

ALTERNATIVE MOTOR FUELS

Further Research with Straw Recommended

INSTRUCTIVE ADDRESS BY DR. W. A. HARGREAVES

Further research on a large scale into methods of extracting alcohol from straw is justified by results obtained by the South Australian Department of Chemistry, says Dr. W. A. Hargreaves (director of the department.)

In a paper on "Alternative Motor Fuels" read before the first Australian Transport Conference in Melbourne, Dr. Hargreaves referred to experiments made, and said the research suggested could only be profitably pursued by a syndicate or company.

The prize in view was so great that the expenditure of a few thousands of pounds would be money well spent. He commended the subject to the various associations connected with motor trading and motorists generally.

Dr. Hargreaves mentioned that automobiles might be propelled by stored electricity, or steam, or by an internal combustion engine. At present the internal combustion engine was the most popular, and petrol was the most popular volatile liquid fuel used.

After quoting the technical details of the composition of liquid fuels for use in internal combustion engines, Dr. Hargreaves said the alternative fuels so far suggested were composed of one or more of the following substances with or without the addition of some petrol—benzol, power alcohol, and methanol.

Output Limited

Unfortunately the production of benzol was limited by the amount of tar produced from coal, and to the quantity of coal gas manufactured. Even if benzol were systematically extracted from coal gas, in addition to that being distilled from coal tar, the total production would not go far in replacing petrol.

Benzol could be produced synthetically from acetylene gas. In that case, also, coal was the parent substance and the benzol produced was too costly to be regarded as an alternative fuel to petrol. Power alcohol was ordinary ethyl alcohol or spirits of suitable methylated or denatured to satisfy the Customs Department. That was the greatest obstacle to its use in motor cars.

Since human beings had cultivated a taste for alcohol it was not safe to let loose a plentiful supply of pure spirit. Hence before alcohol was available for use in motors it had to be made undrinkable, and the cost of doing that might be as much as the cost of the spirit. On a large scale it might be possible to satisfy the Excise Department at a less cost if some simple and efficient method of denaturing could be invented. Such a method was still being sought, and there should be a good reward for anyone who could find it. Fortunately there was no Excise duty on power alcohol.

Heavy Importations

Petrol imported into Australia in 1925-26 amounted to 66,000,000 gallons. If that could be replaced by the alcohol-petrol mixture he had mentioned, 46,000,000 gallons of the imported petrol would need to be replaced by 62,000,000 gallons of Australian-made power alcohol. It would still be necessary to import 21,000,000 gallons of petrol or find some other safe, volatile substance to mix with the alcohol. Once the use of the mixture became general, and there was a plentiful supply of power alcohol, there would not be the slightest doubt that engineers would find simple means of converting existing motors to run on that substance entirely and so obviate the necessity of using petrol.

It had been shown by experiments in England and America that when alcohol was used in an engine specially designed for its use with high compression it had greater efficiency per brake horsepower than petrol had in a well-designed petrol engine. With a specially designed alcohol motor, the same mileage should be obtained to the gallon as was now obtained with petrol in existing motor cars. Even without altering an engine, more power could be developed from it by using alcohol than was obtained by using petrol.

Advantages of Alcohol

The advantages of using alcohol over petrol were less risk of fire, no trouble with small quantities of water in the fuel, no pre-ignition, no carbonisation, and more power from a given engine.

The disadvantages included difficulty of starting from cold and lack of flexibility, corrosion of brass and copper gauges and fittings, and solution of shellac from corks floats.

The first disadvantage could be readily overcome by suitable design of carburettor. In fact, some carburettors now in use would work satisfactorily without

alteration. The second disadvantage was overcome by using aluminium gauzes and fittings or non-corroding iron alloys.

Dr. Hargreaves said it had to be freely admitted that there was no immediate prospect of obtaining alcohol cheap enough to compete with the present price of petrol in Australia. The only primary sources of power alcohol on a large scale at present in view were molasses, foodstuffs, and fodders containing starch, straw, and coal.

From 60,000,000 to 80,000,000 gallons of power alcohol would be required to replace petrol at present used in Australia. Assuming, however, all the molasses produced in Australia was converted into power alcohol and used in motor cars the resulting supply would go only a short way toward replacing petrol as the total production would be only 3,500,000 gallons. As to foodstuffs and fodders containing starch, the land which would produce those substances was far too valuable to be used for producing power alcohol.

Encouraging Experiments

Regarding straw, the position was different. It had been estimated that within a 100 miles radius of Port Adelaide upward of 500,000 tons of straw was produced annually. It was wasted. It cost nothing to plant and grow, as it was paid for by the wheat. The only cost was that of collecting, baling, and transporting to a mill, and that could be done on a large scale by machinery. The crop was produced annually, and there was no immediate danger of exhaustion of reserves as there was in the case of petrol.

Dry straw consisted principally of cellulose (48 per cent.) and starch, gum, and other substances. If a method of converting all the cellulose, which was theoretically possible, could be discovered a yield of 100 gallons of alcohol to the ton of straw would be obtained.

Assuming, however, that 80 gallons to the ton could be secured, 500,000 tons would produce 40,000,000 gallons of alcohol, which would go far to supply the 60,000,000 to 80,000,000 gallons required. The total straw grown would be more than sufficient to supply all the power alcohol required.

Chemologists in many places were engaged in the search for a method of profitably turning the cellulose of straw into alcohol, and Australia should not lag behind. It was possible that some organisms, bacteria perhaps, or yeasts which would attack cellulose and prepare it for fermentation into alcohol might be found. The method of chemical attack on the cellulose seemed at present to be the most promising.

Dr. Hargreaves referred to the research made in the South Australian Department of Chemistry, and the yield obtained in the laboratory which worked out at the rate of 50 gallons of alcohol to a ton of straw. Unfortunately, he said, funds were not available to confirm those results and carry on the research. Although the results fell short of the 80 gallons that should be obtained it was so promising that he was convinced further research on a large scale was justified.

Possibilities in Coke

As to coal, Dr. Hargreaves said several processes had been invented which depended on that substance as a primary raw material. They were, however, complicated in technical detail and depended upon cheap electricity to make the carbide. He referred to reports of the manufacture of methanol and synthol from coke by German chemists, and said the production of cheap liquid motor fuels from coke might be announced any day.

It was unlikely, however, that any form of manufactured product would compete with petrol at the present costs of production, but it might help to control the selling price as petrol became scarcer.

The known sources of petroleum were limited and with the increasing consumption throughout the world the time was not far distant when petrol would not be readily obtainable. It behoved them therefore to be prepared with alternative fuels.

It was of interest to all motoring associations, Dr. Hargreaves concluded, to encourage by financial assistance all branches of scientific research, chemical or biological, that might tend in the direction of producing cheap alternative motor fuels.



Bust of Sir Langdon Bonython for University

Executed by Mr. Alfred Drury, R.A., the celebrated English sculptor, the bust has been accepted by the Council of the University from Mr. Justice Angus Parsons. Sir Langdon was a member of the first Parliament of Australia.

STUDY OF NATIVE RACES. ADELAIDE TO LEAD.

America leads the world in the study and preservation of her aboriginal inhabitants, according to Professor F. Wood Jones, who returned from a trip to London and the United States on Wednesday. Australia, in his opinion, is facing the very problems which have been solved by the United States, and he is hopeful that the people here will solve many of them by the same methods adapted to Australian needs.

Although he visited London primarily on private business Professor Wood Jones is certain to have made enquiries regarding the marketing of fur and other products of Flinders Chase. When questioned by a representative of "The Advertiser" regarding fur, however, he laughingly replied that he had "booked orders for all sorts of things," and declined to say any more on the subject. He was particularly interested in the preservation of the remnants of the great herds of seal which were once to be found on the South Australian coast, and before his visit to London last year expressed himself in optimistic terms regarding the establishment of the fur industry here.

Professor Wood Jones was greatly impressed by the Bernice P. Bishop Museum of Honolulu, and made a study of the methods employed there. The Australian aboriginals, in his opinion, form an extraordinarily interesting study, and they also furnish an important link in the solution of the problem of the origin and migration of Pacific races. It is not until the aboriginals have been studied as a group, however, that any idea of their inter-relationship to other races may be formulated. Adelaide, it is believed, will be the centre of anthropological research in the Commonwealth, and the professor is convinced that it would be a good thing if some of the enthusiastic young men from the American universities and museums who are engaged in the study of anthropology could be induced to come here and an exchange of students arranged.

Professor Wood Jones (Elder Professor of Anatomy at the University of Adelaide) returned to Adelaide by the Melbourne express yesterday, after a visit to Great Britain on private business. He returned by way of America, and while in that country he made enquiries at the Rockefeller Institute regarding the foundation of a chair of anthropology at the University of Adelaide. He was accompanied by Mrs. Wood Jones.

RHODES SCHOLAR WEDS
Dr. Stanford Howard, youngest son of the Rev. Henry Howard, formerly of Adelaide, a South Australian Rhodes scholar, now of Fifth Avenue, New York, was married this month to Miss Thelma Lee, daughter of Mr. and Mrs. Robert Lee, of Harley street, London, one time of Victoria. The ceremony took place at the Hinde Street Wesleyan Church, London, and was conducted by the Rev. Arthur Howard (brother of the bridegroom), assisted by the Rev. Samuel Chadwick and the

Professor F. Wood Jones (Professor of Anatomy at the University of Adelaide), accompanied by Mrs. Jones, returned to Adelaide on Thursday from a visit to Europe and America. On his return through America, the professor made enquiries at the Rockefeller Institute regarding the founding of a Chair of Anthropology at the Adelaide University.

Prof. F. Wood Jones (Professor of Anatomy at the Adelaide University), and Mrs. Jones, who have been for a trip to Britain, arrived in Adelaide this morning by the Melbourne express. Returning through America, Prof. Jones made enquiries at the Rockefeller Institution regarding the foundation of a Chair of Anthropology at the Adelaide University.

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