Correspondence.

The Locomotive Whistle.

To the Editor of the Scientific American:

I can verify the statement of Mr. David L. Ellis. Our mill is in Atlantic County, N. J., six miles from the nearest station, seven and a half miles to the station above, and nine miles to the station above the latter. On the approach of a storm or in damp weather, we can clearly hear the whistle of the locomotive at all three stations; and standing in the mill door, with the railroad time table in one hand and watch in the other, we can verify the time and tell if the train is late or on time. This has been frequently done, and the whistle has been heard above the station (nine miles) to "clear the track," "back," "go slow," etc. In dry weather we do not hear it. It is to our hands a "sign of rain," to hear them "shifting cars" at the station nine miles away. I have frequently heard the whistle after leaving the station several minutes give the "put on brakes" signal, which would be at least ten miles from where I stood.

W. E. F.

Philadelphia, Pa., Sept. 13, 1883.

How to Destroy the Woodchuck.

To the Editor of the Scientific American:

In your journal of Sept. 8, 1883, I observed an article on the woodchuck and the action of the New Hampshire Legislature to exterminate the pest. Mr. George O. Chamberlain, a farmer residing at Cedar Hill near this village, had on his sand farm an army of woodchucks, and for years they took more than a tenth.

Mr. Chamberlain extirpated them by the following device: After they had retired for winter quarters, and the surface of the ground had been deeply frozen, he chose a cold night and shut up all the holes with earth, pressing it down so that the entrance and exit were hermetically sealed, excluding the air. With all their strength they could not dig out of their prison, and died as in the "black hole of Calcutta;" not one came out alive. This plan is better than a bounty or "drowning out."

J. P. BUTLER.

Saratoga Springs, N. Y., Sept. 14, 1883.

The Electric Age.

To the Editor of the Scientific American:

Any one who was a close observer at our great Centennial Exposition of 1876, can but discern the wondrous advancement in electric science in the past seven years. Comparing the faint show of 1876 with the three thousand or more of the Edison interior lights of the Louisville Exposition, lighting as it does every part of the vast buildings with a soft, mellow light, by which all the shades of color are as discernible and the smallest needle's eye as conspicuous as by noonday sunlight. And then view the towering brilliants that illumine the entire surroundings, putting the blush upon the very face of the full moon as it peers through the rifts of snow-white clouds and sheds its dim, shimmering light, then hides away again behind its silver lining as if to say, "I am no longer monarch of night." Then step into the park; here stand two cars, much more spacious than ordinary street cars, and attached to a small machine. Pay ten cents for your ticket, take your seat, fill any place for a passenger. "All aboard!" The conductor, or engineer, or electrineer, or whatever you choose to call him, gives a little wheel a whirl, and off we go, turning and twisting around all the short curves, making a stop at the Art Gallery station; then off again, down grade and up grade; now the artificial tunnel is reached; we enter—all is darkness; but instantaneously, as quick as thought, it is as light as day by means of the same agent that is propelling you around the park at the rate of a mile or more every two minutes. Then enter again the building; see the busy sewing machine stitching away, propelled by the same subtle agent; and the submarine light under water. Contrast this, I say, with the electric show at our Centennial, and who dare dispute that we live in the Electric Age?

And we naturally ask ourselves, "Are we to utilize the waste powers of nature—air, water, and electricity—to light and warm our dwelling, cook our food?" And is electricity to become the motor of the future? Is man yet to harness all of the elements of the heavens and the earth into his service? The achievements made within the past seven years in electrical science, including the transmission of human speech by telephone, are among the most marked triumphs of scientific attainments of the age in which we live.

The Louisville Exposition is by far the largest ever held in the South. The display of agricultural machinery, implements, and tools is probably the largest and the most complete ever displayed in the world. And that of saw mills, wood working, woolen, and cotton machinery is equal to any similar show that has ever been made.

And in many departments the products, machines, and manufactures of the Southern States show them to have become successful rivals of Yankee Land. With no more "Mason and Dixon" lines to mar the fraternal sensibilities, the men of the East, the West, and of the South here unite and compare the vast products of genius and labor, where all can come and in a few days learn more of what has been done in this progressive age of scientfic and mechanical achievements than could be learned in a lifetime hunting warehouses and workshops. And the people of the entire country, by such an exhibition as this, are able to form a higher appreciation of each other, socially, scientifically, and mechanically, than could otherwise be done in a generation.

J. E. EMERSON.

Louisville, September 17, 1883.

Relief Maps or Models, and a New Vegetable Fiber.

To the Editor of the Scientific American:

Having just completed some relief maps, which in connection with a somewhat extended manuscript and several models constitute my response to the international offer, proposed by the King of Belgium, for the best "System of popularizing Geography, and developing its Instruction in Institutions of all Grades," I send you a brief statement of the material and means used for modeling these relief maps. After numerous experiments with various substances, clay, plaster of Paris, hydraulic cement, a compound recently recommended of whiting, Venice turpentine, etc., and purchasing some models in papier mache, besides obtaining estimates for models in metal, etc., it was found that for cheapness, facility in correction, and in the reception of colors, etc., before hardening, for permanence after hardening, and for striking effect, no other material tried was at all comparable to the plastic material derived from a thorough incorporation of the requisite amount of linseed oil with pure Spanish whiting; in other words, good putty of the right consistence. In the maps destined for Belgium, no one would recognize that compound as the fundamental structure, yet it is so, even in models designed to illustrate the various technical terms used in geology, such as strike, dip, synclinal axis, escarpment, talus, cañon, glacier, moraine, etc. It is true, that in the latter case plaster of Paris and small pebbles have been worked in, while in the former the colors, dusted on while the putty is in the proper condition of receptivity, conceal entirely the original material.

METHOD OF WORKING.

On a half inch board, putty in the suitable condition is rolled out thin to cover all the land, which may have been previously traced with charcoal or pencil, leaving the planed board to represent oceans, etc. The putty usually adheres, unless where thinly spread, in which case running a brush full of mucilage over the board will insure the putty to remain when pressed down.

Either the same day or even several days later, the student may correct all his outlines in detail by means of a penknife or small steel instrument made purposely somewhat shovel-shaped, but curved and running to a point. At a subsequent period, the plastic material, rolled in the hand, is laid of suitable height and extension to represent mountains and plateaus. The valleys, rivers, and lakes are then excavated, and the model is ready, if the putty has not been too moist, for the reception of colors, etc. To represent snow mountains, either plaster of Paris or zinc white may crown the summits. Should we desire to show that a mountain is an active volcano, a small amount of dry vermilion is placed in the crater. The colors, if too vivid, may be tempered by mixture with dry whiting. This is especially necessary with the artificial and cheap pigment in powder sold as ultramarine. With a short camel's hair brush the various colors are dusted on to represent the geological features, employing if desired, for easy remembrance and harmonious succession, the colors of the rainbow; various shades of red (with orange) characterizing the Paleozoic formations; of yellow (with green), the Mesozoic; of blue (with purple), the Cenozoic. The Plutonic rocks (granites, syenites, porphyries, etc.) can be well imitated by black, white, and reddish dots on an appropriate ground, metamorphic rocks by longitudinal striæ on suitable ground, as blue for clay slates, greenish for talcous, yellowish for mica slate, etc. The igneous basalts, trachytes, etc., are represented by the shades of brown, the newer volcanic being of the lighter varieties. The ocean is made by using oil with chrome green, and the lakes oil with some blue.

THE ADVANTAGES

are comparative lightness and cheapness as compared with the cast iron relief maps, capability of correction and practice for the eye, as contrasted with gypsum casts; durability and comparative safety from fracture as compared with papier mache models.

Purchasing putty wholesale in bladders, it costs only two to four cents per pound, can be kept a considerable time quite plastic; but when spread out thin, especially if we add a little Japan varnish, becomes, after some weeks or months, as hard as a board, and the models can be preserved by the student for constant reference.

Judging from my own experience, I should say that any given map, thoroughly modeled, will impress the facts, particularly orographic and geologic, with infinitely more force on the memory than the best map can effect, or even the lesson conveyed by drawing the map.

The system was tested with good results in the graded school here, by a class of boys and girls from twelve to fourteen years of age. Since then, having sent specimens to a teachers' meeting (about 300 present), the models were approved and permission asked and granted to use the system. A few months later, President Lugenbeel, of the Mitchell Normal School (Ind.), having 300 students, writes me that they have been most successful in modeling the United States on a scale 3 feet by 2 feet. That "in no case did the materials cost over fifteen cents, yet the owners of the models would not sell them for five dollars, some not for ten."

A plaster cast of Bourbon (Reunion) with its extinct and active volcanoes cost me in Rochester, N. Y., four dollars. I have since modeled from that copy at a cost of four or five cents, using a foot of pine board and a pound of putty. The colors cost usually from ten to fifteen cents per pound, and by being dusted over the surface cover a large area with a small expenditure of material. Sandy deserts are easily imitated by dusting fine sand over the putty while moist, and, where geological coloring is not desired, clay, earth, or pounded rock can be worked into the surface either with or without admixture of water.

Educational institutions will, I think, find the above system an important aid in the study of geography.

NEW FIBER FOR CORDAGE, PAPER, OR TEXTILE FABRICS.

When attending the Boston Meeting of the A. A. A. S., a member informed me that he was an importer of the raw caoutchouc material from South America, and a manufacturer of rubber goods; that he had successfully employed as a partial substitute, in the waterproofing of certain fabrics, an Asclepias, or milkweed, cultivated for him in some Western State; and had satisfied himself that, in case of a scarcity from South America of the gum from the Siphonia elastica, or similar plants elsewhere, this could be utilized to a considerable extent.

Thinking that either in case of a diminished demand for our maize, or from a desire to alternate crops, the culture of the Asclepias might be tested here and found advantageous, I examined several localities in which I knew of its growing spontaneously, and I obtained plants of very luxuriant growth, some of them six feet high, with their curious double pods often four inches long and full of silky seeds.

The Secretary of our Workingmen's Institute here, on having his attention called to the above facts, informed me that the stems of the Asclepias afforded abundance of a tough fiber; and a few days after, brought me the specimen which I inclose. It seems, judging from that small sample, a fiber of considerable length and strength, which might perhaps prove useful and profitable in the hands of those who choose to experiment upon its merits, as an adjunct to the fibers at present in use, either for textile fabrics and cordage, or for some qualities of paper.

RICHARD OWEN.

New Harmony, Ind., August, 1883.

Giant Mining Pumps.

A correspondent of the *Mining Record*, writing from Virginia City, Nevada, says the excavations for the pump station on 2,640 level of Combination shaft is making rapid progress. Some of the material for the pumps is on the ground and arriving daily, which is being overhauled, inspected, and prepared to be put in place. Mr. Charles Mathewson, the efficient foreman of the shaft, promises to have the pump in operation about the middle of December. When this is done, the water problem will be effectually settled in this group of mines, and will enable the Savage, Hale and Norcross, Chollar, and Potosi to prospect as far west, further east, and at as great a depth as any property on the Comstock, with absolute safety from flood and a greater certainty of development. No one, unless they were to personally examine the pumping appliances now in use in this shaft, can form any conception of their magnitude and power. The hydraulic pump station on the 2,400, 80 feet long, 20 wide, and 10 high in the clear, with an ell for a water tank 80 feet long, 7 high, and 10 wide, is timbered most substantially throughout with 14 x 14 inch timbers and 4 inch lagging, over 100,000 feet of timber being used in its construction. Here are the two massive double ended, double acting hydraulic pumps, regular, reliable, and noiseless, running at a speed of 4½ strokes per minute each. Although the pressure of the feed is 1,300 pounds to the square inch of valve surface, so perfect is the action of the air cushions and valve connections there is no perceptible jar. With a capacity of 5,000,000 gallons, these pumps are sending to the Sutro level, from the 2,400 west cross cut, 1,360,000 gallons, and from the 2,600 level. 1,840,000 gallons, a total of 3,200,000 gallons or 188 miners' inches every 24 hours.

The station is connected with the surface by an electric signal appliance, which makes communication instantaneous and perfect. Gauges indicate the pressure in the several columns, the variations, the speed per minute, and the work done for any interval of time. A first class fitting shop with necessary tools and vises is one of the conveniences; a cooling house one of the necessities, as the temperature of the water is 140 degrees, that of the station over 100 degrees. When the pump on the 2,640 is completed, this shaft will be able to handle 10,000,000 gallons of water every 24 hours. The Sutro tunnel discharges 8,250,000 gallons, more than 3,000,000 of which is from her own drifts and connections, thus making it possible for this shaft to handle double the quantity now handled by the combined working shafts on the Comstock.

The shaft consists of one large pump and three working compartments, every foot of which is in perfect condition. The surface machinery and hoisting engines are constructed for power, speed, and endurance. They are capable of doing all the business of the four mines, can handle the men, the timber, the material and supplies necessary in their working and prospecting, and in addition, 2,500 tons of rock, equaling 33,750 cubic feet, or the creation of a cavity in the earth's crust, 10 feet wide, 10 high, and 337½ long every 24 hours.