Fuel of the Past, Present and Future

by

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Synopsis:

Importance of fuel question, early condition of man and surroundings, first use of fuel, steps taken in the use of fuel. Periods in the use of fuel—prior to coal; era of coal; what the rise of coal has done for progress; still there be an age of gas?—durability of gas as a fuel.

Our fuel supply—coal, wood, gas and subterranean possible exhaustion—what exhaustion would mean.

Smoke consumers, smoke nuisance, waste of energy through unburned gases; Siemens gas producer compared to coal stove; combustion of sulphur in coal; products formed to effect on vegetable and animal life.

Conversion of solid fuels to gas for use as a fuel—durability of gas as a fuel, is the scheme possible and practicable; economy of gas as a fuel and other durable fixtures.

Petroleum as a fuel, water ditto, artificial fuels; nature of different fuels, appliances for consumption of fuel; kind of further improvements in appliances.
We must agree that the fuel question is one of great importance, when we consider that only a small portion of the energy stored up in our fuels is utilized by us in their consumption and that the principal one, coal, is by no means inexhaustible, also that other sources now available, may some or later fail us.

However, before we imagine our machinery at a standstill, or portray the picture of a fuel famine, let us go back and notice a few of the influences it has had as a factor in human progress. Let us begin when nature was in her youth, as it were, when man in his primitive state roamed through the forests in the vicissitudes of his future dawned before him and when the eternal shades of the mountain ranges were wrapped in the first soft swaddling clothes of snow.

Inhabiting the warm fertile regions man no doubt found it comparatively easy to obtain a subsistence, but in this world of time changes in climate, demands and wants compel some other aid for his advance. About him are the various animals, which have been his associates all through the evolutions which have gone on...
Through the ages which have elapsed since he first appeared and began his conquest, man has associated with his crafty and cunning an possessed of remarkable instincts. Some have built stone fortresses against future wants, huts, constructions which the hand has the curious arks to shelter and protect the young. The higher animals as the apes, monkeys, and gorillas use such weapons as clubs and stones in battle and are thought to have a language; many animals effect organization for offensive and defensive purposes and in general the habits, industries, and characteristics of animals show a gradual gradation up to man.

Some of the apes will cluster about fires left by hunters in their native haunts to enjoy the grateful warmth, but man, hour ever been observed to display the sagacity and foresight of extinguishing the supply of fuel for the continuance of the flames. Be the art of using fuel entirely and exclusively human, man only it is that mitigates this force of nature and may we not say that it is by this means that he has been able to reach the supremacy and extend his possessions and favors. While we can thus see that it is
by the ability to use this form of energy that man has risen above his fellow creatures; we can see as plainly the effect among the different nations, and so we can almost affirm that the civilization of a nation depends upon the ability and the extent of the utilization of the fuels.

This subject of fuels is as broad as it is important and links with it in practical interest, chemical and other industries, with the still wider considerations of political economy. It is also of interest to the antiquarian, for, in the remains found, he can trace the history of man back, back, away into the dim long ages, until time loses itself in remote antiquity, and he finds only in some dark, dark cavern, creamed by thick estates of soils formed by the sediments of setting dust of ages; the ashes and charcoal from the fires of prehistoric man intermingled with the remains of animals which were extinct when man had learned but few of the lessons which nature taught, and before he thought to write a book.

Many and interesting are the means that man has employed to kindle his fires. First
it was probably obtained by fiction in the long labors of melting 2 or 2 sticks upon
another. Improvements came slowly but the steps in our history pass from one method
to another, from flint and tinder to the lucifer match, and finally from the diss-
olvable sulphur match to the paper match of today which adds so much to our conveniences.
Similar are the changes which have been made in the fuel employed and also again
in the manner of utilizing them.

We might divide the time of man's fuel
using career into periods somewhat as
follows: first, prior to the use of coal; second,
an age of coal using which today seems to
be shading gradually into an age when gases
fuel promises to take the supremacy. In the
first period the use of wood was chief but the
fats and oils of animals were not unknown as
fuels and later charcoal was a concentrated
and valuable form of fuel. With the use of
charcoal probably first came the working of
metals and with this there would be the
many new industries then impossible.

Coal marks the beginning of a new era. When man first discovered nature's locked up
treasure of fuel and first kindled upon his hearth the fossil stones of former ages he little realized its importance; probably scarcely thought of its future; certainly never dreamed of the part it would play in later civilization. Yet what a history it has and what a wonderful work and transformation it has accomplished—the arts, the processes, the products, the comforts, the conveniences, the civilization. Revolutionized the means of transportation and has led to the use of things innumerable which formerly were discarded as waste products. By its use the expansive steam was cheaply made to turn the mighty wheels of the world's machinery and through it has the reduction of ore and the manufacture of articles of iron and steel have been rendered comparatively easy and inexpensive.

But science, never idle, reaches out to something better though not new in the form of gas. Although we have really just begun to use gas it was known to the ancients who in their early writings speak of the blazing gases which issued from the earth. To-day finds gas as a fuel rising rapidly in favor and another contemporary gas in the form of
oil promises to be of importance as a fuel. Although as yet we cannot affirm that in the near future gas is to supersede coal as a means of running our engines and heating our homes, we do know that in a comparatively few years great strides have been taken in this direction and it bids fair to become more and more important in the future. Already the chemist uses gas exclusively for this purpose and in the manufacture of glass and numerous other articles gas has come to be the desirable form of fuel.

Let us turn to a consideration of our supply of fuel. Our present coal beds will one day fail to furnish the sufficient amount of coal even at our present rate of consumption but when we consider the fact that the more we advance in civilization the more purposes there are for which we need fuel, our coal supply diminishes still more rapidly. Our investigator says that England's coal supply will be exhausted in one hundred and seventy years. Imagine the world in this condition where would we turn to seek for means of furnishing heat to supply the multiple needs
of today increased as they would be then. We cannot think of wood yet having the fearfu
smell upon our forests have almost destroyed
them while we have had an abundance of coal;
then the supply must be in the natural gas
and oil. These are thought to be sufficiently
abundant to last for untold ages, however this
can be only an approximation, a mere opinion,
and in view of the fact that a failure of
the fuel supply means, the prevailing use of
all modern conveniences and that civilized
life would practically come to an end, it comes
as a duty to economize in the use of the
fuels at our command, but is this the only
plea to be offered for our very health and
comfort demand a reform in this line.
So called smoke consumers have been
invented to do away with the smoke nuisance
which is so disagreeable and injurious in large
manufacturing cities. These might just as fairly
be called foul consumers for it is by making the
combustion more nearly complete that they do away
with the smoke. The smoke escaping from the
chimneys and smoke stacks all over the land
is not merely the unburned fuel that is lost to
us as such for it come back to us invading
All of our coals contain more or less sulphur which, by combustion forms SO₂ which in the air is readily converted into sulphurous and sulphuric acid. We who live here upon these broad, busy lands of the west, where little coal is used compared to the area have not had occasion to feel or notice the effects of this product, which is not only destructive to plant and animal life, but which is also active in the disintegration of many organic substances. The effect is unmistakably apparent and most disagreeable in and about the large manufacturing towns especially of England, where trees or fruit can not be made to thrive. If such is the effect upon vegetation we would expect it to be detrimental to man and so it is plainly seen to be so not all other causes are sufficient to explain the miseries of the accidents of such a place. The poet would probably say: What a year without a summer? What a sky without a sun? What in earth, nothing of its verdure? What is life when health is gone?

As a matter of fact we first distil our coal and then we utilise or lose of the gases but often it is rather less that we utilise. This fact has rise to the idea of generating the gas
at some central station and supplying it to all in order to avoid waste. By so doing the waste would be reduced to a minimum for the only loss would be that required for the generation of the gases and as most of the heat required is, for the raising of the temperature to the point at which the gas is liberated, this one attained in the generated would require but little fuel for its continuance. Besides in so doing the small coal and even the dust now wasted in mining could be utilized. It is also probable that almost any carbonaceous material even straw or even fibers might be readily converted to gas and thus turned to good account.

Gaseous fuel is much more managable in every way than any other form and for ordinary purposes is much more easily conveyed from place to place. Our coal could readily be converted into gas in the pits from which it would rise without further effort on our part to be conveyed by pressure through pipes for use wherever wanted. The only waste would be in the converting of the coal to gas and as this would be done on a large scale the loss of energy would certainly be less than the combined losses from the various single

Phrases. Gas is the ideal fuel, the combustion is easily made complete and the greatest effect obtained at the time desired. Greater or less heat may be obtained at the will of the user and the instant it is not needed it may be shut off instantly while with a coal fire not only is this the waste because of improper or incomplete combustion but the fire is usually out and can not be obtained at the time and as desired, much more coal is always used than is necessary and especially in winter the fire has only reached a proper condition for use after the time for its use is passed.

In the making of the gas it would be an easy and simple matter to rob it of its sulfur, phosphorus and other undesirable properties thus ridding ourselves of this undesirable feature in the product of combustion besides obtaining them for use in the manufacture and arts. Thus this plan would seem to be practical and practicable in all of our larger cities. The added expense for equipments for a few years would be counterbalanced by the benefits and conveniences that would ensue.

Another factor which enters into the consider-
ation of future fuel is the tremendous output of petroleum which important mine is destined to become more and more as in the future. Its use as a fuel has been crowned with success as if properly regulated it produces neither cinders nor smoke and also gives a much greater efficiency than coal. Moreover it has the advantage of being a concentrated fuel and for use in locomotives and steamships when stowed it proved to be superior to coal. The combustion is easily made complete and the amount of heat readily regulated it also has the advantage of self-adjustment so that in case of accident the fire simply shatters itself thus saving loss from probable explosion of fire.

Water has been spoken of as the great and inexhaustible storehouse of fuel for the future but we must remember that our waters are the product of a combustion which took place in the misty long ago when earth had not yet become the settled steady going body that she now is and while water is plentiful and can be obtained without price the breaking asunder of the bonds between the elements is a task which requires much little expense. Could we indefatigably control
such a power as Niagara falls to the separation of water elements we might turn away some of its power for use as a fuel but such a project is not thought of seriously by men whom fuel is so plentiful as it is to-day. Niagara pouring its immense volume over the precipice and dashing to the rocks below annually wastes as many horse powers of work as could be produced by steam in the burning of the coal output of the whole world and I think will continue to be so unused for this purpose until the grand old falls of Niagara exist only in history and the shallows of Lake Erie become the fertile banks of a stream.

Desultory attempts have been made to manufacture an artificial fuel which would have the advantage of using up waste products and at the same time supply a fuel desirable in form. For this purpose various mixtures of coal dust or peat with clay and meal or sand dust or other constituents mixed intimately formed into bricks, pressed and dried. The result is a very good quality of fuel but cannot profitably be employed at present. The value of the different fuels compared with each other is an extremely variegated
tity even fuels of the same kind differing widely because of differences in density, composition, and moisture. Moisture in the fuel forms a part of the waste in all our fires as the heat required for its evaporation becomes latent and is lost to use in inefficiency. However, the loss in this direction is comparatively small when considered with the loss by imperfect draft, loss by charring or by smoke. The value of a fuel also depends largely upon the convenience for its consumption. There was a time when our hard coals could not be utilized even by the maker of iron but improvements in appliances the introduction of air blasts and other improvements have made it possible to use them to great advantage as well as such products as coke now so important and necessary in the manufacture.

While we are constantly finding new uses for fuel we are gradually learning to better utilize what fuels we have and are also learning to use new products and forms and in emphasizing the need of still further and more perfect utilization of fuel it is not from the supply that is the prompter now is it merely economy, our very wills and happiness de
concerned. The question is not merely the consideration that one fourth the value of an article is not a sufficient recompense for its destruction but added to this is the fact that the products and forms of this renewed nation become a nuisance to humanity and injurious to plant and animal life.