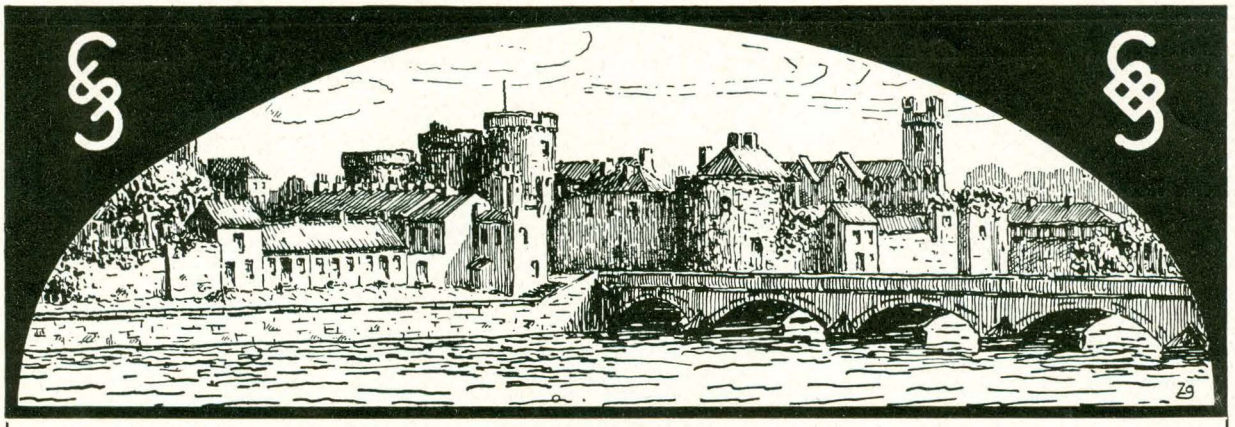

Siemens-Schuckertwerke Aktien-Gesellschaft

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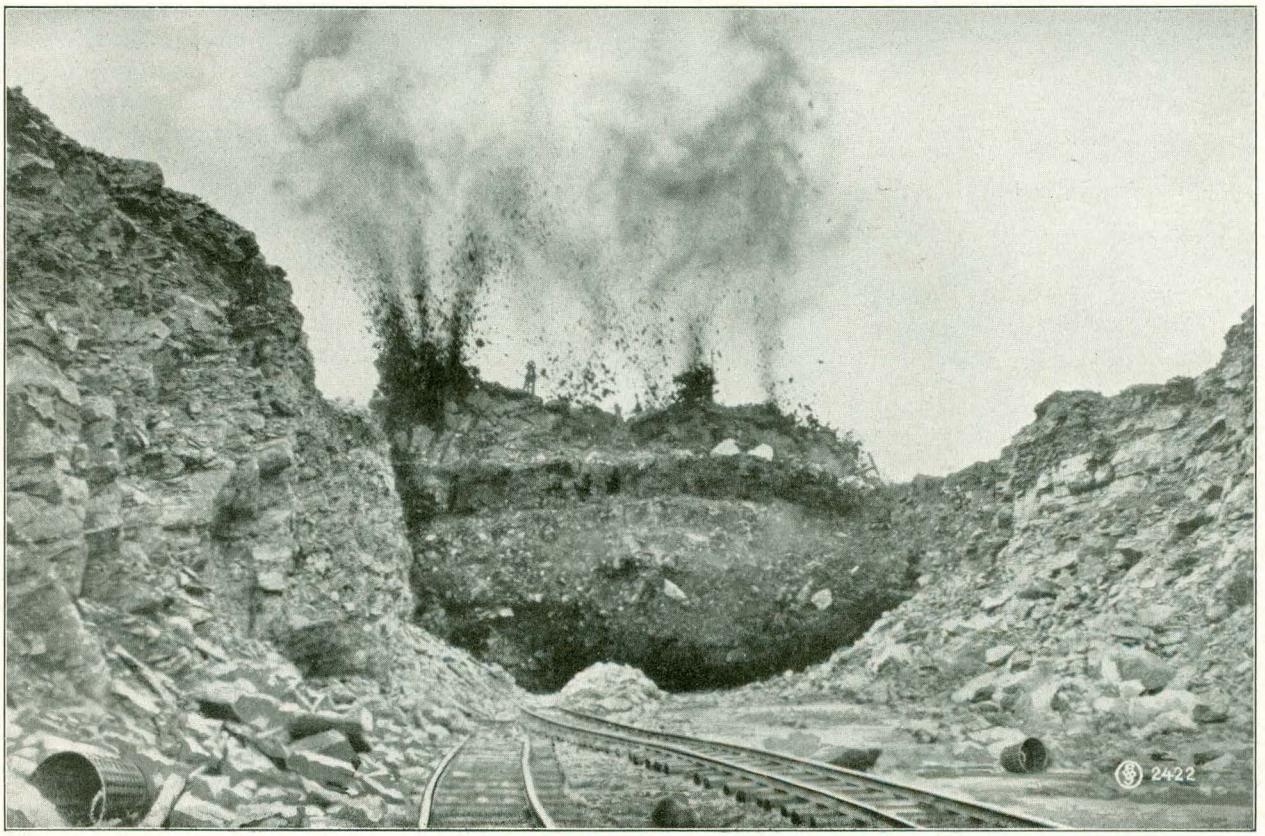
PROGRESS ON THE SHANNON

2nd YEAR MARCH 1928 NUMBER 6

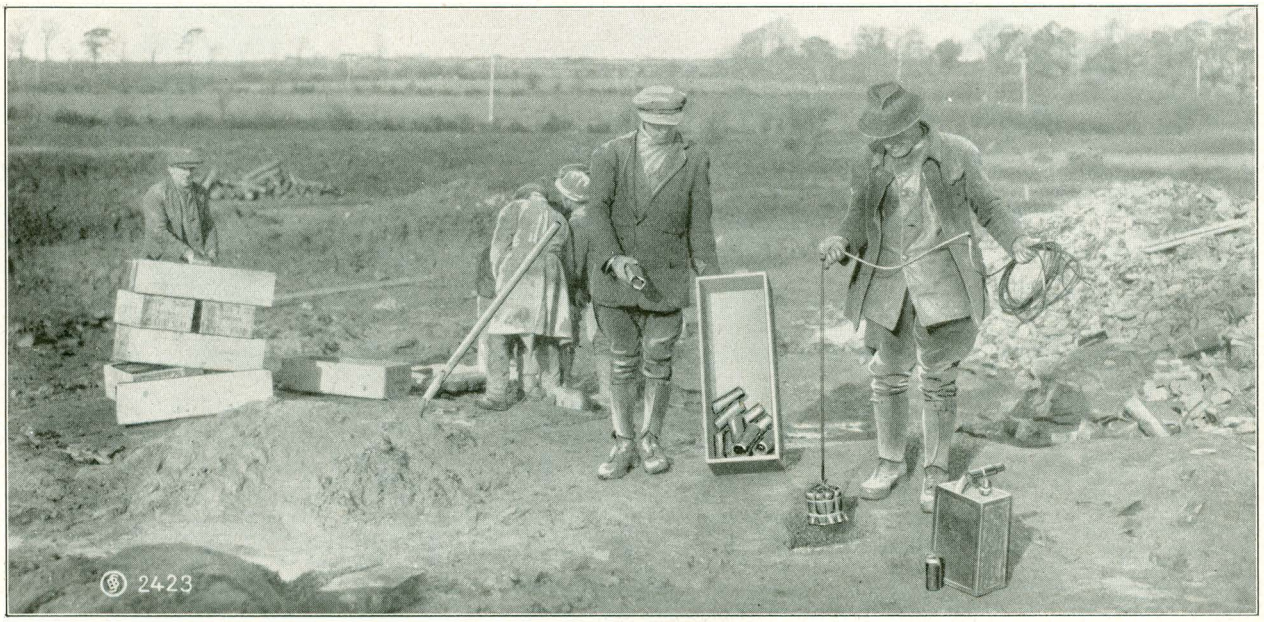
Blasting Operations in connection with the Shannon Scheme

Owing to the very extensive rock work that has to be undertaken, the choice of blasting material plays as important a part as the supply and proper deposition of the plant (boring machines, excavators, rolling stock etc.).

The rock that has to be excavated in connection with the Shannon Power Works is composed of hard limestone and sandstone, partly interspersed with water bearing fissures. In consequence explosive material with the necessary detonators had to be



Rock Blasting



Charging the bore holes

obtained that would be suitable not only for dry bore holes, but also be effective in water. Owing to the extent and frequency of the blasting operations required, the transport over roads in the area of the building site where shaking and jolting of the material is unavoidable, and the fact that the majority of workmen would have no experience in the handling of explosives, it was most necessary that so-called safety explosives should be selected to obviate all danger of accidents. For blasting dry bore holes and breaking-up blocks and tree stumps Ammonite is used, and for wet bore holes and those under water Ammoniated Gelatine. Both explosives are composed mainly of Ammoniated Saltpetre, certain chemicals being added to the Ammoniated Gelatine to make it effective in water.

Rock before blasting

The explosives store is a large isolated and detached hut some distance from the Works, and there is also a smaller detached detonator store. Both these buildings are underground. They are surrounded by earth banks and barbed wire and are under constant military supervision. Both powder and detonator stores are constructed of timber framing with cement walls. The inner timbering is separated from the walls by a 10 cm. layer of air. The floor is constructed on the same principle. This layer of air affords a completely dry

Charging the bore holes

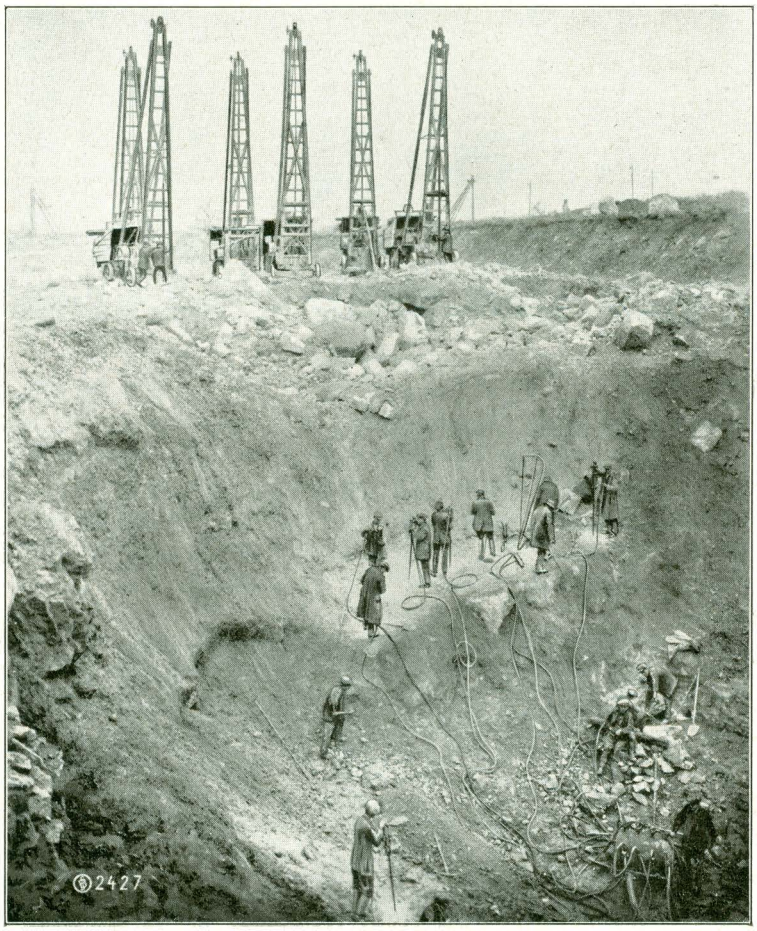
storage for both explosives and detonators. The roof is composed of slates lined with Ruberoid. The buildings are also well protected against lightning by means of numerous conductors. A 60 cm. gauge track, by which the explosives are brought to and from the lorries, connects the store with the nearest road.

According as they are required, the explosives are distributed daily to the various building sites by means of a 1 ton lorry, under police supervision, where they are temporarily stored, until required, in a concrete hut provided with an iron door. Nearby there is a hut where the explosives are prepared for use. This process is a most important one, as the success of the blasting operations largely depends on the careful carrying out of this part of the work. Here the fuses are cut into long pieces of equal length and provided with detonators, the electric detonators being tested by means of an ohmmeter. Here too the primers are prepared for large explosions, which are composed of single charges, provided with several parallel electric detonators. A distinction must be made between the blasting of rock by means of bore holes and the breaking-up of separate rocks by charges above ground. Two kinds of bore holes are carried out.

Rock after blasting

1. Small bore holes made with compressed air hammers about 4 cm. in diameter and of varying lengths according to the nature of the rock.
2. Bore holes made with heavy plant about 20 cm. in diameter.

For the last named bore holes electrically driven drop chisels are used, in connection with the Shannon Works. The bore holes made with compressed air hammers together with the necessary charges are distributed in large or small quantities, according to the nature of the rock and the purpose for which the blasting is being carried out, over the rock that has to be blasted. The bore holes made with large boring plant are much fewer in number, but on the other hand they require larger charges. As we already stated in a previous article (1st Year No. 7) in general 3 bore holes are sufficient for the whole width (22 m.) of the tail race. In one explosion it is possible to break up 1000 cbm. of rock with a charge of 400—600 kg.



Boring with Belgian boring machines and compressed air hammers

The charging of the large bore holes is carried out with a heavy ram rod attached to a pulley on a tripod, which presses-in the separate primers tightly and firmly into the bore hole by lifting and dropping the weight. A special primer, which contains the fuses and is connected by a double cable to the current, is placed on top of the charge. After the bore hole has been charged in this way it is filled with wet clay or water to prevent escape of the gases caused by the explosion. The small bore holes are loaded in the same way with a light ram rod.

Electric detonators are used almost exclusively for the bore holes. This method is a saving in explosives as, by the simultaneous explosion of all charges, the rock is much better broken up than by separate explosions which need a far bigger charge. The use of electric detonators further affords protection against miss-fires when blasting in wet rock, on condition of course that the detonators used are specially made for blasting in water.

The ordinary gutta-percha fuse serves quite a different purpose. This is used for breaking up the separate stones which have been loosened by electric detonating and for removing tree stumps. In cases where no boring plant is available, as for example in earth work, the stones are broken up by means of so-called "flat" explosions. This procedure consists in the explosive being put on the stone, lightly covered over with sand or clay, and then exploded. The stone is broken up by the effect of the explosive power which acts principally in the direction of maximum resistance. This method of blasting causes such a tremendous report that people living in the vicinity of the building site suppose that a huge explosion has taken place. When large blasting operations are undertaken, the explosion is actually only heard in the immediate vicinity owing to the charge being deep set.

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