covered also with an isolated substance. The advantages of this system are obvious, the first being reduced cost of the magnets. Then we have greater effects, which is tantamount to a reduction of size—and consequently another reduction of the cost. The "extra currents" being also done away with, a more prompt movement of the armatures results, and therefore greater usefulness in induction coils. In telegraphic instruments they present the additional advantage of remaining unaffected by lightning. M. Du Moncel remarks, by way of explanation—explanation is easier than prediction—"I consider that in magnets of the new construction the surface of contact of the spirals between themselves represents, in fact, a linear spiral, of which the points furnish derivations. We can easily imagine that the electric flux provoked by these derivations can only be produced by furnishing a series of superposed currents circulating through all the folds of the metallic helix, by reason of the resistance to the passage from one spiral to the other. Now, if the primitive current circulating through the helix is weakened by these derivations, it is reinforced by the derived and superposed current, which, in over exciting the pile, furnishes at last a more energetic current. Besides it must be borne in mind that the direct current which results from the derivations, and which passes through the spirals towards the axis, ought to be derived from them, and as it is not enfeebled by its passage, it should augment the intensity of the current which flows through it." Lastly, the quantity of uncovered wire which can be used for a given magnet is greater than that of covered. We shall, doubtless, at once hear of some experiments disproving or supporting M. Du Moncel's; in the latter case the method he points out should be immediately acted upon.—*Reader.*

The Origin of the Locomotive.

In the matter of priority of invention in, or rather of attempts at, land propulsion by steam, the French may well claim to be our *devanciers*, and we do not think that any true Englishman will be inclined to grudge them this honor. The first steam carriage seems to have been made by a Frenchman, Cugnot, in 1769, that same marvellous year which witnessed the birth of Napoleon I., Wellington, Humboldt, Mehemet Ali, Lord Castlereagh, Sir E. I. Brunel, Cuvier, and the first patent of Arkwright, the first patent of Watt, as also some other events almost as great in their eventual influence on the present era. An engine made by Cugnot is still in existence in the Conservatoire des Arts et Metiers at Paris. It has a copper boiler, very much like a common kettle without the handle and spout, furnishing with steam a pair of 13-in. single-acting cylinders. The engine propels a single driving wheel, which is roughened on its periphery. Altogether, this engine bears considerable testimony to the mechanical genius of its inventor. It was unsuccessful, having got overturned once or twice on the very bad roads then existing in France, and it was put on one side. It is stated, however, that arrangements were made, in 1801, to put it to work in the presence of Napoleon Bonaparte. The departure, however, of Napoleon for Egypt, prevented the trial—a circumstance which recalls Fulton's subsequent unsuccessful negotiations with Napoleon for aid in attempting marine propulsion by steam. Watt, then, in 1784, patented a locomotive engine, the boiler of which was to be "of *wood*," hooped like a beer barrel. Watt, however, had not much faith in steam carriages, and he objected to the attempts made in this direction, in 1784, by William Murdoch, his very able assistant. The miniature engine made by Murdoch in that year is still carefully preserved at Soho. Careful and elaborate researches, such as those lately made by Mr. Zerah Colburn, into the history of the locomotive, seem to more and more confirm existing impressions as to the great part done by Trevethick in the introduction of the locomotive engine.—*Builder.*

Chloride of Barium against Boiler Incrustation.

The applicability of chloride of barium for removing and preventing boiler incrustations of sulphate of lime is not so well known as it should be. Recent experiments made in Hanover show that it may be used with advantage in many cases. Chloride of barium decomposes the sulphate of lime present in many waters, forming chloride of lime, which remains in solution, and sulphate of barium which precipitates in the form of powder, producing a yellowish white slush at the bottom of the boiler. The chloride of barium should always be present in excess in the boiler, which is the case when no further turbidity is produced on adding some to a sample of the water. The high specific gravity of the sulphate of barium, which is double that of any lime salt, requires the use of a shovel for removing the slush, but also prevents the possibility of any of the particles being carried up by the steam. When the boiler is stopped for cleansing purposes, the water should not be entirely drawn off until cold, the slush becoming otherwise dried and hardened by the heat. The water may also be purified previous to use, time being allowed for the settling down of the turbidity. Unlike certain other chemicals frequently employed, chloride of barium has not the least injurious effect upon iron.—*Engineer.*

Various Sources of Vegetable Oils.

A very large white pea is grown near Shanghae, in China from which oil is extracted for burning. So extensively is this article used that from Shanghae alone £2,000,000 worth is yearly distributed over China. This leguminous plant is called teuss. There is another Chinese production called the tea oil, said to be produced from the seeds of species of the two genera, thea and camellia, which oil is nearly unknown in Europe. When fresh it is quite free from smell, of a pale yellow tint, and devoid of sediment. It resists a cold of 40°, and its density is 927. It burns with a remarkably clear white flame. This oil might prove an important article of commerce in the East, because in its properties it is superior to cocoanut oil, and the various other oils used for burning. From the leaves of the Australian eucalypte on oil can be procured of equal utility to the cajeput oil of the East. Among the various kinds of oils used in Northern Germany, especially in the kingdom of Hanover, that extracted from the nuts of the beech is deserving of notice. Beech oil does not play a prominent part in commerce, nor is it likely to do so, owing to the fact that it cannot be obtained in large quantities. The country people who collect the nuts, or who cause them to be collected, use the greater part of the oil extracted from them in their household, and dispose only of the remaining fraction. About the beginning of November the nuts are gathered, either by picking up those which have fallen to the ground, or by spreading large sheets under the trees and beating the branches with poles, so as to cause the nuts to separate from them. Twenty-five pounds of nuts yield about five pounds of oil. The oil is of a pale yellow color, and has an extremely agreeable taste. It is often adulterated with walnut oil; the latter is even sold as beech oil, and this may account for the difference of opinion respecting the quality of beech oil. The townspeople use it chiefly as salad oil, but the peasantry employ it as a substitute for butter, etc., and only when there has been a good harvest for nuts, for burning in their lamps. The nuts are, after the oil has been expressed, made into cakes about nine inches square, and an inch and a-half thick: these are used for combustibles.—*Technologist.*

Rubidium.

According to the latest experiments of Prof. Bunsen in connection with the preparation and properties of this metal, it appears that it may be reduced from carbonated aciferous tartrite of oxide of rubidium (in a manner similar to the reduction of kalium): 75 grains of that salt will yield 5 grains of pure metal melted to a compact mass. It is very light, like silver, its color is white, with a yellowish *nuance*, hardly perceptible. In contact with air it covers itself immediately with a bluish gray coating of suboxyd, and is inflamed (even when in large lumps) after a few seconds, much quicker than kalium. At a temperature of 14° Fahr., it is still as soft as wax; it becomes liquid at 101-3° Fahr., and in red heat it is transformed in to a greenish-blue vapor. The specific gravity of rubidium is about 1·52. It is much more electro-positive than kalium, if combined with the latter to a galvanic chain, by acidiferous water. The rubidium, thrown on water, will burn and show a flame of the same appearance as that exhibited by kalium.

Correspondence

Pyroligneous Acid in Chimneys.

Messrs. Editors:—In your last paper I noticed the article under the above heading, and believe I can suggest a remedy for the moisture in the chimney, which is as follows:—The pipe should not be less than six inches diameter, with round joints or elbows to give the smoke a natural curve around the corners, and where it enters the chimney the pipe should be enlarged and made oval, so that the widest way will be equal to the width of the flue, and the narrowest way equal to the thickness of the flue. The chimney is small, but will improve the draught, and be, I think, an effectual remedy, provided no other pipes enter the chimney near this one.

Wm. O. Glover.

New Milford, Conn., Feb. 20, 1865.

Dental Plates.

Messrs. Editors:—If your correspondent S. H. will use pure platinum for his plates, and have the teeth soldered fast with pure gold, he will have no further trouble with the galvanic action of which he justly complains. Or, he may have the teeth baked on to the platinum plate, by Allen's or Moffit's plan or process. This kind of work is better for under sets, but almost too heavy for upper. The best plate for upper sets, when properly got up, is the vulcanite or hard rubber.

Philadelphia. W. P. H., Dentist.

The English and the American Patent Offices.

Our English contemporaries have for some months been discussing the important subject of patents and laws relating thereto, some suggesting the need of reform, others advocating the entire abolishment of them, and similar views. In a late number of the *Westminster Review* can be found the following tribute to the system pursued in our Patent Office:—

The *Review* gives the decided perference to our patent system over that of Great Britain in two particulars. The first is the preliminary examination as to the novelty of an invention by the office previous to the issuing of the patent. This is obviously on the ground that the office can perform this work much better than the inventor, especially where, as in this country, according to the *Review*, the examiners "are men of exceptional talent."

He is thus saved the expense of taking out a patent which has been anticipated, or from the greater expense, besides the loss of time involved, of having this examination made for him. The records of the English courts show a vast amount of litigation which is thereby avoided. Instances are cited in which patents have been litigated for years at a cost ranging from £15,000 to £25,000, when at last it has been discovered that the invention was not novel. The writer sums up the argument on this point by saying;—"Moreover, it (this examination) prevails in a country which is more worthy to instruct us in patent matters than all European countries combined—the United States of America." The other respect in which the preference is given to our system is the relative cheapness of patents. This, evidently, is a wonderful stimulus to invention.

Engineering Schools.

We judge that "parents and guardians" are beginning to appreciate the value of instruction on practical subjects, or, to speak more postively, feel that by familiarizing their children or wards with science from their youth they will have something certain to rely upon when their majority is attained. We infer this from the number of institutions where engineering and other scientific studies are prominent courses. At the Delaware Literary Institute in Franklin, Delaware Co., N. Y., surveying, civil engineering, geometrical and mechanical drawing, as well as the construction of common roads and railroads are taught; lectures on the various elements, imponderable agencies, etc., are given, and the general course at the Institute is to make the pupils proficient in the modern professions. We understand that this institution is in a flourishing condition.