SCIENTIFIC AND PRACTICAL INFORMATION.

TO ENAMEL COPPER UTENSILS.

Finely pulverize 12 parts white fluor spar, 12 parts unburned gypsum, and 1 part borax, and fuse together in a crucible. When cold, mix with water to a paste, and apply to the interior of the vessel with a paint brush. When dry, the vessel should be thoroughly baked in a muffle or furnace.

MESMERISM.

Mr. J. E. E., of Pa., says: "About six months ago a mesmerizer was performing in this place for about a week. Our nearest neighbor's little daughter, a pretty bright child, became a very interesting subject: and during the stay of the professor was nightly under his influence, sometimes for two hours. Her mind seemed in a strange way the day after he left, and in two days she was taken with a severe headache with darting pains; these terminated in a stupor, and, for about six months, she has been under medical treatment. The physicians say she has no disease. The poor child is an object of pity, having pined away to a skeleton and become perfectly helpless and idiotic. She does not know her own wants; never asks for food, merely opens her mouth when it is touched, and takes it like a young bird."

FIREWEED FIBER.

In reference to this product, described on page 89, current volume, our correspondent, Mr. I. Stauffer, says:

"The plant known as fireweed, which springs up in clearings when recently made and burned over, is the *Erechthites hieracifolia, Raf.* This belongs to the natural order *compositæ*, and the numerous *achenia* in the receptacle, provided with a copious pappus of very fine and white hairs, might be compared with the boll of the cotton plant. But the writer says it is called *epilobium;* of this we have 5 species: the *epilobium angustefolium*, L. (great willow herb) attains a hight of from 4 to 7 feet, and is often very abundant in newly cleared land. This gets fine flowers in a long spike or raceme. The pod is linear, many seeded, each seed with a tuft of long hairs at the end. The epilobium belongs to the natural order *onagraceæ* (the evening primrose family). I doubt not but that the fiber of the bark would be useful for the purposes of "wicks, ropes, yarn, and even paper." I know that our common evening primrose, *œnothera biennis*, with which I have seen neglected fields completely covered, is suffered to rot as a weed, simply from ignorance of its value."

WATER FROM THE BOTTOM OF THE SEA.

A German inventor suggests the use of a vessel, lowered by a rope and provided with a wire which, by electrical action, closes the vessel when the required depth has been reached. The idea is simple and appears to be practicable; and some valuable results may be obtained by drawing up water from various depths in the sea.

APPEARANCE OF FOREIGN GRASSES IN FRANCE.

The growth, apparently spontaneous, of several foreign species of grass in middle France, especially in the communes of Cour and Cheverny, has been explained by M. Vibraye in *Les Mondes.* It appears that, wherever the cavalry horses had been supplied with forage from Algeria, numerous grasses unknown to the locality were growing, as many as twenty new kinds already having been observed. A gentleman has noticed as many as forty four unknown species in the neighborhood of Angoulême, which all appeared immediately after the presence of a cavalry camp in the suburbs. The avidity with which the new plants have taken root has induced the Academy of Sciences in Paris to authorize the preparation of a scheme for the systematic introduction of Algerian forage plants into France.

[Special Correspondence of the Scientific American.]

LETTER FROM PROFESSOR R. H. THURSTON.

A flying visit to Chicago, "the Cream City," and St. Paul. The St. Louis River and its remarkable characteristics. Important railway engineering. Duluth, its astonishing growth. Houghton and the Lake copper regions.

HOUGHTON, Portage Lake, Mich., July 17, 1872.

Leaving St. Louis soon after sunset, we next morning found ourselves rapidly but smoothly riding across the level, treeless prairies of Northern Illinois, the view strongly reminding one of that obtained from a ship's deck in open ocean on a calm day—a monotonous dreary sameness bounded in every direction by an equally distant line, the apparent line of meeting between heaven and earth.

At eight o'clock A. M. we were landed in Chicago and rode across to the Northwestern depot through a portion of the "burnt district." We were thus enabled to obtain a glance at the terrible desolation which so suddenly overspread a large portion of this great city, and to see something of that phœnix like revival which the wonderful energy of the people, assisted by the substantial sympathy of every civilized country, has inaugurated. We must spend more time here on our return from the great northern lake.

MILWAUKEE.

After a substantial breakfast, we again started northward, passing through Milwaukee, one of the most interesting cities of the northwest and one which promises to become the seat of extensive manufactures in iron. "The Cream City," as it has been called, has a fair harbor at the mouth of the Milwaukee river; extensive water power is afforded by the river, and lines of steamers and railroads assist in making the city one of great importance and of promising future. It is scarcely more than twenty years since the city was founded, and, yet, in 1870, it contained 71,464 people.

From Milwaukee, our route took us through a country which, as we went northward, gradually lost the prairie character and became irregular in surface and more and more wooded; and as one pleasant scene succeeded another, and as we crossed one fine farm after another, we thought these Minnesota lands the finest we had yet seen.

ST. PAUL.

A day and a night on the rail, and we finally reached St. Paul, the capital of Minnesota, a city of about 25,000 inhabitants, standing upon a high bluff at the head of navigation of the Mississippi river. A quarter of a century ago, there were, where the city now stands, perhaps a dozen dwellings, whose inhabitants were trading with the Dakotas or the Chippeways, and hunting and fishing in the neighboring forests and in the beautiful streams flowing through them. To-day, with its 25,000 people and their well built residences and frequently imposing stores and public buildings, its four miles of water front from which steamers can take their cargoes without difficulty to New Orleans, 2,060 miles below, and with the lines of railway which radiate in all directions and connect the city with every part of the country, with its healthy climate and surrounded, as it is, with a fine farming country, St. Paul is an excellent place in which to build up a manufacturing industry, and its future should be one of exceptional prosperity.

The cities of Minneapolis and St. Anthony are a short distance above St. Paul, at the falls, and seem equally prosperous. They have an additional advantage in the possession of immense and readily utilized water power. The former has already become known as the seat of woollen manufactures; and the blankets woven there are among the very finest in our markets.

ON TO DULUTH.

We made but a short stay here and then started for Duluth *viâ* the Lake Superior and Mississippi Railroad. This road passes, for the greater part of its length, through a rather uninteresting country; but, at Thompson, we crossed the St. Louis river, and thence the road was carried along its banks nearly to Duluth.

DIFFICULT RAILWAY ENGINEERING.

It was during our ride along the banks of the St. Louis that we saw at once some of the most beautiful scenery and the most difficult engineering that we had met with since leaving home. The rails are carried on high trestles across deep ravines, and for long distances along the high bank of the river and at points, the road bed seems almost ready to slide into the stream. The work is, however, well done, and the greatest care is taken in running trains over the more dangerous portions of the road; there is really very little risk, much less than on many roads where the natural obstructions are far less formidable, but where the engineering is less skilfully done.

A GREAT WATER POWER.

The river, from Thompson to Fond du Lac, where it enters Lake Superior, presents an almost uninterrupted succession of falls and rapids.

In the last eight miles, the river falls about 400 feet and, as the rate of flow has been stated to be 290,000 cubic feet per minute. it is not improbable that this stretch of the river offers an available power of not less than 100,000 horses,—enough to drive 10,000,000 spindles, could it be applied to cotton manufacturing. It is a large cotton mill that contains 50,000 spindles; this water power is thus capable of supplying 200 large mills. The rocky bed and precipitous banks of the river are slate, and this stone, together with the excellent lumber of the adjacent forests, is quite sufficient to support a large industry for an immense length of time. The amount of capital which may be usefully and profitably employed here can hardly be imagined. The valley must at some future time support a large population, and a beginning has already been made at Thompson, where there are several saw mills, railroad shops, and other manufacturing establishments.

THE "DALLES" OF THE ST. LOUIS.

But, as the traveller rides over this eight miles along the "Dalles" of the St. Louis, even although he may be the most thoroughly utilitarian of capitalists or engineers, he can hardly, at his first visit, so far control his feelings as to be able to speculate, upon the probable available power of the stream or the value of its slate deposits and bordering forests, while in their actual presence. Nature here presents such scenery as is rarely found either at home or abroad. It has none of the grandeur of Niagara or of the Yosemite, but in its wild beauty, in its picturesqueness, and in the variety of its scenery, it can have but few rivals. The Dalles present a collection of attractions that will repay the lover of Nature for all the fatigue of a journey across a continent. Here, for miles and miles, the river rushes between precipitous banks over its rocky channel, and rapids and falls and rapids again follow each other in constant succession. Occasionally the banks recede, and the river widens and becomes a wide but shallow and brawling stream; again the banks approach each other and high precipices confine the river in a narrow bed where it roars among craggy slate dykes or rushes over a succession of cascades to a lowel level; here it, perhaps, flows more quietly for a little time, but soon it resumes its wild career, and finally loses itself in the calm depths of Lake Superior.

THE NEW CITY OF DULUTH.

Duluth, where we were to take a steamer for the lake ports, is one of those typical western "cities" which frequently spring up as if at the command of the slave of Aladdin's lamp. Hardly three years old, it already contains eight churches, two hotels of moderate size, several saw mills, and a considerable number of stores. An opera house and another hotel are promised. The North Pacific Railroad is building long lines of wharf in a very good harbor. This has been rendered readily available by cutting a ship canal through Minnesota Point, which stretches out six miles across the bay toward Superior city, and makes the best possible breakwater. A capacious elevator has been erected at the landing. There are probably 4,500 people in the place. This is the terminus, on Lake Superior, of the great Northern Pacific Railroad. Its connection by rail with all parts of the country and its several lines of steamers, which keep it in regular communication with all the ports of the great lakes, are advantages that must rapidly build up the city. Still, when land sells, as it has here within a few days, at eighty dollars per front foot, we are somewhat inclined to believe that the youthful city is suffering from an inflation of prices in its real estate market that must retard its growth. The buildings are generally framed structures and of rather rough construction, as might be expected. An occasional brick building and at least one brown stone front may be seen in the upper town.

This town, springing up as it has, reminds one of those which, during the war, were occasionally built by the army, not only by the rapidity with which this peaceful army has erected its quarters, but, in some places, by the character of the buildings.

THROUGH THE LAKES TO THE COPPER REGIONS.

After waiting two days at Duluth, the steamer *Meteor* came into port and we sailed next morning. We had a clear bright day, with a warm sun but a cool air, and enjoyed the sail extremely. By the middle of the afternoon, we were steaming through that beautiful group, the Apostle Islands, and, just before sunset, touched at Bayfield, a village on the south shore of the lake. As we left the shore again and headed for Isle Royale, we witnessed a magnificent sunset; such brilliancy of color and such variety of cloud shapes no Italian sky could surpass.

We arrived, next morning, at Isle Royale, where we took on board a prospecting party returning from an exploration of the copper deposits of the island. These deposits are quite extensive and are supposed to be at some points extremely valuable. They were formerly worked by several companies; they are now nearly all held by a single corporation, and operations which have, for some time, been entirely suspended, will probably, ere long, be resumed. It is not improbable that this island may be found to contain an immense amount of mineral wealth, if we may judge by its geological structure and by the evidence afforded by explorations and workings which have already been commenced.

Once more steaming out of harbor, we again headed southward, and, at evening, by the light of the full moon, we were skilfully piloted through the long, tortuous entrance to Portage Lake, and late at night came alongside the wharf at Houghton, the principal town of the Lake Superior Copper Regions. Here we propose spending some days for the purpose of learning something of the character of these deposits, and the methods adopted in "winning" the ores.

R. H. T.

NEW BOOKS AND PUBLICATIONS.

EASY RULES FOR THE MEASUREMENT OF EARTHWORKS by means of the Prismoidal Formula. Illustrated. By Ellwood Morris, Civil Engineer. Philadelphia: T. R. Callender & Co., Third and Walnut Streets.

This is a well arranged treatise on the subject announced in its title page; and it provides for the calculation of earthwork of all kinds by an elaborate compilation of formulæ and tables.

THE MUSICAL WORLD. Henry Litolff, 211 Fourth Avenue, New York city.

This publication contains, in each issue, a number of songs, reprinted in a clear and legible manner, the selection being judiciously made from composers of known ability.