Snow Plows Needed in Roumania—A Chance for American Inventors.

We take pleasure in publishing the following letter from Mr. Ch. Courgoulier, 60 Calea Victoriei, Bucharest, Roumania. The communication speaks for itself:

"Every year the snow stops the movement of trains in Roumania for a longer or shorter time. This year they were obstructed for more than three weeks. Having learned through *La Nature* and *La Revue Generale des Chemins de Fer* that rotary plows are used successfully on the lines of the United States, it occurred to me that I would propose a trial of them on the lines of Roumania. My proposition was accepted. So I write to ask you to give me assistance in carrying out my idea, by furnishing me with all the necessary information for the introduction of one of your plows into Roumania, and making experiments with it. If it works successfully, others will be needed.

"I will need to have drawings and detailed description of these plows, and the results obtained by experience. Also dimensions, weight, price, terms of payment, time required to deliver, expense of transportation, supposing that the apparatus can be delivered on a boat at Galatz, a port on the Danube."

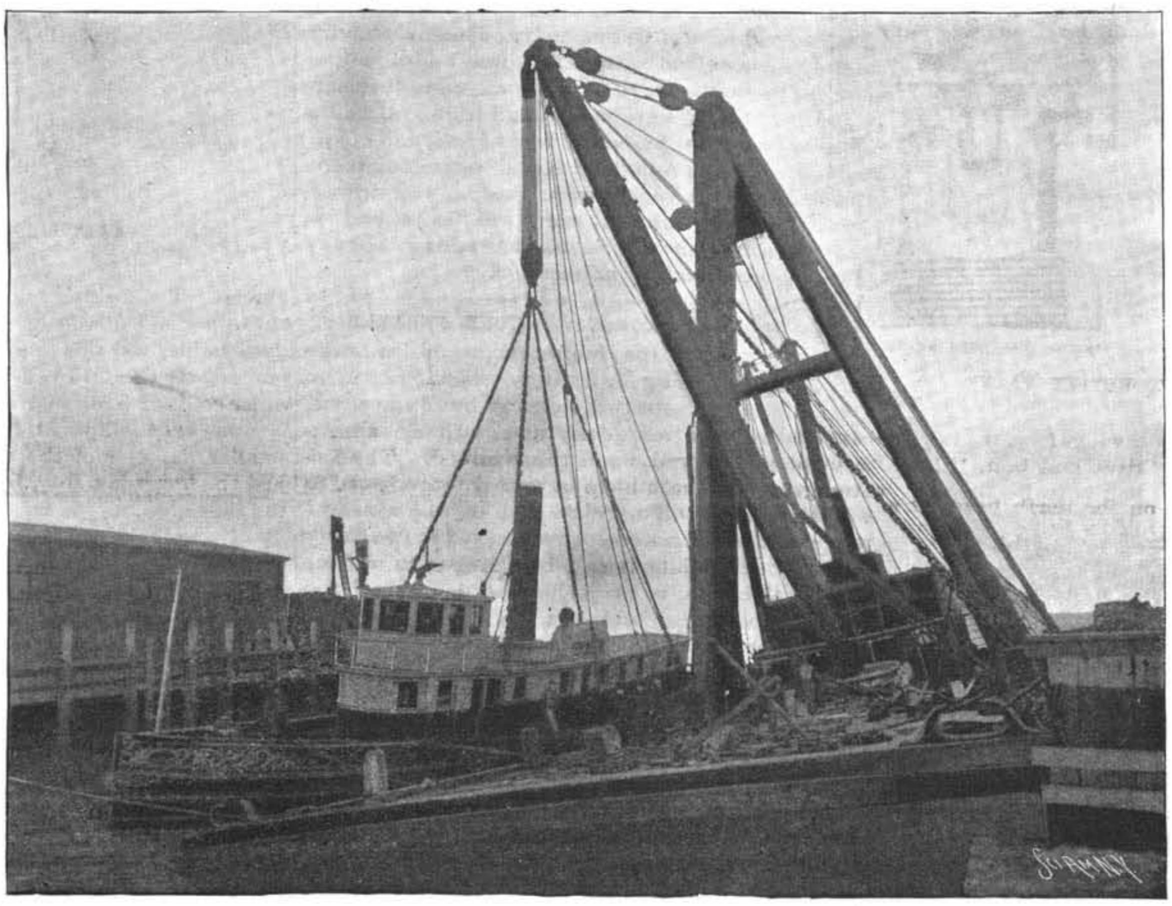
We trust that numerous responses will be received by Mr. Courgoulier. Write him direct.

HOW SUNKEN VESSELS ARE RAISED.

On the morning of February 27 the United States revenue cutter Washington, Lieut. C. F. Shoemaker, U. S. R. M., was run down by the Brooklyn Annex boat No. 3, of the Pennsylvania Railroad Company, just opposite the Barge Office dock, at the southern extremity of this city, where the East and North Rivers unite. The cutter's port side was stove in amidships, and the vessel sank just inside her slip at the Barge Office.

The Custom House authorities appropriated $500 to have her immediately raised, and the Chapman Derrick and Wrecking Co. began the work of raising her at 7 P. M. Feb. 28. The derrick boat Reliance was employed. With the aid of divers a sling of chains was passed under the boat and attached to the arm of the derrick, as shown in our photograph. The steam hoisting gear of the derrick was then set in motion, and at once the sunken vessel began to rise out of the water. The Washington was soon completely raised. The derrick and her burden were then towed to dock for repairs.

The Chapman derrick consists of a strong float or scow provided with several watertight compartments, on which a powerful crane is erected, worked by steam power. The machine is capable of lifting weights of several hundred tons. The raising of a sunken boat like the Washington is considered a small affair for this machine to handle. This derrick was fully illustrated in the SCIENTIFIC AMERICAN of November 8, 1890.



RAISING A SUNKEN REVENUE CUTTER.

The Sources of the Nile.

The report of Dr. Baumann's latest geographical investigation of the Kagera River and the country lying between that stream and Lake Tanganyika affords an interesting and important contribution to the history of the sources of the Nile and a singular confirmation of the ancient myths concerning the Mountains of the Moon.

On September 5 last Dr. Baumann's expedition, after having crossed Stanley's route a week previously, reached the Kagera River, and was received by the natives of Urundi with such demonstrations of joy and respect that he instituted inquiries as to the cause of their enthusiasm. He learnt that Urundi, from Ujiji to Rouanda, had been for ages ruled by kings who were supposed to be lineal descendants of the moon, and that the natives believed him to be the last king, who had died a generation before and who had now come back to them from the moon.

On September 11 the expedition crossed the Akenyaru, which is not, as supposed, a lake, but a river, though the name "Nyanza" is often applied to it. Dr. Baumann also discovered that the so-called Lake Mworengo is in reality a river which flows into the Akenyaru, and came to the conclusion that there was no extensive sheet of water in Ruanda or North Urundi. On September 19 Dr. Baumann arrived at the source of the Kagera, which rises at the foot of the precipitous and wooded hills which form the watershed between the basins of the Rufizi and the Kagera. This mountain chain is known to the natives by the name of the "Mountains of the Moon," and is held in peculiar reverence by them. Here Dr. Baumann maintains the real source of the Nile to be, for if "it be acknowledged that the Kagera is the chief feeder of the Victoria Nyanza, it follows that the headwaters of the Nile can be none other than those of the Kagera itself in the Mountains of the Moon in Urundi, within the boundaries of German East Africa."

The Trap Door Spider.

Mr. D. Cleveland, of San Diego, Cal., contributes to *Science* an article in which he states some curious facts regarding the trap door spider (*Mygale henzii*, Girard), which is widely diffused in California. Behind San Diego there are many hillocks about a foot in height and three or four feet in diameter. These hillocks are selected by the spiders, Mr. Cleveland suggests, because they afford excellent drainage and cannot be washed away by the winter rains. A suitable spot, which always consists of clay, adobe, or stiff soil, having been chosen, the spider excavates a shaft varying from five to twelve inches in depth, and from one-half to one and a half inches in diameter. This is done by means of the sharp horns at the end of the spider's mandibles, which are its pick and shovel and mining tools. The earth is held between the mandibles and carried to the surface. When the shaft is of the required size, the spider smooths and glazes the wall with a fluid which is secreted by itself. Then the whole shaft is covered with a silken paper lining, spun from the animal's spinnarets. The door at the top of the shaft is made of several alternate layers of silk and earth, and is supplied with an elastic and ingenious hinge, and fits closely in a groove around the rim of the tube. This door simulates the surface on which it lies, and is distinguishable from it only by a careful scrutiny. The spider even glues earth and bits of small plants on the upper side of the trapdoor, thus making it closely resemble the surrounding surface. The spider generally stations itself at the bottom of the tube. When, by tapping on the door, or by other means, a gentle vibration is caused, the spider runs to the top of its nest, raises the lid, and looks out and reconnoiters. If a small creature is seen, it is seized and devoured. If the invader is more formidable, the door is quickly closed, seized, and held down by the spider, so that much force is required to open it. Then the spider drops to the bottom of the shaft. When the door of the nest is removed, the spider can renew it five times—never more than that. From forty to fifty cream-colored spiderlings are hatched from the yellow eggs at the bottom of the nest.

When these have attained only a fraction of their full size—before they are half grown—the mother drives them out into the world to shift for themselves. After a brief period of uncertainty they begin active life by making nests, each for itself, generally close to "the old homestead," sometimes within a few inches of it. These nests are always shallow and slender, and are soon outgrown. When the spider attains its full size, it constructs a larger nest.

Sparking of Dynamo Brushes.

The *Elektrotechniker*, of Vienna, contains some useful remarks on this subject which, we feel sure, will prove of interest to our readers. The sparking of dynamo brushes not only wastes the brushes and the commutator prematurely, but also gives rise to a considerable loss of energy, which might otherwise be properly utilized. This sparking formerly was one of the unavoidable defects of dynamos, while nowadays the commutators of small machines mostly run without sparking—provided no mistakes have been made in the construction and treatment of the machine—and the sparking of large machines has been reduced to a minimum.

The sparking may be due to various causes. It occurs when the armature becomes strongly heated, and is due to a faulty construction of the latter. If the pieces of sheet iron of the armature are not properly insulated from one another, Foucault currents are set up in the iron and strongly heat it. The armature, therefore, is tested, before being wound, by making it rotate for several hours between strong magnets. If it has been properly constructed, the increase of temperature will be very slight. The armature may also be heated by too heavy a load. This will occur when more lamps are switched on than the machine ought to feed. For regular working the armature wire must not be loaded with more than 4½ amperes per square millimeter (0·00155 square inch). Some manufacturers go as high as 6·4 amperes per square millimeter, but this is a very questionable practice. The E.M.F., too, must only be allowed to rise within certain limits, which are generally specified by the manufacturer for each machine. If the E.M.F. at constant current is unduly raised, a much larger number of revolutions is required, the armature iron is heated by the frequent changes of polarity, and the shaft runs hot in the bearings. Sparking also occurs when the brushes do not lie against the neutral points of the commutator. These neutral points, in consequence of the reaction of the armature current on the field magnets, are subject to displacement in the direction of rotation of the armature when the current increases, and in an opposite direction when the current decreases. When the brushes touch at the same time two segments of the commutator, the latter are short-circuited; this causes an overload of the respective convolutions of wire and gives rise to sparking. The commutator must not be rough or uneven, and must have no protruding sheets. By protracted use the sheets of the commutator are ground by the pressure of the brushes, and in this case the commutator must be turned off, or new sheets must be inserted.

Sometimes, during the rotation of the armature, a sudden flaring up is noticed at the commutator; this is frequently due to interruptions in the armature winding. A break of current in the field magnets can also give rise to strong sparking. In the present state of perfection to which dynamos have been brought the sparking of the brushes can be altogether avoided, or, in large machines, reduced to a minimum. In every case the constructor can ascertain and remove the cause of this defect.—*Electricity, London.*

A Varnish for Collodion Lantern Slides.

A correspondent writes: I have been making a series of experiments to find out the best varnish for collodion lantern slides. I have tried nearly all the published formulæ, including Mr. Armstrong's acetic solution of gelatine, but the best one which I have used is as follows:

Tunny's impervious varnish (This is a saturated solution of amber in chloroform.)	1½ ounces.
Pure benzol	1½ "
Gum dammar	¼ ounce.

When dissolved to be filtered through cotton wool.

This varnish runs on the plate as freely as collodion does, without the tendency to coat your fingers and backs of the plates like most other varnishes which I have tried. It dries hard with a gentle heat, and is not tacky, and it renders the film quite bright and glass-like.—*Br. Jour.*