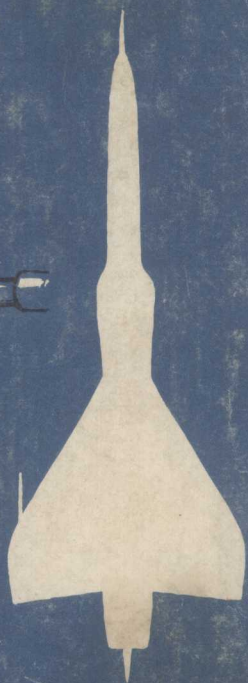
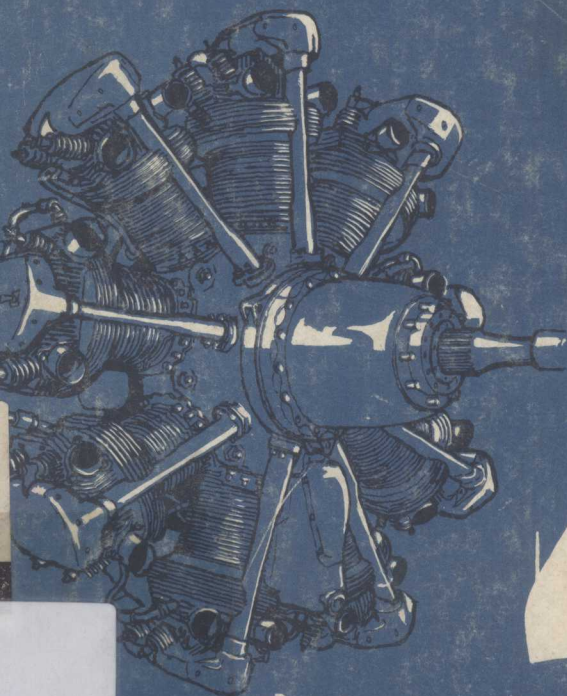


大学
资料
Power and
Progress

G.C. Thornley



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POWER AND PROGRESS

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by

G. C. THORNLEY, Ph.D., M.A.



暨南大学外语系资料室



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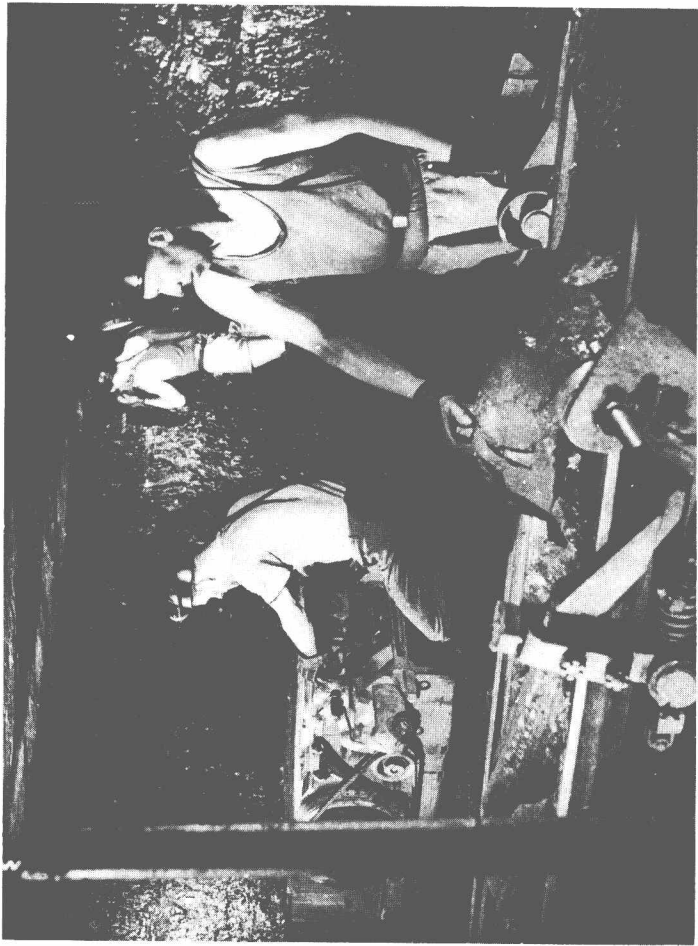
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(By courtesy of the National Coal Board)
Miners at work in a gallery of a British coal-mine

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CHAPTER I

Coal

THERE are many people in the world who seldom see a piece of coal because they live in a warm climate. But even if they never use coal personally, their lives are affected by it in countless ways. The importance of coal is not very apparent to those who rarely see it. They manage to get on well enough without it, and perhaps wonder why the rest of the world cannot do the same. It is difficult for them to understand why a shortage of coal should be so disastrous to the whole world.

Very little thought, however, will convince them of the importance of coal, and show them why, in manufacturing countries, a shortage of it is a national disaster. In most countries of the world coal is still the chief source of power. Trains run on coal; one load of coal will take a heavy train a long way. A small lump of coal gives off a surprising amount of heat.

But coal does far more for each of us than supply the necessary heat to move our trains. Almost everything around us has some connection with coal. Much of the food we eat has been transported either by steamship or by train, perhaps by both. Most ships are still driven by coal. Every bit of metal in sight, the nib of a pen, the frame of a desk, the pin in a coat, the telegraph wire outside in the street, was once molten metal running out of a furnace heated by coal.

The electric power that turns the wheels of industry is,

in most cases, coal power in another form. It is usually coal that drives the dynamos which produce the electricity. Power cannot be created out of nothing, and all the electric power used to-day was originally either water power, oil power or coal power; and most of it was coal power.

Coal has a nickname. It is called "Black diamonds," not because, like diamonds, it is mostly carbon, but because it is as valuable as diamonds. We could easily do without diamonds, but we could not do without coal.

* * * * *

After the last great war there was a shortage of coal in Europe. In the Ruhr, the industrial heart of Germany and of Europe, great damage had been done. Whole towns had been destroyed by bombing and many of the coal mines had been extensively damaged, especially the buildings and machinery above the ground. Many of the miners had gone into the army; thousands were prisoners of war, and thousands would never return home. The mines were restarted, but for many months the output of coal was very low and it was not sufficient for Germany's own needs. There was little to spare for the rebuilding of Europe. Millions of people were cold, and thousands died during the first few winters following the war, owing to the shortage of coal.

The output of coal in Germany and in Britain rose only slowly. One reason for this is the fact that mining is hard work and the miner must be well fed. After the war, most of the population of Europe was underfed, and millions of people lived in a state of semi-starvation. The Ruhr miner could not have worked very hard, even if he had wanted to do so. And he did not want to do so. There was little that he could buy with the wages he received; even food

was scarce, and the shops were empty of consumer goods, all the goods that make life worth living. He received more food than other people but it was insufficient for a labourer. He had not enough strength for hard work. As soon as more food was shipped from America, the output of Ruhr coal increased.

The industrial prosperity of Britain was built on coal. She has always been rich in coal and iron, and as they are found near each other it costs little to bring one to the other. This was a great advantage when Britain began her industrial development. She soon became the workshop of the world. She produced more coal than she could use and had a good surplus for export. This surplus brought in money from overseas and increased the national wealth. Some of the best coal in the world, anthracite, that burns hotly with little smoke, is mined in Wales. It finds a ready market all over the world.

But British mines are not what they were. They are old. When a mine is new, the coal is near the surface and its extraction is fairly easy and cheap. The deeper the mine, the higher the cost of mining. Coal is found in layers called seams. If the seam of coal runs a mile below the surface of the ground, then the mine must be a mile deep. The passages underground, usually called galleries, may run for miles. In one mine in the north of England, where a recent disastrous explosion caused the loss of more than a hundred lives, the galleries run out for six miles under the *sea*. Thus the miner often has to travel long distances underground before reaching the coal face, which is the name given to the place where the coal is cut. A little railway carries him to the coal face, but even so mining in these circumstances is difficult and expensive. In many mines much of the work of cutting the coal is done by machinery, but in Britain local difficulties often prevent the

full use of cutting machinery. For this reason the output of the American miner is greater than that of the British one. For the first time in her history, Britain, whose wealth was largely founded on coal, had to import some herself in 1947, and again in 1950.

It is a very serious matter when an industrial country runs short of coal. In the first place, nearly all houses in Northern Europe are heated with coal. An ordinary workman's house needs about a ton a year to keep the family warm and to cook the food. It is usually bought in small quantities which last a week or two. When the coalman reports that he has no further supplies, the unhappy family gathers round a half-dead fire in the evenings, and shivers; for in cold countries the fireplace is the centre of the home, the place to which everyone returns. A home without a fire is no home at all in cold weather.

A shortage of coal leads to a shortage of electricity. Most modern factories depend largely on electricity, and when the current fails the wheels stop turning. Work may be possible only four or five hours a day; output and wages fall; prices begin to rise. The workers go back to cold homes, where also the current is cut off during certain hours. Railway and other services are reduced to save fuel. It is a universal calamity.

Throughout the world to-day, there is an enormous demand for coal. In Europe it is needed for rebuilding the ruined cities; for not even bricks can be made without it. Industries must be restarted and expanded, and this cannot be done without an ample supply of coal. There is still a shortage of consumer goods throughout the world; prices are high and quality is low. Goods will not become cheap again until the shops are full, and only when supply meets demand will the cost of living begin to fall.

In Britain, there are other things besides the age of the

coal pits to account for the fall in output. Coal mining is a dirty and dangerous occupation, and one that has not paid good wages in the past. For many years few young men have been attracted to the mines. They have preferred to look for other work. Their fathers and mothers have urged them not to go down the mines, but to look for cleaner, better paid, and less dangerous occupations. Many of them have been successful in finding such jobs. As the number of newcomers to the mines decreased, the average age of the miners began to rise. A miner whose age is twenty-five can produce far more than one ten years older, for mining is hard work and needs young, vigorous men. In Britain, not only are the mines old, but so are the miners. The government is now taking steps to make mining more attractive. Many foreigners are finding in mining a chance to make a better living than they ever made in their own countries.

To try to restore mining to its old place in Britain's economy, new laws have been passed. All the private owners of mines have been bought out, and the mines are now national property: they have been nationalized. The miner no longer works for a private owner: he works for the country. The hours of labour have been decreased and a five-day working week has been introduced. Those who absent themselves from work on frequent occasions without just cause are being dismissed. Wages have been raised and up-to-date machinery is being brought into the pits. Young miners are given periods of free training, to fit them for their work.

Many people, especially those who were the owners, disapprove of the nationalization of the coal mines. But no political party had any sensible plan to improve the conditions of the mining industry other than nationalization, and everyone realized that Britain's economic recovery

would be impossible without a reorganization of some kind or other.

* * * * *

One may wonder why anyone in his right senses becomes a coal miner. Yet it is the natural occupation of most boys born near the coalfields, just as farm work is the natural occupation of those born in an agricultural district. Ordinary people have little choice of occupation. When they leave school, they look for work that will enable them to live at home. The natural fate of a miner's son is to be a miner. We cannot choose our own parents; if we could, most of us would probably prefer them to be millionaires or ministers. Fate or luck plays a great part in our lives.

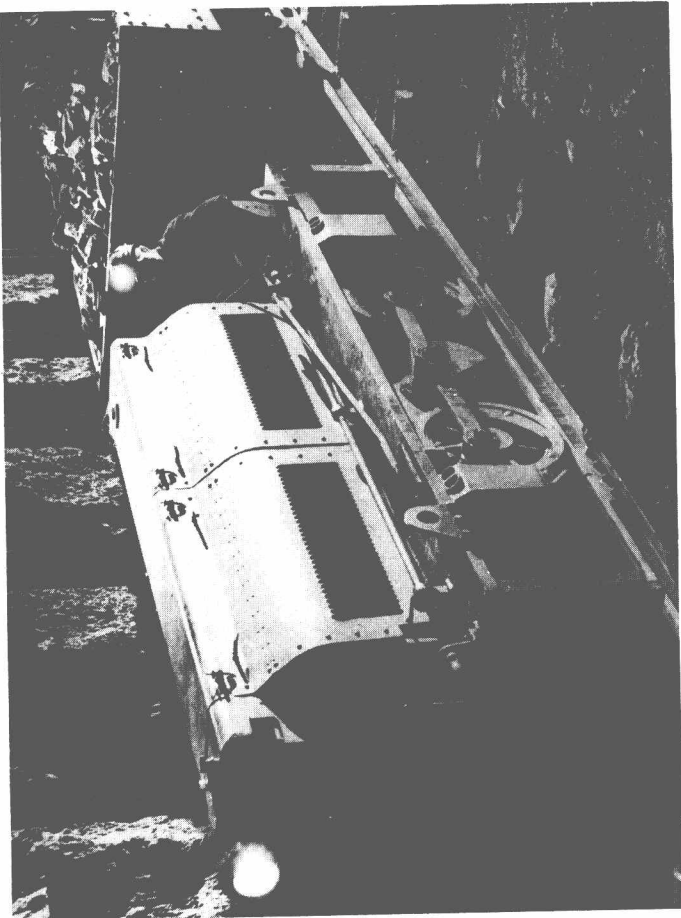
We should, however, remember that the miner does not live a life of perpetual dirt, work and danger. When he comes to the surface at the end of a day's work, he is certainly tired and dirty. The whites of his eyes shine strangely from a face blackened with coal dust. But after a bath, a change of clothing, a meal and a rest, he is a different man, and ready for a visit to his club, the football field or the cinema. Miners are fond of all kinds of sport. If they do not play themselves, they eagerly follow the fortunes of those who do. They are fond of betting, too, and every horse-race that is run takes money out of some pockets and puts it into others. In good times they live cheerful, ordinary lives. They are accustomed to the ever-present danger in the mines, and accept it as a natural part of their existence.

A modern coal mine is a wonderful example of man's skill and courage. To go down a mine is rather alarming the first time. You enter a lift called a cage. Suddenly the bottom seems to fall away under your feet and you feel your heart rising into your mouth. You find yourself

falling, falling, farther than you have ever fallen before. When the cage slows down and stops, you have come to the first level, but you do not get out yet. You are going down much farther, a quarter of a mile farther down. Again the cage stops and you walk out. It is better not to think of the amount of earth and rock that is now above your head, or of what would happen to you if it fell in. You find yourself in an underground town with offices and streets, all lighted with electricity. To reach the coal face, you must go for a long ride in a little waggon, one of the waggons that carry the miners about the mine. The waggon may be drawn by a diesel locomotive, but in some pits ponies are still used, little horses whose work is to pull the loaded waggons from the coal face to the bottom of the shaft.

The mines are much safer places than they used to be. The chief danger comes from gas. There are pockets of explosive gas in some of the coal seams, and when this escapes it is liable to explode. A spark made by a miner's boot kicking against a piece of iron may be sufficient to explode the gas. In the old days, when all the miners had to carry lamps, the invention of a special safety-lamp reduced the number of accidents. Nowadays electricity is used to light the mines and safety-lamps are not needed so much.

Whether work is going on or not, the safety staff is always on duty. This is a body of men whose work is to preserve the safety of the mine and of all who enter it. Water and bad air are two great enemies. Water pumps must be kept going all the time, because if they stopped for any considerable period, many mines would be flooded. Fresh air is always being pumped into a mine, and bad air pumped out; proper ventilation is absolutely essential. It is interesting to note that many mice are used in mines to



(By courtesy of the National Coal Board)

A Diesel engine used for pulling waggons in a coal-mine

detect the presence of gas or poisonous air. As this is usually heavier than ordinary air, a mouse in a cage on the ground feels its effects before a man can feel them. A little bad gas will kill a mouse in a cage; its death indicates the presence of gas, and precautions are immediately taken.

What is coal? It is the remains of huge forests that long ago lived, died and fell, were compressed and heated, heated and compressed, during immense periods of time. The power that is in the coal and that turns the wheels of progress came from the sun in past ages. The heat given out is the sun's heat, heat that was radiated from the sun millions of years ago and stored underground, until man appeared on the earth and, in the course of time, started to dig it out.

CHAPTER II

The Steam-engine

WHEN was the steam-engine invented and who invented it? Many people would answer that James Watt did so in the eighteenth century. There is a story that when he was a boy, James was sitting by the fire one day watching the kettle boil. He noticed that the steam from the boiling water moved the lid of the kettle, and this set him thinking how powerful the steam was. While he was sitting there deep in thought and gazing at the kettle, his aunt came in and blamed him for wasting his time when he ought to have been studying his books. She was wrong to be angry with him, however, for in later years James Watt became one of the most famous makers of steam-engines in the world.

This is a pleasant story; but it is a fact that the power of steam was known more than 1,800 years before Watt was born. In 130 B.C. a small machine driven by steam was made by Hero, a man who was greatly interested in all kinds of mechanics, and who lived in Alexandria. He made a famous toy, a kind of ball which was turned round by steam. It can hardly be called a steam-engine, but it shows that men have been aware of the power of steam for at least two thousand years.

No real progress, however, seems to have been made in the development of the steam-engine until the seventeenth century, when men began at last to realize how useful such a machine could be. In 1698 a man named Savery con-