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COAL CONSERVATION IN GREAT BRITAIN

IT would be difficult to overstress the importance of making the maximum use of the available coal in Great Britain; our survival as a first-class nation may indeed come to depend on the answers we give to some of the fundamental questions concerning the proper use of coal. Individually, they are well understood, and there is no great divergence of opinion as to the facts. Collectively, there is a lack of agreement as to policy, and a strange and fatal apathy on the part of Ministries and the fuel industries. This lack of understanding in the past has in no small measure brought about the present unfortunate and serious state of affairs, where confessedly we are unable to supply the consumer with our only native mineral, albeit the demand is less than in peace-time.

Certain aspects of the problems were referred to by Mr. E. V. Evans, the present technical leader of the gas industry, at a meeting of the Fuel Luncheon Club held on December 17 last. It is perhaps worth while directing attention to them, as the subject above all needs impartial discussion on a platform free from the sectional interests of the various coal-using industries.

Britain's world predominant position was built on coal; until the War of 1914-18 both coal and transport were cheap and only the very few were concerned to use coal economically. Bad habits persist, and it is a safe guess that at least 20 per cent of the coal used by industry in Great Britain in 1939 could have been saved by attention to methods of fuel economy. A committee of fuel technologists under Dr. E. S. Grumell is known to be at work to effect this saving.

The question before the public is how they shall obtain the heat, light and power they need in their daily life: from raw coal, gas or electricity? The three forms have been long competitive for the favours of the householder, and the tempting prices charged are not always fair. There can be no justification for price structures that put a tax on consumers who *must* use the commodity in order to subsidize adventure in markets that, in themselves, are uneconomic.

Surely, the various branches of the fuel industry should become complementary parts of one whole. This is the essence of the problem of co-ordination, and the solution can only be achieved by the findings of impartial judgment, sifting and balancing the advice of experts. The fuel industries themselves should be preparing for such comprehensive co-operation, which indeed has been largely achieved in certain American cities, but so far there is no sign of such vision in Great Britain.

The householder of the future will require to use both gas and electricity and perhaps some solid fuel for water and space heating. The old-fashioned coal fire grate, using raw coal and sending all the tar products and most of the heat up the chimney, is an anachronism. Surely it should be forbidden as a

wasteful apparatus under the new fuel order announced on December 28, for only some 20–25 per cent of the heat in the coal reaches the room. It is responsible also for the smoke pall, for fogs and for the decay of stonework, metal and textiles. Until November 11 last, many of the present generation had never seen a London fog and realized what burning raw coal involved. It is criminal also to waste the raw hydrocarbon material present in coal tar. Great Britain has no native oil, a handicap the extent of which we have yet to realize, and it should be insisted that every ounce of tar is recovered and used as the raw material for motor-fuel and chemical industries. Perhaps the day may come when all coal, whether used for domestic or industrial purposes or for making electricity, is carbonized before use. Petroleum may well become scarce or we, as a nation, so poor that we cannot afford to buy it.

Light will be supplied by the electrical industry and should become cheaper, better and capable of decorative development as the lamp improves. Power applied to small units is also a matter for electricity. The cooking and individual heating load is claimed by gas, and the share that electricity is to take requires settlement. Water heating and central heating are best done with coke, for which they provide a valuable outlet. Both gas and electricity claim to heat small quantities of water.

It is quite clear that from the scientific and national point of view the burning of raw coal by the domestic consumer should be discouraged: a point not previously mentioned is that the transport and delivery of solid fuel to each household and the collection of ashes are wasteful factors. Rubber, petrol and man-power are scarce now, but however plentiful they may become they should not be wasted.

Both gas and electricity are 'on tap' in the home; the onus of maintaining an efficient load factor is thrown on the companies. The annual hourly load factor of the gas industry, that is, the relation to the plant required to meet the maximum demand, is of the order of 17–20 per cent. Fortunately, the provision of the gasholder makes it possible to even out the load to 50–60 per cent. The load factor of the electricity companies is 30–35 per cent: they can store steam but not electricity.

Both industries seek to obtain off-peak loads, presumably each from the other. Both have made great strides in economic production. Since 1916 the consumption of coal per horse-power hour for power has dropped from 5–7 lb. to 1½ lb. The gas industry has increased the thermal efficiency of its process to about 80 per cent and increased the total amount of heat supplied by 13 per cent in the last eighteen years in spite of competition by the electrical industry. The replacement of the coal range by the gas cooker has involved a saving of some 15 million tons of coal a year, besides an enormous relief to the housewife.

As regards the future, the coal industry is endeavouring to design appliances that shall burn coal without smoke; the gas industry is preparing to demonstrate how greatly the interests of the nation and of the consumer will be served by the extended use of gas for space heating and water heating; and

the electrical industry, always growing more efficient, is interested to take over such proportion of these loads as can be supplied remuneratively.

Some measure of guidance and of collaboration is necessary. In this, coal conservation must be included as the predominant factor. The appliances and methods that were in common use before the War and are in use to-day show striking differences in the amount of coal that has to be consumed to give *equivalent service* by different methods. According to Mr. Evans, for most domestic uses gaseous fuel shows a saving of some 40 per cent compared with either raw coal or electricity. Clearly we must try to establish and work to a sane national fuel policy, so that the resources of material and man-power in Great Britain are not wasted.

MEDICINE FOR PHILOSOPHERS

Physics and Philosophy

By Sir James Jeans. Pp. vii+222. (Cambridge: At the University Press, 1942.) 8s. 6d. net.

IF Sir James Jeans finds difficulty in defining philosophy (p. 16), there is no doubt of his qualifications for the task. Emerson, in his essay on Plato as a "representative man", defines philosophy as the account which the human mind gives to itself of the constitution of the world. It has been given to Jeans to participate effectively in our quest for the "constitution of the world"; as physicist, as mathematician, as astronomer, as cosmologist, he has opened windows on Nature—on the origins of planetary, stellar and nebular masses and on the interplay of matter and radiation. Now he attempts what he has earned the right to do: he speaks to us his account of the nature of reality, his views on materialism and what he calls mentalism, on determinism and free-will.

If we define the aim of science, including all utilitarian and humanitarian applications, as the endeavour to live the good life and to see into the mind of God, then at least part of that aim is realized when a mature man of science and thinker approaches the fundamental problems of philosophy by the path of mathematics and physics; and in fact without that background the discussion of philosophical problems tends to remain verbal and scholastic. It is, of course, sadly true that whereas we have had our poet and our man of science with the unmistakable characters of universality and agelessness—our Shakespeare and our Newton; we still await a modern *universal* philosopher, a thinker fully equipped as mathematician, physicist, biologist and psychologist, a new Aristotle. Sir James Jeans modestly states that his acquaintance with philosophy is simply that of an intruder, without any authority on questions of pure philosophy. Nevertheless he gives the pure philosopher a good deal to think about.

Perhaps the pure philosopher will wince most under the thrusts which Jeans gives him in the chapter entitled "The Two Voices of Science and Philosophy". While much of the book, as a survey of recent physical thought, is necessarily not new, in these sections Jeans has something vivid, pertinent and new to say to philosophers; and they may be considered as constituting Jeans's riposte (and an effective riposte they are) to the criticisms which have