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RATIONALISATION OF
MECHANICAL AND ELECTRICAL EQUIPMENT IMPORTS INTO PAPUA NEW GUINEA

S.F. Johnston

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MECHANICAL AND ELECTRICAL
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PAPUA NEW GUINEA

A REVIEW OF THE WORK OF
THE COMMISSION OF INQUIRY
INTO STANDARDISATION OF
SELECTED IMPORTS

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Witten up whilst the author was on study leave with the Open University Alternative Technology Group.


The inclusion of the Paper by Mr. S.F. Johnston, of the New South Wales Institute of Technology, in this series of occasional papers from the School of Engineering of the University of Edinburgh, calls for some explanation.

It had been the intention of the editors of these occasional papers to hold a Conference in Edinburgh in September 1979, on the theme of case studies in appropriate technology. In the event, this proved impossible because of the lack of participants able to offer analytical papers of an adequate standard. One exception was Mr. Johnston's paper on "Rationalisation of Mechanical and Electrical Equipment Imports into Papua New Guinea".

We were fortunate that this paper was completed whilst the writer was on study leave in England, at the Open University, and that he was prepared to offer it for inclusion in our series. It is on a subject which is of crucial importance to developing countries. We are glad to help in its wider dissemination.
The Paper deals with the work of a Royal Commission set up in 1974 by the Government of Papua New Guinea, to study the problems being experienced with imported mechanical and electrical equipment and to recommend and implement measures to improve the situation.

The central concern was with motor vehicles and outboard motors. The Commission found that there were fewer than 40,000 motor vehicles registered in the whole country, including at least 129 different makes and over 300 different make and size combinations. The 6,500 outboard motors sold in the six years 1969-1974 included at least 14 different makes and 57 different make and size combinations. The Commission found that this variety very much increased the problems caused by difficult operating conditions, limited transport infrastructure and a general shortage of experienced operators, mechanics and spare parts personnel.

The Report showed up strongly the inappropriateness for Papua New Guinea of many aspects of the international motor industry, particularly the frequent model changes and huge variety of models. It also provided the basis for rejection of a proposal for a vehicle assembly plant in Papua New Guinea.

Poor availability and high cost of spare parts were considered to be central to the short working life of equipment. When parts were available, prices were high. Mark ups from landed cost to retail price were typically from 90% to 150%. Similar problems were found with heavy equipment, and the 4,000 items of heavy equipment in the country included at least 100 makes and 270 make, size, and type combinations. These difficulties are experienced on islands throughout the Pacific.

The work of the Commission went on from September, 1974, to March, 1976. It presented its Report in three parts over this period, two before Independence and one after. The Commission formally demonstrated the problems and made wide ranging suggestions for administrative and policy changes, in particular for alternative transport measures to reduce the demand for private motor cars.

Its most radical long term recommendation was that the Government should take over the industry, setting up a Government Controlled Corporation which was to have a monopoly on imports of the main ranges of motor vehicles and outboard motors.

The Paper discusses some of the reasons for the rejection of this proposal by the Government. It concludes by raising some of the ethical problems for expatriate professionals in this type of work.

Perhaps the most important aspect of the Commission's existence was its challenge to the policies of both the international equipment manufacturers and the importers in Papua New Guinea.
INTRODUCTION

In 1974, as Papua New Guinea (P.N.G.) moved towards independence, there was widespread public concern at the high cost and poor availability of spare parts and service for motor vehicles and outboard motors. Outboard motors, used for most light and medium coastal and river transport, were particularly important because of the very limited road network. The problems were more serious outside the main towns. Equipment owned and operated by P.N.G. nationals tended to have a shorter than average working life.

It was recognised by the Government that the small total equipment population, wide variety of individual units, limited transport infrastructure and lack of experience of the Papua New Guinea people with mechanical equipment, all combined to make up a very difficult situation with serious implications for the future. The House of Assembly had previously set up a Committee of Inquiry to look into these problems, but without the resources to hold public hearings or the power to subpoena evidence, it had little impact.

In 1974, Cabinet, on the initiative of the then Transport Minister, Mr. Iambakey Okuk, set up a Royal Commission to study the problem, and make and implement recommendations for improvements. ("The Commission of Inquiry into the Standardisation on a National Basis of Imported Plant, Transport, Mechanical and Electrical Equipment", to give it its full title, usually abbreviated to "The Commission of Inquiry into Standardisation of Selected Imports").

The Commission presented its Report in three parts, from April 1975 to March 1976. The first part dealt with outboard motors and motor cycles, the second with other motor vehicles and with transport generally, including bicycles and footpaths. The third part dealt with earthmoving and similar heavy equipment and with refrigeration and air-conditioning equipment.

Data in this Paper is drawn largely from the Commission's Report. Detailed references are given by a Roman numeral for the part of the Report (I, II, III), followed by the page number.
The problems of keeping vehicles running were very much increased by the limited road network, shown on figure 1, and by the difficult operating conditions.

Administration of the country was based on nineteen "districts" (now "provinces"), of which fourteen were on the mainland. Of these fourteen, only six were inter-connected by all-weather roads. The island of New Britain was divided into Eastern and Western districts, and the other three districts were separate island groups.

Air routes formed the main national transport network and were served by Fokker Friendships and World War II DC3s with smaller aeroplanes used in more difficult areas. Papua New Guinea is one of the most difficult countries for flying in the world. Cloud can, in an hour or so, blanket the mainland. The interior is very mountainous, with Mount Wilhelm rising to 4,694 m (15,400 ft). This complicated the operation of unpressurised DC3's, which were obliged to fly through the gaps rather than over the tops of the mountains.

Figure 1: Papua New Guinea Road Transport Network
Vehicle operating conditions outside the main towns were also very difficult. In at least one highland area, standard pre-delivery service on the Toyota Land Cruiser (the most common vehicle in the country) included hammering over the crown wheel bolts to stop them vibrating loose.

The difficulties of communications were demonstrated and increased by the existence of the seven hundred to one thousand mutually incomprehensible languages spoken by the around three million nationals. There were two trading languages, Motu on the Papuan coast, and Melanesian Pidgin in New Guinea. The latter is also used, to some extent, in Papua. It derives significantly from English, but has its own specific vocabulary and syntax, and is an earthy and expressive language.

Most Papua New Guinea nationals had very limited experience of maintaining any sort of machinery and very little operator training was available. There was neither awareness of the need for routine maintenance, nor, except in a few main towns, any substantial infrastructure for carrying it out. In one district, only about one-quarter of registered "Land Cruisers" were re-registered a year later. Administrative problems, such as inability to find the old registration documents, make this a slight overstatement of the number of vehicles actually written off during the year. It does, however, show the severity of the problems (see also 5.) below.
1. Terms of Reference and Personnel

The Commission was unusual in that it was set up not only to demonstrate formally what was already obvious, i.e. that a major problem existed, and to make recommendations, but that it was also to be responsible for implementing its recommendations. Its brief included:

1. determining if and what types of transport and plant should be standardised; if so, how this should be done; investigating the feasibility of local manufacture of component parts; recommending appropriate action to Cabinet;

2. if Cabinet approved, the Commission was then to negotiate terms and conditions of marketing, including government participation in policy making of importers and agents;

3. with the approval of the Australian High Commissioner, the chairman of the Commission was further empowered to sign appropriate agreements on behalf of the Government (Cabinet decision 103/74, quoted in II, III).

These wide powers reflected both the extent to which the Government felt that the motor industry had failed to meet the needs of the country and the high confidence then placed in the expatriate engineer, Julian Lee, who was the moving spirit in the setting up of the Commission. He was appointed one of the Commissioners and was responsible for selection of staff and for much of the liaison with the responsible members of the Cabinet. For most of the life of the Commission, the chairman was a senior Papuan magistrate, and the other Commissioners included an Australian economist and two Papua New Guinea nationals, who were senior officers of the Government Plant and Transport Authority (P.T.A.).

Perhaps because the Commissioners had the authority to subpoena information (and to fine and/or jail for contempt, if necessary), confidential commercial information was readily provided.

The two Commissioners from P.T.A. encouraged co-operation by that Body, and helped with its acceptance of the Commission's recommendations. Some officers of P.T.A. worked very closely with the Commission staff.

The Senior Project Officer (the author of this Paper) was an Australian Mechanical Engineering Lecturer, who was also concerned with the political and economic implications of the work and came to Papua New Guinea to work for a year for the Commission. One Project Officer, an Australian, had been a motor mechanic and had run a garage in the highlands of New Guinea for some years before joining the Public Service. He had wide experience of the country and worked easily and well with both expatriates and nationals.
The other project Officer and the series of Executive Officers were Papua New Guineans. They played an essential role in liaison and in gathering information in the field, particularly on the effects of the situation on the people.

The main steno-secretary was an expatriate who had lived for many years in Papua New Guinea.

3.2 Language and Presentation of Reports

The reports were intended, as far as possible, to be able to be read by interested people without technical backgrounds such as, for instance, members of the House of Assembly.

It was decided to present the report in English, the language of the Colonial Power, Australia, and to try to avoid unnecessary complexity. Summaries and captions to illustrations were also to be given in Motu and Pidgin.

It was hoped in this way to make the gist of the report widely accessible, whilst still providing detailed information for the people who would then be responsible for implementation.
4 COMMISSION ACTIVITIES

4.1 Public Hearings

The Commission held public hearings in all district headquarters and most sub district centres throughout Papua New Guinea, during the period 4th November 1974, to 17th February 1975. Except in isolated centres where the problems were more serious (1, 13), attendances at the meetings were poor, apparently because of inconvenient meeting times and poor publicity.

The hearings were intended to gather information and to increase public awareness by showing that there were general problems in the industry. They also contributed to the broad "political" atmosphere in which the Commission's Report and Recommendations were considered, and made it easier to apply pressure on importers to improve their performance by reducing the range of units imported and paying more attention to spares, service and training.

4.2 Other Sources of Information

4.2.1 Government and Semi Government Sources

Although some of the information needed was available from existing Government records, in particular from the tables of "Imports Cleared for Home Consumption" in the "Overseas Trade Statistics", it was generally found necessary to go beyond these sources for much of the detail required. Information was also collected from Government and semi Government departments of their holdings of outboard motors and of heavy equipment. The list of privately owned heavy equipment available for hire by the Government provided part of the basis for a detailed survey by questionnaire of private users of heavy equipment (120 forms were sent out and 65 returned). Particular attention was paid to making sure that responses were received from the larger users of equipment, and Commission staff called on the main suppliers and users to get a view of the problems at first hand.

4.2.2 Registration Forms

On the basis of the home addresses of the owners, one of the Commission staff allocated all the 36,890 vehicle registration forms for 1973 to Districts. Forms were then grouped by makes and vehicles were, as far as possible, divided into sizes. This was slow and tedious but very responsible work, demanding not only patience, but also considerable practical automotive knowledge and experience. It was complicated by incomplete and incorrectly completed forms.
4.2.1 Surveys of Importers

For each type of equipment studied, a detailed census of importers was made, giving imports during each of the six years 1969 to 1974 inclusive. For some equipment this was extended to the end of June 1975. Many small importers had gone out of business during this time, and some dealerships had changed hands, making this source of data unavailable for some less well represented brands. Surveys were also made of importers' mark ups on equipment and spare parts.

4.2.4 Outboard Motor Survey

In the absence of registration data, it was necessary to carry out a national survey to discover what makes and sizes of outboard were actually in use in the country and where they were located. This survey was done by the staffs of the District Commissioners between October and December 1974. In the capital, Port Moresby, this survey was quite inadequate and the Commission staff carried out their own survey. Altogether, these surveys located 3,429 of the 6,463 outboard motors sold in Papua New Guinea in the six years 1969 to 1974 inclusive. Between 1,000 and 1,500 expatriate owned units used for pleasure boating were not covered by the District Commissioner's survey. Most of the balance was probably units which had been unserviceable for a long period and which were therefore missed. The discrepancy was largest for the smaller units (up to 10 HP). This was considered to indicate that these units had a rather shorter working life than the larger ones. Of the units actually located by the survey, about 40% were unserviceable.
Comparison of the 1969 new car and commercial vehicle registrations in Papua New Guinea, totalling 6,960 (7,051 for 1974) with world production for 1969 of 29,721,500 showed how small a part Papua New Guinea was of the world market.

The Commission found that the small and fragmented equipment populations in Papua New Guinea caused very serious problems with servicing and spare parts supply.

The data available made it possible to identify different makes, sizes, and types of units.*

This breakdown gave a reasonable estimate of the number of complete ranges of spare parts needed for adequate maintenance. The number was affected by two conflicting factors. On the one hand, it overstated the problem to the extent that some spares for one category could be used for one or more others, provided the personnel involved were well enough trained to recognise the possibilities. On the other hand, it understated the problem, in that it did not identify variations other than the basic ones for each category. Such variations included model changes; variations within a model production run; different truck and bus engine size or type (petrol or diesel).

In the present writer's opinion the figures for size, make and/or type significantly understated the extent of the problem.

5.1 Outboard Motors

The 6,500 outboard motors sold in 1969 to 1974 included at least fourteen different makes and fifty-seven different combinations of makes and sizes. In one hundred and seventy one cases, there were fewer than ten of a particular combination of make and size located in an entire district. The lack of road access to many coastal centres made maintenance very difficult.

There were many complaints about availability and cost of spare parts. Even with the high mark-ups shown in Table 1, suppliers could not afford to carry an adequate range of spare parts for the large variety and small population of motors imported.

* The Commission used the following terms:

MAKE : Units made by a particular manufacturer
SIZE : Outboard Motors : nominal horsepower
        Motorcycles and cars : nominal engine size in cubic centimetres
        Buses : seating capacity
        Trucks : load carrying capacity
TYPE : Broad category such as : car, light truck, four-wheel drive, etc.
The effects of the shortage of experienced mechanics were also increased by the variety of makes and sizes which limited the possibilities for specialisation, and for the purchase of special tools, and made work slower. Even where there were workshop facilities in outlying areas, they were generally poor, with little attention paid to proper storage of motors to protect bearing surfaces and cylinder linings from corrosion. Evidence was given that repair costs often included owner travel and motor freight to Port Moresby and accommodation in Port Moresby, increasing typical repair costs from K15 K70 to K62 K140.

<table>
<thead>
<tr>
<th>TABLE 1</th>
<th>CHARGES AND MARK-UPS (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment</td>
<td>No. of parts studied for each Model</td>
</tr>
<tr>
<td>Outboard Motors</td>
<td>(2)</td>
</tr>
<tr>
<td>new units</td>
<td></td>
</tr>
<tr>
<td>Spare parts</td>
<td>(1)</td>
</tr>
<tr>
<td>Motor cycles</td>
<td>(4)</td>
</tr>
<tr>
<td>new units</td>
<td></td>
</tr>
<tr>
<td>Spare parts</td>
<td>(5)</td>
</tr>
<tr>
<td>Motor cars and trucks parts</td>
<td>ex Japan</td>
</tr>
<tr>
<td>Other parts</td>
<td></td>
</tr>
</tbody>
</table>

NOTES:

(1) All imports are subject to a 2 1/2% ad valorem general import levy, in addition to any specific customs duty mentioned below (II, 62).

(2) Duty free up to 35 HP and over 100 HP. Ad valorem duty 10% over 35 HP to 100 HP. The Commission's interest was drawn by this obvious anomaly (II, 62).

(3) Marine spare parts ad valorem duty 5% for business and private use (I, 26).

(4) Duty free to 100 cm³. Over 100 cm³ 45% ad valorem duty (II, 60).

(5) Ad valorem duty 15% for business and private use.

(6) These charges were considered by the Commission to be artificially high, concealing a mark-up more like that shown in brackets in the later columns (I, 31).

(7) Average of data submitted by each importer. Ad valorem duty of 15%.

(8) Rising to 85% for the 1975/1976 financial year.

(9) One supplier charged 200% for mechanical items and 100% for major and body items respectively.

(10) These figures were considered by the Commission to be unrealistically low, particularly as they should include ad valorem duty at 15% and the overall levy of 2 1/2%. Even information given in statutory declarations was commonly inaccurate (II, 24-25).

* The Kina (K) was, at the time, on parity with the Australian dollar.
5.2 Motor Cycles

In the same six year period, the nearly 7,000 motorcycles sold, included at least thirteen makes and sixty one make and size combinations. In over one hundred and fifty cases in 1973, there were only one or two of a particular make and size combination registered in a district.

There was not the same concern for motorcycles as for outboard motors, although problems were similar. There were thirty seven combinations of make and size, of which fewer than ten were registered in the whole country. Some agents kept very small stocks of spare parts, preferring to air freight parts as required, often passing on air freight charges to the consumer rather than absorbing them in the usual mark-up.

The pricing structure is summarised in Table 1. Wide variations of price were found for similar parts from different suppliers (up to twice as much, in some instances). Although it was expected that shipping charges from Japan would be similar for all importers, a wide range was quoted in evidence by importers. Variation was from 36% to 86% of f.o.b. price. The highest mark-up (122%) coincided with the highest "shipping costs" (86%), and seemed to be being used as a device to hide very high retail mark-ups, which should probably have been quoted as 231%. These mark-ups covered the whole of one range of spare parts, and the Commission expressed concern that they may have implied gross over-pricing.

5.3 Motor Vehicles

The Papua New Guinea market is very small by world standards, with annual sales of about 7,000 motor vehicles. The 16,000 cars and station wagons, and 24,000 utilities, trucks, and buses, sold in the six years 1969 to 1974, included at least seventeen different makes and two hundred and fifty different make and size combinations. Taking into account variations in body type as well, the Commission found four hundred and thirty-six combinations of make, size and type. In at least six hundred and thirty-five cases in 1973, there were fewer than ten of a particular make and size of vehicle registered in a district.

Correlation of suppliers data with vehicle registrations suggested that "new" registration figures were about 5.5% high. Taking this into account the Commission analysed registration figures and drew the rather sombre conclusion that average vehicle life in Papua New Guinea was about five years (II, 23). It suggested that overloading, poor routine maintenance, inadequate service and spare parts availability, and high accident rates, all contributed to this very short life, which compared very unfavourably with an average vehicle life of around twelve years in economically developed countries (II, A5-3, 2).
Analysis of the spare parts situation highlighted the problems created by the combination of a large range of vehicles, difficult communications, and inexperienced users and spare parts personnel. It was apparently a common occurrence for operators to fail to obtain needed spare parts, even though they were in stock, because they could not specify model, engine or chassis numbers, and the parts staff could not locate the parts without them.

As mentioned in the notes to Table 1, comparisons by the Commission of spare parts prices given in statutory declarations with actual customer invoices showed a high proportion of errors. For example:

"A check for one firm of submitted prices and listed retail prices showed that out of sixty five items checked, twenty five were incorrect. In another case, a check against copies of customers' sales dockets showed that of eighty items checked, fifty nine (74%) were correct, thirteen (16%) were over-priced and eight (10%) were under-priced. The value of under-pricing was K3.60, whilst the value of over-pricing amounted to K1505.63. The errors were explained as being partly staff error, but it was also apparent that either by accident or intent, a situation existed whereby some items had dual prices." (II, 24)

The total value of spare parts in the country was estimated at about K4 million at in-store cost. Almost K3 million of this was in Port Moresby and Lae, with the balance at seven other centres.

5.3.1 Public Hearings

Evidence presented at public hearings showed a desire both for reduction in the variety of vehicles and for some choice to be preserved. The need for information on basic use and care of motor vehicles to be available in English, Pidgin, Motu and, where possible, in other local languages was emphasised. Deep concern was expressed at the high cost of spare parts and the difficulty and delay in getting them, with consequent loss of time and earnings. Ideas put forward to improve the situation included legal requirements for minimum stock holdings, and price control.

The Government's practice of auctioning worn-out vehicles was strongly criticised. It was suggested that they should either be reconditioned before sale or stripped down for use as spare parts.
6 COMMISSION RECOMMENDATIONS

The work of the Commission continued for over a year, during a period of rapid political change. The Commission interpreted its brief quite widely, not restricting itself to the question of which of the existing imports were most suitable, but also looking for alternatives and trying, as far as possible, to deal with the problem of transport as a whole. With Independence, changes in the structure and personnel of the Public Service required measures which could be implemented by staff who were relatively new to their positions, and who commonly had less technical training and experience than the expatriates they were replacing.

6.1 Part I - Outboard Motors and Motor Cycles

The first part of the report, presented in April 1975, dealt with outboard motors and motor cycles. In it, the Commission specifically recommended the setting up of a 51% Government owned importing corporation, which was to have a monopoly on imports of outboard motors and motor cycles. This corporation was to import a single make of conventional outboard motor, in only three sizes, 6 HP, 25 HP, and 40 HP (4.5 kW, 18.7 kW, and 30 kW), and a single make of "Bangkok" long-tail outboard motor, with a four-stroke petrol engine of about 15 HP (11.2 kW).

Although the Commission did not specify a make of conventional outboard motor, it was clear that there would be a strong preference for "Johnson/Evinrude" (J/E) (mechanically identical, but with different names, depending on whether they originated from the United States of America or from Australia). J/E made up 55.7% of the six year sales figures, and 59.2% of the motors located by the District Commissioners' survey. This "make" had the additional advantage of two alternative sources of supply. The other possible contender was Yamaha, with 22.3% and 18.6% respectively.

Possible sources for the "Bangkok" unit were not analysed by the Commission. This type of unit, although unsuitable for use at sea, was good for river work, where the ease of clearing the propeller by lifting it momentarily out of the water to throw off weeds was significant. Because of the mechanical simplicity of the outboard leg, it also offered the possibility of local manufacture.

The corporation was also to import one make of four-stroke engined motorcycle, in three sizes, a 90 cm³ trail bike and two sizes of street bike, and 125 cm³ and either 175 or 250 cm³. Although the Commission did not specify a make, the four-stroke requirement made it clear that it was to be "Honda", which accounted for 70.3% of the six year sales, compared with the next largest, "Yamaha", a two-stroke, with 19% of sales.

Radical changes to distribution and servicing arrangements were also proposed. It was recommended that, where possible, district agencies should be handled by technical colleges or vocational schools (an arrangement which was intended to make them more self supporting, in line with stated Government policy). Village sub agents were to be trained to handle routine maintenance and operator training for outboard motors.
The main reaction to the recommendations was an almost universal conviction that a Government importing agency with such a monopoly would be both corrupt and inefficient.

The Education Department, although formally committed to increasing self-reliance in technical colleges and vocational schools, was reluctant to become seriously involved in commercial activity. Importing companies recognised that the idea of a Government monopoly of imports threatened their existence. Lobbying to the Cabinet, and the eventual Cabinet discussion on the Report, were apparently conducted on the basis that this approach would be applied to motor vehicles generally. The opinion was also privately expressed that some members of the Cabinet were reluctant to have a profitable business area permanently denied to them.

In view of the negative response to the idea of a Government controlled importing corporation, the Commission, in conjunction with the National Investment and Development Authority (N.I.D.A.), the Customs Department and the Department of Foreign Affairs, looked for other methods of control.

The approach finally adopted was to set customs tariff categories so that outboard motors and motorcycles of the preferred sizes were admitted duty free (although still subject to the general levy of 2½% ad valorem). Other sizes were to be subject to a duty of 45%. Because of the technical difficulty of discriminating between spares for the preferred sizes and spares for the other sizes, all spares were to be admitted at a common rate of duty. The final preferred categories were around 6, 15, 25 and 40 HP for outboard motors and around 90 cm$^3$ for trail bikes and 125 cm$^3$ for street bikes. Even with four main suppliers for each type of equipment, this substantially reduced the variety of imports, although not to the extent which the Commission had wished. It did not address the question of operator or other training or of provision of decentralised services.

These changes in customs duty also redressed an anomaly highlighted by the first part of the Commission's report. This was that 40 HP units, widely used for coastal trade, were subject to 10% duty whilst units over 100 HP, presumably not envisioned when the regulations were drawn up but widely used by expatriates for water skiing, were duty free.

6.2 Part II - Recommendations on Cars, Trucks, Buses and Bicycles

The second part of the Report, presented in July 1975, dealt with motor vehicles which the Commission saw as its major area of concern. In addition to making recommendations for standardisation, it suggested alternatives to motor vehicles generally and to the present mix of vehicles. It also dealt with a number of other problems and policy issues relating to motor vehicles.
6.2.1 Recommendations on Standardisation of Motor Vehicles

Because the most serious problems were found to be in spare parts supply and cost, maintenance and servicing of units and training of mechanics and operators, the Commission concluded that it was essential to reduce substantially the number of different makes and sizes of motor vehicles imported.

The Commission reaffirmed its view that only a Government monopoly on imports could achieve the reduction in variety which was technically desirable.

It went on, however, to suggest a range of other measures which could achieve some degree of standardisation. These included price or advertising controls, differential tariffs and administrative measures like the Fijian approach of requiring Import Licences for cars over 2,000 cm³ and goods vehicles under 3 tons (II, A6.1).*

It also suggested that a substantial improvement could be effected by requiring the importation of a guaranteed minimum number of each model each year, together with a given minimum quantity and range of spare parts for it. Details of the proposed controls are given in Table 2.

Because, in most cases, a number of makes could meet these criteria for standardisation, the Commission felt able to specify makes and models for consideration in each category. It also made some detailed comments on the vehicles recommended, and expressed a strong preference for the use of diesel engines for commercial vehicles.

6.2.2 Recommendations on Implementation

The Commission suggested two stages of implementation; firstly, immediate action to reduce the range of imports before substantial Government legislative or financial action was taken; and secondly, longer term action, including the setting up of a Government corporation to import standard motor vehicles.

To co-ordinate the immediate action, it recommended the appointment of an Implementation Officer, who would act through the N.I.D.A., and/or the Price Controller, and use exchange control provisions and any other appropriate measures to prevent the importation of non-standard units. He would also work with the P.T.A. to make sure that routine Government purchases of vehicles were confined to this standard range of units. It was also recommended that a condition of granting foreign exchange for the import of vehicles should be a requirement for purchase of adequate levels of spare parts at the same time as the vehicles themselves. Adequate levels would be approved by a Standardisation Office, with a Standardisation Officer who should be appointed immediately to co-ordinate the implementation of these recommendations. He would need adequate office support and facilities, and be advised by a committee with representatives from some or all

* The approach adopted by Fiji was the only example the Commission found of Government action which it felt might address the need for standardisation in Papua New Guinea.
of the Department of Finance, the Department of Foreign Relations and Trade, the N.I.D.A., the Papua New Guinea Investment Corporation, and others as appropriate. The Standardisation Officer was to be appointed on a permanent basis, with initial attachment to the staff of the Implementation Officer. In due course, a Standardisation Office would be set up (attached to the Department of Foreign Relations and Trade or as located by the Public Service Board) to carry on the standardisation work of the Commission. The Officer would then be concerned particularly with ensuring proper levels of spares holdings.

TABLE II: POSSIBLE BASIS FOR STANDARDISATION OF MOTOR VEHICLES

<table>
<thead>
<tr>
<th>Category</th>
<th>Number of potentially suitable make/model combinations already imported</th>
<th>Total number of this category imported over the last six years</th>
<th>Guaranteed minimum number of each make/model combination to be imported annually</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Car and Derivatives (not utilities or panel vans or mini buses)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) Small (up to 1300 cm³)</td>
<td>3</td>
<td>6,000</td>
<td>200</td>
</tr>
<tr>
<td>2) Medium (over 1300 cm³ to 2000 cm³)</td>
<td>4</td>
<td>4,800</td>
<td>200</td>
</tr>
<tr>
<td>3) Large (over 2000 cm³ to 4000 cm³)</td>
<td>1 (2)</td>
<td>3,900</td>
<td>200</td>
</tr>
<tr>
<td>B Light Commercials (approx. 1 tonne capacity)</td>
<td>2</td>
<td>1,000</td>
<td>100</td>
</tr>
<tr>
<td>C Four Wheel Drive Vehicles (not trucks) and derivatives</td>
<td>1 (3)</td>
<td>5,500</td>
<td>500</td>
</tr>
<tr>
<td>D Commercial Vehicles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) Light duty</td>
<td>4</td>
<td>3,914</td>
<td>200</td>
</tr>
<tr>
<td>2) Heavy duty</td>
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<td>200</td>
</tr>
<tr>
<td>E Trucks (4)</td>
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</tr>
<tr>
<td>1) Light trucks (2 to 3.5 tonnes capacity)</td>
<td>4 (3)</td>
<td>7,900</td>
<td>200</td>
</tr>
<tr>
<td>2) Medium trucks (over 3.5 tonnes up to 8 tonnes)</td>
<td>5</td>
<td>2,000</td>
<td>50</td>
</tr>
<tr>
<td>F Buses (4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) Small (up to 15 seats)</td>
<td>2</td>
<td>600</td>
<td>50</td>
</tr>
<tr>
<td>2) Medium (over 15, up to 30 seats)</td>
<td>2 (3)</td>
<td>200</td>
<td>20</td>
</tr>
</tbody>
</table>

NOTES:
1. Based on Table 4.11 (II 30-32)
2. This was to include the alternative of either a diesel or a petrol engine. Curtailment of imports of this size group was of particular concern to importers as it carried the highest profit margin (of order K1,000 per car).
3. It was proposed that if the Toyota unit in each of these categories were to be considered it should be fitted with a common engine (a 2500 cm³ diesel) and drive train.
4. It was not at this stage proposed to restrict the importation of trucks over 8 tonnes or buses over 30 seats.
6.2.3 Reaction to Recommendations on Motor Vehicles

The possibility that some suppliers might be excluded from the market raised serious international tensions. The West German Government was said to have suggested to the Department of Foreign Affairs that the exclusion of German motor vehicle manufacturers from the Papua New Guinea market could affect coffee exports to West Germany. So serious was the concern of the Papua New Guinea Government that the terminology was suddenly changed from "standardisation" to "rationalisation" and there were vigorous representations to the Commission that criteria for rationalisation must be, and be seen to be, purely technical, and fully justified on grounds of essential national interest. The approach summarised in Table II was therefore pursued.

The irony of West German intervention on behalf of the local Mercedes/Volkswagen dealer (who was trying to arrange to bring in VW units from Brazil) was underlined by his comment to Commission staff that Volkswagen advised that, in their view, the minimum number of identical units in one location for an economic maintenance operation, was fifty to one hundred thousand, more than the total number of vehicles in the country.

6.2.4 General Recommendations on Road Transport

The Commission drew attention to the striking disregard for most of the population shown in Colonial urban traffic planning, with its preoccupation with the private motor car. Even as late as 1973, the Port Moresby Transport Planning Study was done in terms of cars, rather than in terms of people to be moved.

The Commission roundedly condemned the private motor car as "not appropriate for Papua New Guinea". It went on to state that:

"As effective alternatives recommended elsewhere in this Report are provided, it will become virtually redundant, a relic of the 'Colonial era', and can be phased out. Suitable measures initially should include increased taxes on imports of cars and petrol, and banning advertising of motor cars. A substantial proportion of these taxes should go to improving public transport, and to building cycle paths and footpaths." (II, p54)

In practice, the private motor car may not be so easily eliminated. The car was seen very much as a perquisite of power and an indicator of success. So high was this status value that, as the Report noted, some people spent half their incomes to run a car, that is, they worked twenty of their forty hours for their vehicle.
6.2.4.1 Vehicle Assembly

The Commission found that vehicle sales were well below the level at which any form of vehicle manufacture or assembly could be economic. It therefore advised rejection of a proposal by General Motors that the Government should be involved in setting up a vehicle assembly plant in Papua New Guinea (assembly is, in any case, the least profitable part of the industry (II, A5-3, 3)). There was, however, potential for some specialist body building for commercial vehicles, particularly for Public Motor Vehicles (P.M.V's), which operate as village buses and produce carriers. Concern was also expressed that P.M.V. bodies should give better roll-over protection.

6.2.4.2 Footpaths

The Commission emphasised the need to provide satisfactory transport facilities. In particular, it suggested immediate programmes for the improvement of existing footpaths in both urban and rural areas and recommended that planning for all new roads should include provision for adequate, sealed, footpaths.

6.2.4.3 Cycle Paths

The Commission proposed that top priority should be given to building an initial cycle path in Port Moresby, where technical personnel were available for design and for detailed on-the-spot evaluation. Based on a six to twelve month study of the operation of this first path, it proposed that within the next five years, comprehensive cycle path networks should be built up in urban areas throughout Papua New Guinea. Road reservations for main trunk roads should allow space for construction of cycle lanes separated from the main carriageway. Encouragement should also be given for local assembly of bicycles. In consultation with the bodies through whose land it would run, Commission staff prepared a detailed proposal for the first cycle path. The proposal was accepted as an aid project by the relevant Ministers of the New Zealand Labour Government at the time. Unfortunately, shortly afterwards, the New Zealand Government fell, and the new Government was not interested in the proposal. With aggressive and relatively unskilled motor vehicle driving and busy and narrow roads, it was very dangerous to cycle in Port Moresby. There was, therefore, no pressure group pushing for cycle paths and, indeed, the beginnings of a network needed to be constructed before serious attempts could be made to encourage cycling as an alternative mode of transport.

6.2.4.4 Buses and Electric Traction

The Commission drew attention to the need for increased political and financial support for scheduled bus services in towns, so as to provide regular scheduled services every day, including week-ends.
Brief reports on the possibilities for using electric power (available cheaply from hydro-electric schemes) were commissioned, from a Planning Officer of the Melbourne and Metropolitan Tramways Board and from a member of the P.T.A. staff, and were appended to the Report (III, A7.1 and A7.4). The Commission concluded that high capital costs at present precluded the large scale use of electric power for transport in Papua New Guinea. It suggested that with increased traffic on the highland highway there might be economic justification for a system of trucks, supplied by electric power from overhead lines. If such a system were adopted, consideration of trolley buses for urban transport would be warranted. It suggested that the Department of Transport should keep track of developments in the field of battery-powered buses (II, 55-56).

6.2.4.5 Animal Power

The possibility of reintroducing animal transport, particularly in remote areas, was also raised. The report noted the advantages of a motive power source which could use local fuel and which could provide the users with a meal at the end of its working life. Even if tough, the food value would be rather higher than that of a worn out tractor (II, 56 and A7.3).

6.2.4.6 Advertising

The Commission suggested that advertising which promoted anti-social features, such as excessive power and speed, or which promoted sales on the basis of status and prestige considerations rather than of basic utility, should be discouraged, as being undesirable and at variance with the stated objectives of the Government (II, 57). At this time the National Broadcasting Commission was beginning to accept advertising in order to make itself more self-supporting. These objectives were written into the guidelines prepared to control this advertising.

6.3 Part III - Earthmoving Machinery and Refrigeration and Air Conditioning Equipment

The third and final report of the Commission was presented, in March 1976, to the Governor General of the now independent country of Papua New Guinea. For earthmoving and logging equipment, it noted the same sorts of problems:

"over four thousand items of heavy equipment in the country ... included at least 100 makes and at least two hundred and seventy make, type and size combinations. Even among equipment owned by the Government, there were at least one hundred and ninety four cases where only one unit of a particular make and type combination was held in a province". (III, 1)

There were the same problems with spare parts supply and cost, maintaining and servicing units and training of mechanics and operators, with the difficulties of keeping equipment working most serious in the more remote and isolated areas.
6.3.1 Recommendations on Earthmoving Machinery

Whilst the Commission recommended that some minimum Government controls were needed to ensure the availability of a full range of equipment to maintain a degree of competition and to ensure that importers met their responsibility for effective service support of their equipment, it recommended that importation and distribution of this equipment should be left with private companies.

The Commission noted that there was evidence that much more machinery was available in Papua New Guinea than was needed for the amount of work at present being carried out. This over-supply of equipment went hand-in-hand with general under utilisation (in terms of typical hours worked per year) and was probably historically associated with poor availability of equipment due to inadequate service and spare parts supply. It suggested there was significant potential for savings of foreign exchange spending in this area if the Government created conditions which would encourage the trimming of total equipment holdings and the more effective use of the remaining machinery.

In particular, it suggested that purchase of new items of construction machinery by semi-Government bodies should be vetted by the Plant and Transport Authority, to protect both foreign exchange reserves and the finances of semi-Government bodies.

The Commission reaffirmed its recommendations for an Implementation Officer and a Standardisation Officer, and noted that the Standardisation Office would provide:

"as the Commission has tended to, a valuable clearing house for investigation and resolution of complaints by the public of failure by suppliers to meet their commitments". (III, 52)

It also emphasised the importance of the Government role, particularly in the area of heavy equipment, since the major share of this market was in Government purchases.

6.3.2 Recommendations on Refrigeration and Air Conditioning Equipment

In the field of refrigeration and air-conditioning equipment, the Commission found that a large degree of standardisation already existed, and suggested that the basic problems in the current situation were that:

"records kept by importers were completely inadequate and gave no idea of the numbers and sizes of units imported; customs regulations encouraged importers to classify equipment in such a way as to make the categories meaningless; trained servicemen were not retained within the industry and there was a major shortage of experienced servicemen. (III, 50)"
The shortage of skilled labour made it very difficult for locally-based firms to undertake major contracts, so these were mostly undertaken by companies not represented in Papua New Guinea, who brought in skilled staff for the duration of the project and did a great deal of preparatory work in their home factory and did not train Papua New Guinea personnel for skilled positions, confirming the vicious circle. The Commission concluded that unless some action, such as a levy on contracts for training was taken, overseas based firms would continue to dominate large scale installations in Papua New Guinea.

The Commission found that the Government policy of imposing a substantial duty on domestic air-conditioning equipment was being avoided by importing air-conditioners in two or three parts so that they could come in as air-conditioning and refrigeration equipment spare parts, duty-free instead of at 25% (raised to 45% in the 1975/1976 budget). It therefore recommended that duty should be imposed on all items of air-conditioning and refrigeration equipment, including spare parts.

6.3 Training, Pay and Promotion for Mechanics and Technical Personnel

Throughout its work, the Commission emphasised the importance of training and holding technical personnel. It drew attention to the fact that in the Public Service promotional opportunities were much wider and maximum salary levels were much higher for clerks than for technical personnel. At the same time, there were very serious shortages of technical staff in the Public Service, particularly at the supervisory and senior supervisory levels, with only 288 Papua New Guinea nationals available to fill the 902 established positions. This problem could not be remedied quickly, as many years of on-the-job experience would be needed to carry out these duties successfully.

The Commission emphasised the need to improve the training of mechanics and operators in order to make more effective use of the very large investment in mechanical and electrical equipment in Papua New Guinea. It suggested particularly that instructors should be brought to Papua New Guinea rather than Papua New Guineans going abroad for training. Much more attention also needed to be given to the training of technicians and to their achieving wage parity with clerical staff.

The Commission recommended that the Public Service Board, the largest employer, should take the lead in bringing pay scales up to the levels needed to encourage recruitment and to hold trained staff.

It proposed that, with similar length of experience and training, mechanics should be paid more than clerks to compensate for their harder working conditions.
6.3.4 Capital versus Labour-Intensive Approaches

Before considering earthmoving equipment in detail, the Report discussed some of the implications of replacing labour-intensive methods with capital-intensive machinery in the construction industry. It suggested that factors which should be taken into account included:

"The unemployment problem in urban and rural areas, the particular problem of school leavers, the serious need to conserve foreign exchange, the distribution of income within Papua New Guinea and finally, the real meaning of 'self-reliance'". (III, 18)

While recognising that, at current Papua New Guinea wage levels, the direct cost of labour-intensive approaches would be higher than capital-intensive ones, the Commission suggested that capital-intensive techniques were likely to increase the already growing disparity in income between modern urban sector employment and rural traditional sector employment and to eliminate hundreds of jobs. (III, 20)

As a practical measure to attack this problem, the Commission proposed some form of compulsory, universal, national service for development purposes. It suggested a two-year period for all young people between the ages of 16 and 20, with the possibility of deferment for people receiving tertiary training, who would then perform their service as instructors, teachers and technicians. The corps would work on both major and minor projects and use a minimum of capital equipment. It could be self-sufficient in food and could even produce a surplus to be marketed, as well as giving elementary practical training in agriculture and animal husbandry.

This proposal implicitly argued the irrelevance of the education system to the needs of rural Papua New Guinea. It is the present writer’s view that it was also a complete misreading of the political will and climate in the country at the time, although increasing problems with youth unemployment and drift to the cities could lead to the imposition of authoritarian "solutions" such as this one.
DISCUSSION

How useful and effective was the very bold initiative taken by the Papua New Guinea Government in setting up the Commission? Bold the initiative certainly was, rejecting for example the proposal by General Motors (a firm with an annual turnover many times the gross national product of Papua New Guinea) that it should set up a local assembly plant. It also challenged the previously unquestioned view that the international motor industry should have unlimited access to the market and that market forces should be allowed to determine events in Papua New Guinea. From the work of the Commission, it was clear that the very large variety of models and the frequent model changes posed serious problems for a small and geographically divided country like Papua New Guinea. The inquiry highlighted the shortage of mechanics, spare parts personnel and operators and the inadequacy of existing training arrangements. It demonstrated the impossibility of achieving satisfactory availability of the small numbers of units in Papua New Guinea without drastic reduction in variety.

The political aspects of the Commission's work were emphasised when the Chairman of the Commission, Mr. Andrew Maino, resigned in September 1975, after the Pangu Pati (the main party in the Government) and the United Party (the main party in the Opposition) had jointly purchased P.N.G. Associated Industries Ltd, the "Mazda" dealer in Port Moresby. Mr. Maino considered that this purchase created a conflict of interest for the Government with respect to the implementation of the recommendations of the Commission. During the political storm which followed, the Parties claimed that they had disposed of their interests in P.N.G. Associated Industries Ltd., but there was widespread concern that this was not, in fact, the case.

The position of the Commission was also weakened by increasing tensions between the responsible Minister and the Chief Minister. There was also an increasing reluctance in the public service generally to work with the Commissioner whose initiative had led to the setting up of the Commission.

In the author's view this was at least partly because honest concern in Central Planning Office about the potential for corruption, inefficiency and incompetence in a Government-controlled importing corporation was interpreted, by the Commissioner concerned, as being deliberately vicious and irrational criticism of the Commission's work.

The Australian Colonial Administration had quite effectively isolated Papua New Guinea from any ideology more radical than that of the Australian Colonial businessmen, and independence was granted before any broadly-based nationalist political movement developed. In the circumstances, reservations about a Government corporation were probably well founded. Conflicts between public servants and Commissioners threw increased responsibility on Commission staff and made it more difficult to implement even the less radical recommendations.
There was also a tendency for the Department of Labour and Industry and the Education Department to see the Commission's concern with the inadequacy of existing training measures as a threat to their own positions, rather than as a basis for applying additional pressure on the Government for the further development of those areas.

There was perhaps also a feeling that the Commission, having overplayed its hand on the question of a Government importing corporation, was something of a declining force.

The responsibility for negotiation of possible implementation procedures with the Public Service fell increasingly on the Commission staff. The Commission continued to press importers to improve their performance, in particular by providing better spare parts and service facilities, and by sorting out their pricing procedures to reduce the incidence of overcharging. The Commission also assisted importers to resist pressure from their suppliers to widen their range of vehicles carried. This assistance prevented the introduction of the General Motors Holden/Isuzu Gemini model (another small Japanese car) to Papua New Guinea during the life of the Commission. An attempt was also made to get what tactical benefit could be gained from the involvement of Pangu and United Party with P.N.G. Associated Industries Ltd., by bringing pressure on the other importers to co-operate with the Commission in order to strengthen their own position. It is anticipated there will be further political pressure on the Motor Trade Industry. (For a number of reasons, the profitability of P.N.G. Associated Industries Ltd. seems likely to decline sharply, creating problems with loan repayments for its new owners.)

Although there was some rearguard action in support of the idea of a Government importing corporation, it became steadily clearer that this approach would not be acceptable to the Government.

The concentration by the Commission, and particularly the Commission staff, on preparation of formal reports and on discussions with senior staff in business and Government, did not really tie in well with the rather radical recommendations produced. The extent to which it would have been proper and appropriate for the Commissioners and even more so their staff, to engage in overtly "political" public activity is, of course, a very difficult question. In retrospect, it seems to the author that the Commission failed to make opportunities to carry out educational activity directed at the users of the equipment themselves. Without an awareness of the overall situation there was no way that this group could press for effective Government action on their behalf.

The National Broadcasting Commission was probably the only vehicle the Commission could have used to help develop this sort of pressure. The Commission could, for example, have arranged for frequent short items which stressed the importance of regular maintenance, or dealt with how to obtain needed spare parts, or included consumer reports on particular models. Translated by local stations into local languages, such items could have helped to make people more self reliant and more aware that their problems were a reflection of shortcomings in the motor vehicle industry as a whole.
The importance of educational activity in preparing the climate for acceptance of the need for radical rationalisation was missed, while the Commission devoted itself to formal validation of the problem and to contact with the Public Service and the industry itself. The situation was not eased by the pressure to prepare and produce reports in an absolute minimum of time, so that the first and second parts of the Report could be tabled in the House of Assembly by July 1975, before the House rose until after Independence (in September). The second part was actually tabled on the last morning of sitting before Independence.
8 CONCLUSIONS

The stated aims of the Government strongly support "Appropriate" ("small scale", "intermediate") Technology.

In the light of the problem and attitudes outlined in this Paper, it may seem paradoxical that Papua New Guinea is one of the few countries in the world where there is substantial work going on in this field.

One possible explanation for the level of activity is that, since senior positions in Government and the Public Service were filled at Independence by relatively young men (almost exclusively men), these areas have been virtually closed off to ambitious newcomers such as new graduates. These people may be seeking to establish positions for themselves through village-oriented development work. Whatever the reason, the concern with appropriate technology seems a very positive and hopeful development.

An attempt has been made above to give detailed insight into the workings of the Commission and to outline the broader context in which it worked. A lesson which stands out is the need to recognise specifically the groups disadvantaged by the problems discovered and to try to help them towards ways of helping themselves.

The Commission certainly raised many of the right questions. Both the pressures it exerted and the limited measures which it was able to have implemented, significantly improved the situation for motor transport users in Papua New Guinea. Its recommendations on alternatives to the private motor car seem likely to become steadily more relevant as the reliable availability of petroleum products declines.

As this work shows, failure to standardise on a limited range of vehicles gave rise to serious problems in Papua New Guinea. In smaller countries and the more remote and isolated areas of larger ones, for example in many of the Pacific Islands, the situation will be more extreme even than for Papua New Guinea.

It seems likely that the pioneering work done by the Commission may have widespread relevance throughout the Developing World.
9 REFERENCE

Report of the Commission of Inquiry into the Standardisation on a National Basis of Imported Plant, Transport, Mechanical and Electrical Equipment:

Part 1 Outboard Motors and Motor Cycles;
April, 1975;

Part 2 Cars, Trucks, Buses and Bicycles,
July, 1975;

Part 3 Earthmoving Machinery and Refrigeration and Air-Conditioning Equipment,
March, 1976.

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