

of the presence of dust and gas in hitherto unsuspected places. Over 60,000,000 tons of coal were mined last year without the use of black powder, and, indeed, wherever it is prohibited almost the entire product is removed by high explosives of a class known as the "flameless explosives," and called by some the Sprengel explosives, after the inventor, Dr. A. Sprengel.

Here we have a group of mechanical mixtures of two explosive compounds properly proportioned for the necessary chemical reactions, and possessing four desirable qualities of a good powder, being solid, permanent in character, exploded by a detonator, and entirely convertible into gas. Whatever the names by which these flameless powders are known, they contemplate a mixture of a hydrocarbon combustible in a condition favorable for a rapid decomposition and an easily decomposable oxidizer that will not only develop the full energy of the explosive with a freedom from fumes of any sort other than the ordinary products of combustion, but will also be quite free from the projection of flame from the drill hole. Though there may be a variety of nitrated organic substances which will supply the fuel, and di-nitro benzol is the basis of some of them, in every case nitrate of ammonia furnishes the oxygen for supporting combustion.

The element of safety in the use of these explosives lies in the amount of heat necessary for the decomposition of the ammonia nitrate, and in the chemical reactions which are set up at the time of ignition serving thus to reduce the temperature of the gaseous products of combustion, and finally to prevent the formation of flame. It is not necessary to do aught here but to name the best known compounds belonging to this group, for you are familiar with their composition and behavior. Ammonite, bellite, roburite, and securite possess the requisites of a safe blasting agent. Safety is of greater importance to us than are its ballistic effects, and in this class of explosives we have the nearest approach to something safe for mining purposes.

This class of explosives has been examined by numerous committees and commissions, has been the subject of scientific investigations, had strong official endorsement from those who were using it in Austria, Belgium, France and Germany, and it seems a fitting time for American miners to take hold of the subject for the betterment of our mines. The powder is safe to handle, neither element will ignite by heat, flame or electricity. Compare that with the dangers coming from the careless use of black powder. Observe the possibilities of reducing the accident record from premature blasts. It is safe and rapid in action and requires a specially powerful detonator for its concussion to sufficiently divide the elements into their molecular state for quick decomposition into expansive gases. Observe how this will eliminate from our list accidents from picking out mis-fires. Again, the products of combustion are non-inflammable and non-poisonous, with a temperature of explosion as low as is compatible with rapidity of action. What a blessed relief its introduction would afford us.

True, it is not strictly flameless, but that should not debar it from favor here. That it is less liable to flame than is powder is true, as also that the constituent, common to all members of the Sprengel class—the nitrated ammonia—is deliquescent, and in absorbing moisture from the air deteriorates in quality. This may be remedied by dipping cartridges in nitrated resin or by keeping the two combustibles separate until required for use when they may be mixed in proper proportions and loaded. In this regard the safety explosives are all alike as also is the oxidizing element. So that when comparing the several members of the group with a view to selection of the best, that one will be advised which has a hydrocarbon in the most decomposable form. It has been said by an eminent authority that "the Sprengel explosives are as far ahead of black powder as the Davy lamp surpasses the naked light." It is only a question of a short time when they will receive universal adoption. Until we have taken every possible precaution we are not absolved from the responsibility of accidents and explosions arising from the various sources of fire. At present we fall short of fulfilling the requirements which recent valued reports of eminent committees have shown to be necessary for safety. We must discard the present explosives not possessing self-extinguishing elements and substitute therefor agents which are free from the dangers specially attending the use of those explosives, and this can be done without the sacrifice of efficiency as may now readily be understood.

I concede that there do exist places in a mine the atmosphere of which is positively unsafe for any explosive. Then the fault lies with the condition in which the rooms are and if there is not a possibility of affecting a change of method of work from pillar and room to long wall, slaked lime might serve or a vigorous watering might be resorted to, though the latter to my mind has proven a delusion and a snare, so far as any evidence of beneficial results is concerned. During periods of rapid atmospheric depression blasting operations should be conducted with the greatest caution if not actually suspended. Such a suspension is practicable if the shooting is entrusted to a skilled workman. The use of central-fire cartridge and a magneto-electric battery with safety explosives would virtually remove the item of explosion accidents from the mine inspector's classification by leaving only one source of flame to endanger the mine and miners. As tending to the same end I venture to commend the installation of coal cutting machines not only on the score of the increased economy of labor and power but on the score of specializing the remaining operations involved in the removal of coal—one man having charge of the blasting operations only.

These may seem drastic measures and objections will doubtless be set up against them, but history repeats herself and the opposition will succumb to the inevitable. What has been accomplished in the installation of nitroglycerine for rock work will be effected with nitroglycerine and Sprengel explosives for coal. A sound, practical, scientific progress will have been recorded when more active measures are taken also to regulate the manufacture and use of all kinds and grades of permissible explosives. We deceive ourselves when we place entire reliance upon a copious supply of ventilating air with its consequent high velocity for the most markedly conspicuous feature of all extensive catastrophes of this nature is the fact that roads which are not haulage ways, and through which the air courses at only moderate velocities, are exempt from the effects of explosion.

If we relax our vigilance and fail to remove every possible source of flame we lull our fears to rest and are apt to pay the price later. "Eternal vigilance is the price of safety" has long been the motto of the mining engineer. There is no industry in which all engaged have so active a mutual interest as in mining, and none in which officials, employees and owners co-operate, appreciating that a safe mine is a healthy mine and a secure investment. Mining of to-day is hardly more hazardous an occupation than railroading. If the accidents are localized by employing a restrictive energy at the point of origin of the fire it will become a comparatively safe pursuit.

The Byron N. White Co. Pays Another Dividend.—At a meeting of the Byron N. White Company, held at Milwaukee this month, a dividend of 10 cents per share (\$100,000) on the capital stock was declared due and payable at the Milwaukee office on September 1st, 1896. This is the third dividend paid by this company since August last, when \$50,000 was paid. Again, in May of the present year, \$100,000 was paid, and now \$100,000 more, a total of \$250,000 in a year. It is the intention of the company to pay these dividends every three months.

GENERAL MINING NOTES.

(From our Correspondents.)

Nova Scotia.

With the end of next month (September) the fiscal mining year of this Province ends, and the compilation of that wonderful production, "The Report of the Department of Mines, Nova Scotia, 1895-1896," will be started, and we would like to say a few words on the subject, more particularly in the interest of the gold mining industry. During the last year some few of our mines have given some very consistent and handsome returns, and we would suggest that instead of the usual notice each mine gets, (of which the following is typical—"Nova Scotia Gold Mining Co., Montague: W. R. Thomas, Manager; William Collins, Underground Manager. Thirteen men employed, working on the Wolfe lead, down 160 ft., driving west. This mine was full of water at the time I was there, and the manager absent, consequently I could get very little information regarding the mine."—that an account showing the amount of quartz crushed and the average yield of gold be given, also the average number of men employed and a short and intelligent account of the method of working, and the geological formation of the district.

The notice each mine received in last year's report could serve no useful purpose whatever, whereas if our suggestion were followed with regard to the more important mines, and a short and concise account giving figures which would show the production and approximate cost of working, of the smaller mines, the report would make a very useful book to circulate amongst people who would be likely to take an interest in the industry, and would be the means of bringing much needed capital into the Province for it. We would also once again urge the miners to make a point of giving in their returns up to the end of September at the earliest possible date, in order that respective districts may have the full credit of all the gold they produce.

We would also suggest that the state of the timbering and ladder-ways be omitted from the published report; it serves no useful purpose and makes very poor reading matter.

We recently paid a visit to the Stormont district and found the 40 stamps at the Richardson in full swing. The size of the lead continues to hold out, while the workings demonstrate the formation of the lead very prettily. The shaft-house is situated on the apex of the anticlinal at the eastern end, shafts being sunk on both dips; the lead has been worked right around the eastern curve of the anticlinal, connecting the two shafts; it is therefore possible to go down the mine by the shaft on the north dip, through the workings, and come up by the shaft on the south dip.

There is very little work going on at the Country Harbor mines, both the St. John and the Antigonish mines being idle. Mr. J. C. McDonald is doing some development work and reports prospects as being favorable.

At Modstock work is being pushed forward energetically. The mine yielded 172 oz. last month.

The mine at Forrest Hill, on which Mr. J. C. McDonald has recently given up the bond, is now being worked by Mr. Sweet, of Cross Roads, Country Harbor.

Mr. F. H. Mason recently paid a visit to the Richardson mine, making a number of assays of the tailings. Mr. Mason has also made a report of the Barrachois Mine, Wine Harbor, in the interest of parties in England.

The North Brookfield mine is still keeping up its splendid record. It produced 396 oz. of gold from 470 tons of ore last month.

Mr. W. A. McKim *et al.* have been prospecting the copper deposits at French River, near Tatamagouche, Colchester County. They have taken out some 40 tons of stuff, which it is reported give assays of from 8 to 79 per cent. of copper, and it also at times contains appreciable quantities of silver and gold. Prospecting for copper has also recently been done on French River, Colchester Co.

The Barrachois mines at Wine Harbor has been returning some steady yields, although only worked in a very half-hearted way. In June this mine yielded 56 oz., and in July 72 oz., the ore averaged more than half an ounce of free milling gold to the ton.

The losses of refractory gold in the tailings is occupying the attention of several of the leading mining engineers in this Province. The general tendency of the mine owners is, however, to play a waiting game, and we are afraid very much will not be done until Mr. Libbey's plant has proved the success which we feel certain it will do. The following petition has been presented to the Government, signed by the majority of the leading mine owners in the Province. The petition had to be sent in hastily in order that it might be received before the late Premier, the Hon. W. S. Fielding, retired, and it was therefore not signed by some few people to whom it otherwise would have been sent:—

HALIFAX, N.S.

HON. W. S. FIELDING,

Provincial Secretary, Province of Nova Scotia, Halifax.

Dear Sir,—We the undersigned, all interested in the gold mining industry in Nova Scotia, respectfully ask to have the royalty of 2 per cent. removed from all gold recovered from tailings or concentrates by the chlorination process, until 1902, and in doing so we beg to bring the following facts to your notice:—

(1) The gold from which we desire to have the royalty removed is at the present time entirely lost to the Province, hence the removal of the royalty will in no way decrease the revenue. On the other hand the encouragement of the chlorination process will assist mines which are now shut down or about to be shut down to re-open, and the royalty from the free gold will increase the revenue.

(2) The chlorination process, as used in most other gold mining countries, has stood the trial of over thirty years and may be used by anyone without paying royalties to patentees. We are therefore not asking you to foster any patent or untried process.

(3) We believe that Nova Scotia is the only gold mining country with an average yield of gold in excess of 20,000 oz. per annum where the chlorination process is not used.