difference would be found. Sewer water will, in the average, contain more potash than I have allowed for, inasmuch as the fluid voidings of horses are to be added, which increase the amount of potash. We may assume that one-third of the population of Great Britain, or ten millions of men, live on corn and agricultural produce imported from abroad. For this a pretty considerable number of millions of pounds sterling must be paid, besides another pretty considerable number which must be earned by the nation in order to pay for the purchase of manures to produce the food of the remaining 20,000,000 of inhabitants. Many superficial observers appeal to statistics, which appear to show that much of the land yields one-third more than it did in the last century, and this is not, they say, a sign of decrease; but they forget at what costs their larger crops are obtained, and that they are due to an enormous expense of capital for the purchase of foreign manure. It is a sign of a poor or an exhausted soil, if, in order to get high returns, we have to add large quantities of manure from without; a rich or fertile soil does not require such an addition.

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### Saxifragine—A New Blasting Powder.

This is a newly-invented powder for blasting and quarrying purposes, which is said to have already gained considerable reputation on the Continent, and to have been patented in various countries. The Russian patent is stated to have been sold to the Government of that country, and in Belgium and Prussia that companies have been formed for producing the material. It has been practically tested in various quarters, and certificates have been given by engineers, mine-owners, iron-masters, &c., bearing testimony to its efficiency and good qualities. The following are some of the objections to the use of the ordinary blasting gunpowder, alleged by the promoters of saxifragine:—Gunpowder is difficult and expensive to transport, on account of its very explosive nature, and the precautions that it requires. Some of the expenses for the conveyance of a small quantity being as great as for a large, storage is involved, which is very inconvenient and dangerous. Gunpowder being adapted to gunnery and sporting purposes is often purloined. Gunpowder presents great danger to the workmen by scattering fragments with great force. It causes thus interruptions of work. It is pernicious to the health of the men, by the smoke and sulphurous gas after explosion. Saxifragine is composed chiefly of nitrate of barytes, in place of saltpetre, of which only a very small percentage is introduced; sulphur is entirely dispensed with. The cost of the material is thus much reduced. Its merits are enumerated as follows by the promoters:—Saxifragine contains no sulphur; it contains only a very small proportion of saltpetre, and is composed of matters that may be easily procured; it is less dangerous to carry and to store than gunpowder; is not likely to be purloined, as it cannot be used for firearms; it does not interrupt the occupation of the men, nor produce thick smoke or sulphurous gas; while it blasts the rock as well as or even better than gunpowder; its theoretical force, as compared with that of the ordinary powder, is calculated as 18 to 11 in its favour; owing to its superior force and density, it occupies less space in the hole, so that the centre of gravity of the charge may be placed equally low with a shallower hole, and equal tamping; it is much less expensive. The method of blasting with saxifragine is similar to that adopted with gunpowder. The report of the explosion is less, although the expansive powers is greater than that of gunpowder. The fragments detached are not cast to a distance. The promoters say it may be used in mines, and even in some collieries, where from the danger attending the use of gunpowder, blasting has, at a great sacrifice, been abandoned. This the promoters allege, is confirmed by the manner in which saxifragine burns in the open air. Cannon powder spread on a stone and lighted, ignites instantly, and rises in smoke, leaving only a little dust behind it; but saxifragine takes fire upon all the surface which it covers, makes no explosion, but burns with an immense vivacity, and developes an enormous quantity of gas, which is the cause of its great expansive power; and as it leaves behind it a certain blackish residue, it cannot be used for firearms. Saxifragine, it is added, is not hygroscopic, and hence is easily preserved, and is not more dangerous to keep than tow, hay, or any other combustible matter. When fired, this powder leaves a bulky ash, nearly as large as its original volume, unless the explosion has had sudden vent (as in the rending of a rock), so as to scatter it.—*Practical Mechanics' Journal.*

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### Probable Existence of an Enormous Cavity in the Earth.

A most singular and unexpected discovery has recently been made by M. Otto Struve, the Russian Astronomer of the Observatory of Moscow. It was found that upon calculating upon astronomical data the most rigid and exact, the latitudes and longitudes of several of the principle points of the great Russian triangulation, and deducing thence the colatitude of the Moscow observatory, that it differed by no less than eight seconds from the the same deduced directly from the same points by geodetic methods. The result has been a careful recomparison of the positions of many points at various distances, amounting in extremes to several leagues around Moscow, deduced by both geodetic and astronomic methods; and it has come to light (to pass at once to a result), that the plumb line, at all points around Moscow, but chiefly along lines to the north and south of the city, is *deviated away from it*, the greatest deviation being produced at about twelve kilometres distance from the observatory. It follows from this, that beneath the almost unbroken rolling plain upon which Moscow is situated, either there are mineral masses of enormous bulk and density around the city or there are masses of extremely low specific gravity directly beneath it or there is an actual cavity—*i. e.*, no solid matter at all beneath it. According to M. Schweitzer, the Assistant Astronomer of Moscow, this deficiency of matter, supposing it all of the mean density of the earth's superficial crust, must equal in bulk a cube whose side is one fifteenth of a mean degree of latitude. That is, taking the mean degree at 45° as 60,752 fathoms, as calculated by Lambton, there is probably a cavern somewhere at no great depth beneath Moscow equal in bulk to a cube of 2,700 feet. Nothing is more probable, sustained as it is by the character of the subjacent