

## THE UNDERGROUND GASIFICATION OF COAL.

By CYRIL S. FOX, *D.Sc., M.I.Min.E., Geological Survey of India.*

The subject of the underground gasification of coal has been receiving a great deal of attention in the U.S.S.R. for the past five years and although two years have now passed since I was in Russia and made personal enquiries, there has still been no report of the process operating in an established manner.

It will be of interest to review the history of the Russian efforts. They claim that Mendelejev recommended the idea independently of the English chemist Sir William Ramsay who is believed to have suggested this method of using coal. As I have not seen the original reference I am unable to say what was suggested.

The Russian experiments, so far as I could gather, arose in a logical way as a result of necessity. Owing to a great shortage of wagons they found considerable difficulty in supplying the demand for coal for various important industrial centres and power stations for manufacturing plant.

The policy they adopted was to send coal by train to the more distant consumers and to prepare gas at the collieries and pipe this fuel to the nearby steam-raising plant. The success seems to have been complete as Moscow was to be supplied with gas in this way from Tula, 100 miles away.

Many ideas have followed for the complete gasification of coal at the collieries where producer and other gas works were established for the generation of gas and plans were made for elaborate distribution of this gas by pipe lines to the power stations where the gas is burned under boilers.

The idea of having the gas producers at the bottom of shaft, that is underground instead of on the surface, was obvious as this would save the haulage of the coal and the disposal of the clinker and there would be some economy in expenditure to say nothing of the novelty of the thing.

The zeal to do better and better with regard to bold schemes is a feature of Soviet Russia and so Mendelejev's idea was revived and the astonishing daring of the operation made it a popular thing and thus it seems that permission was obtained to burn the coal *in situ* for gas.

All the details I was able to secure show that complete gasification of the coal seam is aimed at but I was unable to arrange a visit to any of the Podszen gas plant. It was explained to me that it was essential to have absolute control over the air and steam supply and gas produced.

From what I could gather the investigations are being made in coal seams which are relatively thin compared with what we have in India, and it is evident that there must be no old workings or breaks and faults through which the gas can escape into the adjacent workings or to the surface.

When I think of the 24-foot and thicker seams in India and the large percentage of coarse sandstones which overlie the coal seams and remember the ease with which water percolates in the joints of the strata in the Gondwana coalfields I cannot imagine how gas cannot escape.

If any proof was needed that underground gasification of the coal, as it stands in the seams, is likely to be a failure in India, owing to the ready escape of the gas through the porous sandstones and the points and fault planes, it is clearly before us in the Damodar Valley coalfields.

You will remember the numerous peridotite dykes and the large areas of so-called 'burnt' or coked coal in many seams in the Jharia field and elsewhere, and the estimate that many millions of tons of coal had been spoilt by igneous intrusions which have produced natural coke.

Have you considered how much gas must have been distilled by the coking of the coal? Where has it all gone? We do not even find any good evidence of the liquid products of distillation. And yet that coking was effected in the virgin seams long before an incline was driven or a shaft sunk.

I do not mean to imply that the gasification of coal in proper producers is not feasible underground in Indian collieries especially in poor quality coal seams but I believe the total thermal units which the gas could provide will be less and cost more than what could be secured by using the coal in pulverised form.

However, these are aspects for closer consideration in power generation and it is quite possible that complete gasification of coal in properly constructed gas producers may be efficiently performed and the gas piped away to nearby consumers or supplied to a great electrical power station at very cheap rates.

It is a question of the cost of the powdered coal and efficiency of the boiler combination on one hand against the cost of the gas and the efficiency of boiler combination on the other hand—*i.e.* on the cost of the powdered coal for doing the same work as the gas fuel at a given cost.