tion of hydrogen due to the action of sulphuric acid on zinc dust. The case of the cartridge is divided into two chambers, the inner of which is filled with the zinc powder and the outer one with the sulphuric acid, the shot being fired by a blow on a pin forcing out a plug, and so opening a passage between the two chambers. The process is stated to be inexpensive.

In the same Journal it is stated that comparative experiments with compressed and with ordinary powder, recently officially carried out at Wieliczka, ended in favor of the compressed powder.

With regard to the various new forms of explosives, heliholite, mention of which was made on a former occasion, is stated to consist of one part of dinitrobengole and 1.5 part nitric acid, or of one part of nitrobengole and 2.5 parts of nitric acid. It is a dark red to brown colored liquid, and was originally used in thick glass or paper cartridges, but was afterwards employed after absorption by kieselguhr, and in this state it possesses considerable advantages over kieselguhr dynamite, both as regards lessened danger in the firing of gas or dust in collieries, and in producing a greater proportion of large coal; further, it is not so liable to sweat as the dynamite is, and even if the oil does become free, there is not much danger, as it cannot be exploded by concussion. The gasses also, which are produced on explosion are less noxious than those produced by dynamite. Heliholite, however, is liable to become decomposed after the lapse of a comparatively brief interval of time, and its manufacture has consequently been abandoned, another explosive—carbonite—being introduced in its stead. This material, while not being subject to decomposition, possesses all the relative advantages of heliholite, like which it also consists in part of nitrobengole. It is also cheaper than all these other explosives, which, as is stated to be the case with carbonite, do not cause explosions in the presence of ten per cent. of firedamp.

The experiments of A. Kas on the tensile strength of wire drawing-ropes were divided into three classes: 1, new ropes; 2, ropes already used but free from broken strands; 3, old ropes with some strands broken; this third class being again subdivided in connection with the position of the broken strands. A large number of experiments were made with several varieties of ropes and the results are given in tabular form. The author remarks that his experiments show that the tensile strength of the wire used in the manufacture of wire rope, far from being diminished, as has been supposed, by the twisting together of the wires, is, in reality, somewhat increased by that operation.

In a paper recently read before the Mining Institute of Scotland, Mr. A. Hill describes the Rio Tinto mine and discusses generally the mining industry of the province of Huelva, in the south of Spain. That portion of the province through which the mineral zone of the Sierra Morena passes is about 100 miles long and 40 miles in breadth, and it consists principally of Palæozoic schists associated with felsitpathic quartz, porphyry, and granite. Ores of copper, lead, zinc, and manganese, are found in considerable quantities. There are large masses of cupriferous iron pyrites and the more important ones, at Rio Tinto and elsewhere, are all worked by open-cast, although in several of the mines ordinary pillar and stall work is also carried on in those portions of the mass where the over-burden was too deep to be cheaply removed. The deposits at Rio Tinto are fully described, as are also the methods of mining adopted, and the metallurgical treatment of the ore. This last is very simple as it chiefly consists in heap-roasting and then washing out the copper sulphate, the copper being thrown down by iron.

In another letter read before the same Institute Mr. J. S. Dixon gives the results of a large number of experiments he has made at the Bute Colliery on the subject of the amount and mode of occurrence of subsidence and draw from working the coal. The examination related to the working of the Ell coal, which the author states was worked stoop and room up until the middle of 1881, when stooping was begun, but it was some time before it reached the line along which the section was taken. The excavation, which is complete, averages 5ft. 6in. in height and the superincumbent strata are allowed to fall and to fill up the space thus made. The experiments showed that the subsidence attained its maximum towards the centre of the excavated space, and that it gradually diminished in either direction. The wave of maximum subsidence regularly followed the working face and at an average distance behind it of 186 ft., this being equivalent to 1 ft. horizontal for every 3¼ ft. perpendicular. The country rock is generally of a firm nature, and the surface chiefly boulder clay. In describing, before the Manchester Geological Society, the section of a shaft sunk through the middle coal measures at Parkside Colliery, Ashton-Under-Tyne, Mr. G. Wild mentions an interesting discovery of calamites, at a depth of 640 yards from the surface, the shoots of many of which were still attached to what, the author considers, were undoubtedly subterranean rhizomes.

A. Iwan describes in the *Oesterreichische Zeitschrift fur Bery und Hüttenwesen* the Val de Travers Asphalt mine, Switzerland. The deposit occurs in the Jura formation between limestone and marl; it has a length of about 10 kilometres and a breadth of 2.5 kilometres. The annual production is about 60,000 tons. The bed has an East-West strike and dips to the South at an angle of from 1° to 3°; it is 5 to 7 metres thick and is worked by ordinary post and stall, the pillars being left 4 metres thick.

F. Hartnigg describes in the same Journal the mining industries of the Upper Feistrity Valley, Styria, and of the neighboring districts. The chief rocks are gneiss and micaceous schist, and in these are found coal and ores of iron, lead, zinc and other metals. Limestone also occurs.

The Mining and Metallurgical Industries of Hungary have, of late, been attracting considerable attention both in Britain and on the Continent of Europe, and in a paper recently read before the Society of Arts, London, Mr. R. H. Brough gives a great deal of statistical information concerning these industries which he gathered during a visit to the Buda-Pesth Exhibition and to the mining districts of Hungary. He states that all mineral deposits of technical value are the property of the Crown, and that prospecting can only be undertaken with the permission of the Government mining authorities; a number of the more valuable mines are worked by the State. Mr. Brough describes the different deposits both geologically and historically, and remarking on the gold and silver mines of Schemnitz, he states that in 1620 they produced as much as 17,000 oz. of gold. The lodes occurring in the Schemnitz district proper are in biotite-trachyte. They course in a north-east, south-west direction parallel to one another and dip 45° to 80° towards east. They are filled with decomposed trachyte, quartz, or calcspar, containing auriferous silver and lead ores, iron and copper sulphides and zinc blende. The dressing works at Schemnitz were constructed by Rittinger, and the most recent innovation is a second stamping of the ore; all that does not pass through a one-fifth inch mesh being automatically treated again. The Salzburg, or Lower Hungarian percussion table is found to be better than the Rittinger continuous percussion table, and although there are at the works three American iron stamps weighing 900 lbs. each, which do as much work as twelve continuous wooden ones, still these latter are on the whole considered more satisfactory. A great deal of statistical information relating to these mines is given by Mr. Brough. This is also the case in connection with the other mining districts of Hungary, and with regard to Transylvania he remarks that the oldest rock of this mining division is crystalline schist, above which is deposited mesozoic limestone and tertiary sandstone, through which burst various eruptive rocks which are traversed by gold veins, the gold being either free or associated with tellurium and sulphur. The largest quantity of gold is found where the rock is of average grain, and where the vertical main lodes intersect the veins with slight dip.

The tellurides from Nagyág are treated by boiling them with sulphuric acid pouring into water, allowing this solution to become clear and then precipitating the silver with hydrochloric acid, and, from the residual solution, the tellurium by zinc. In Transylvania stamps weighing 100 lbs. to 140 lbs. are used in the crushing of silver ores. The heads of stamps are of hard quartz blocks, and it is stated that the quartz answers tolerably well. The metallurgical industry of Hungary is also treated in the paper at some length.

Mr. P. L. Litchauer in an article in the *Bery und Hüttenmännische Zeitung* discusses various questions relating to the mining of the various Hungarian deposits of coal and of lignite. Coal, he says, occurs in Hungary in the carboniferous and Lias beds, lignite being found in the cretaceous and Tertiary rocks. The first colliery in Hungary was opened up in the year 1750, and the author describes at some length both the history of coal mining in Hungary and the laws connected with the subjects which have been, or are now in vogue there.

A translation from the Russian appears in the same Journal of a paper by N. Jossa, of St. Petersburg, on the reasons for the decline of mining and metallurgical industries in the Altaï Mountain District. He describes in detail the different deposit of ore and of coal, and gives statistical information relating to the production of gold, silver, copper, iron and lead during the years 1855-1884.

In the *Revista Minera of Metallurgica* appears a description by A. G. Espin of the mining industry of Portugal, and he describes the deposit of poor copper pyrites occurring at the Santo Domingo mine. This mine is situated at a distance of 14 kilometres from the Guadiana and about 50 from the sea. The ore deposit is of somewhat curious shape, and at its widest part has a width of about 60 metres, and a length of 600 metres. The ore averages about 2.75 per cent. of copper, though the percentage of this metal occasionally reaches 12. The present state and future prospects of the mining industry of Spain is discussed in the same paper by I. B. Vicens.

A series of articles on the mechanical principles of the modern stamp mill, by H. Louis has appeared in the *Mining Journal* and the subject is dealt with at considerable length.