regret the necessity for so doing, and express the opinion that there is no reasonable doubt that the material exists within our own borders. If by "our own borders" you mean the State of New York, you are possibly correct; but if by it you mean the United States, you are laboring under a mistake such as, after a quarter of a century's reading of your excellent paper, I have never before known you to fall into. Kaolin of excellent quality is found from the Valley of Virginia in the East to Arkansas in the West, and it abounds in North Carolina, Tennessee, Georgia, Alabama, and the northern portion of Mississippi, and I think that it (as well as a very superior quality of lithographic stone) has very recently been found in Kentucky. In South Carolina, kaolin is very abundant and of superior quality. During the late war, quite a large amount of table ware was made at the Kaolin Mine, as it is called, in Edgefield district (I think that is the name), some 10 miles south of Augusta, Ga. During the war, I used in my house some of the ware; and though rather roughly fashioned, it was equal in point of color and strength to any other porcelain.

Since the war, the manufacture of the ware, I think, has been abandoned; yet large quantities of the clay have been shipped (thousands of hogsheads yearly) to your own city, where, I understand, it is sold to paper makers, candy makers, and manufacturers of wall paper, as a substitute for *terra alba*. You will find on inquiry large stocks of it in your city, and is most likely sold as an imported article; and quite likely the "slip" alluded to in your article is from the South Carolina mines. If any of the other States have ever engaged in shipping it abroad, I am not aware of it.

Nashville, Tenn. S. D. MORGAN.

The Steam Climber.

To the Editor of the Scientific American:

In a recent issue I find an account of a steam hill climber, as you term the new locomotive for the U. I. & E. R. R. The engine in question was built at the Mason Machine Works of this city, and was designed to run both on a level and an incline. Perceiving several errors in your short notice of it, I imagine that you will be glad to receive a few correct dimensions. The small double-flanged wheels are 27 inches in diameter, and the track they run on is 9 inches above the outer rail, which is of the usual gage. The main drivers are 3 feet 6 inches in diameter, and consequently clear their rails ½ inch when the small ones come into play. The cast steel cog wheel is placed between the small wheels, of course on the back axle only, to which the main rod is attached: it is 8 inches wide, and its teeth have a pitch of 4 inches, while its pitch line diameter is 27 inches. You will notice that the power at the rim of the small wheels (which is also the pitch line of the gear) is much greater than at the rim of the main drivers, because of the increased leverage, which is also an advantage in climbing.

The engine is a double-truck locomotive, designed to allow each truck to swivel on its centers, similarly to the Fairlie system. There are six drivers of 3 feet 6 inches diameter, with 4 inch centers; the cylinders are 17 x 24 inches; the boiler has a fire box, 66 inches long by 48⅝ wide, inside, with 154 two inch tubes 11 feet 6 inches long; the tank has a capacity of 2,530 gallons. The tank end is supported on a six wheeled truck, with four sliding side bearings under the frame, and is so arranged that the truck swivels on its center piece. The engine weighs about 32 tuns on its drivers, and is fitted with the Walschaert valve gear, which is quite familiar to European engineers, but has not yet received the attention in this country which it deserves.

I enclose a photograph of the engine, which is appropriately named the Leviathan.

Taunton, Mass. WM. E. SPARKS.

Dry Plate Photography.

To the Editor of the Scientific American:

No doubt many of your readers who may be interested in practical photography, particularly in preparing plates for the dry process, have often experienced difficulty in applying the preparatory coating of albumen smoothly, unless they resort to the careless general practice of first dipping the plate into water, which so largely dilutes the mixture as to seriously lessen, when it does not entirely destroy, its efficacy. The result is that, in subsequent operations, the film is liable to slip, and thus destroy the value of the negative.

For a long time I experienced much annoyance myself from this source, until I discovered that all difficulty could be obviated by simply breathing upon the plate before pouring on the albumen, when the solution will be found to flow as smoothly and evenly as the best collodion. If during the application the fluid shows any hesitation in covering a particular spot, it is only necessary to again breathe upon that point, and the difficulty will be removed.

I. HENRY WHITEHOUSE.

Ouchy Lausanne, Switzerland.

Parasites in the Tongues of Flies.

To the Editor of the Scientific American:

A few months ago, when examining with a microscope the tongues of house flies, I discovered in the tongues of several a species of worm. In some flies, I found two worms, in others one, and in others none at all.

If among your subscribers there is any microscopist who can give some information concerning these parasites, it would be interesting to many to hear from him. The worms were found about the spiral glands; they were transparent in appearance, head and tail being exactly alike. They were very active in their motions. W. W. W.

Cincinnati, Ohio.

The Wild Sheep of California.

The California species (*ovis montana*) is a noble animal, weighing when fully grown some 350 pounds, and is well worthy the attention of wool growers as a point from which to make a new departure. That it will breed with the domestic sheep I have not the slightest doubt, and I cordially recommend the experiment to the various wool growers' associations as one of great national importance.

The clothing of our wild sheep is composed of fine woo and coarse hair. The hairs are from about two to four inches long, mostly of a dull bluish-gray color, though varying somewhat with the seasons. In general characteristics they are closely related to the hairs of the deer and antelope, being light, spongy, and elastic, with a highly polished surface; and though somewhat ridged and spiraled, like wool they do not manifest the slightest tendency to felt or become taggy. A hair two and a half inches long, which is perhaps near the average length, will stretch about one fourth of an inch without breaking. The number of hairs growing upon a square inch is about 10,000; the number of wool fibers is about 25,000, or two and a half times that of the hairs. The wool fibers are white and glossy, and beautifully spiraled into ringlets. The average length of the staple is about an inch and a half. A fiber of this length, when growing undisturbed among the hairs, measures about an inch; hence the degree of curliness may easily be inferred.

Wild wool is too fine to stand by itself, the fibers being about as frail and invisible as the floating threads of spiders, while the hairs against which they lean stand erect like hazel wands; but notwithstanding their great dissimilarity in size and appearance, the wool and hair are forms of the same thing, modified in just that way and to just that degree that renders them most perfectly subservient to the well-being of the sheep. Furthermore, it will be observed that these wild modifications are entirely distinct from those which are brought by chance into existence, through the accidents and caprices of culture.

It is now some 3,600 years since Jacob kissed his mother and set out across the plains of Padan-aram to begin his experiments upon the flocks of his uncle, Laban; and, notwithstanding the high degree of excellence he attained as a wool grower, and the innumerable painstaking efforts subsequently made by individuals and associations in all kinds of pastures and climates, we still seem to be as far from definite and satisfactory results as we ever were. In one breed the wool is apt to wither and crinkle like hay on a sun-beaten hillside. In another, it is lodged and matted together like the lush-tangled grass of a manured meadow. In one the staple is deficient in length, in another in fineness; while in all there is a constant tendency toward disease, rendering various washings and dippings indispensable to prevent its falling out. The problem of the quality and quantity of the carcass seems to be as doubtful and as far removed from a satisfactory solution as that of the wool.

The source or sources whence the various breeds were derived is not positively known, but there can be hardly any doubt of their being descendants of the four or five wild species so generally distributed throughout the mountainous portions of the globe, the marked differences between the wild and domestic species being readily accounted for by the known variability of the animal. No other animal seems to yield so submissively to the manipulations of culture. Jacob controlled the color of his flocks merely by causing them to stare at objects of the desired hue; and possibly merinoes may have caught their wrinkles from the perplexed brows of their leaders.—*John Muir in the Overland Monthly.*

Colored Confectioneary.

It may not be uninteresting to some of our readers to see what kind of poisons are administered in the form of colored candy to the young Hungarians at home. Professor Ballo, of Pesth, who has been analyzing them, reports that, in 13 specimens of red candy which he tested, he found that 11 were colored with cochineal and 2 with fuchsin. Of 12 blues, 2 were ultramarine, 1 indigo-carmine, 2 aniline blue, and 8 Prussian blue. Of 83 yellows, 31 were chrome yellow, 49 were Dutch pink, and 3 a salt of binitro-naphthol. Of 18 greens, 4 were Paris green, 8 chrome green, 2 ultramarine green, and 4 sap green. The so-called iron yellows were chrome yellows, and the so-called substitute for carmine was an arsenious fuchsin. Of these colors the Paris green, chrome green, and chrome yellows are poisonous; and their use should be prohibited, and so should that of fuchsin, for only the cheaper and arsenious sorts are used. The action of binitro-naphthol salts is entirely unknown, and hence their use should not yet be permitted. To make the confectionery cheaper, its weight is increased by sulphate of baryta and other adulterations.

GREAT BRITAIN AT THE CENTENNIAL.—We are glad to announce that Mr. F. R. Sandford, a gentleman of great administrative abilities, who was Secretary of the Commissioners of the London Exposition of 1862, and Mr. Philip Cunliffe Owen, who had charge of the British delegation to the recent Vienna Exposition, have been appointed to take charge of their country's interest at the approaching Centennial.

A SHAFT has been sunk at Lawton, Eng., for the purpose of pumping up brine, to be conveyed by pipes to the coke ovens in connection with a colliery, a distance of two or three miles, there to be converted into salt by means of the waste heat from the ovens. The cost of the undertaking will, it is said, exceed $200,000.

SOME of the large sugar manufactories of Paris are now illuminated at night by the electric light obtained from the Gramme machine. The apparatus requires from 1 to 1½ horse power, and is driven from the engine the same as any other piece of machinery.