DEVELOPMENT CONTEXT

Transportation

Air transport and telecommunications in Melanesia

CHRISTOPHER C. KISSLING

Domestic shipping: ownership, organization and control

ANNE C. DUNBAR

Roads

M.W. WARD
AIR TRANSPORT AND TELECOMMUNICATIONS IN MELANESIA

Christopher C. Kissling

Throughout the 1970s international and domestic civil aviation in Melanesian countries underwent extensive reorganization. Small airlines based in the region have attempted to participate on international routes in direct competition with the carriers of major metropolitan powers. Newly independent island governments have experienced the difficulties of negotiating favourable air rights agreements with their more powerful neighbours. They have inherited from their former colonial masters vastly differing civil aviation infrastructures and face the formidable task of acquiring the capital to finance both aircraft purchases and the upgrading of airport facilities to meet their international and domestic needs.

Civil aviation has been of growing importance in the region. Early links were established more to meet trans-Pacific demands of developed Pacific-rim countries. If Melanesian countries were fortunate to be strategically located along these routes they benefited as way ports, but schedules and connections were tailored to meet the constraints of external demand rather than the minuscule needs of the intermediate transit locations. Additional regional feeder routes were introduced more for political and strategic reasons than in the expectation of favourable commercial developments.

Most countries in Melanesia have experienced relatively poor communications facilities but again, because of strategic location, some have been more fortunate than others to be located athwart major submarine cable links. The eastern and western margins of Melanesia have fared best. Fiji ties into the COMPAC cable (since 1963) on its route from Sydney via Auckland, Suva and Hawaii to Vancouver. Papua New Guinea also ties into the Australia-Asia (SEACOM) cable (since 1967) at Madang. Prior to 1975 the remaining Melanesian countries were reliant upon high frequency (HF) radio systems which many saw as handicapping their existing economic activity as well as prejudicing national development goals. Major changes in international telecommunications in the region have been taking place since 1975, commencing with the opening of a new Intelsat Standard A satellite earth station in Fiji in 1976. Papua New Guinea gained another cable link to Australia early in 1976, emphasizing that the favoured status of Papua New Guinea and Fiji is being continued relative to other Melanesian states.
When the International Telecommunication Satellite Consortium (INTELSAT) reduced their space segment charges for use of small dish Standard B earth stations in June 1976, the prospects for international telecommunications via satellites immediately became brighter for a number of small Pacific island states. Aid monies were negotiable from the EEC, under the Lomé Convention, as well as from more traditional sources in the region for financing regional telecommunications facilities. Besides this, international telecommunications companies were keen to provide facilities on a franchise basis somewhat more quickly than could be achieved following the normal processing steps associated with government to government aid-funded projects.

The race to catch up has been epitomized by the Solomon Islands. Aid finance was made available at the time of independence, prompting the formation of SOLTEL, a company jointly owned by the government of the Solomon Islands and Cable and Wireless Co. Even before a national trunk network has been established, like Tonga and Western Samoa the Solomon Islands has joined the ranks of nations which can be linked by satellite communications, thus vastly improving links between the outside world and a single capital city but leaving unsolved the problems of satisfactory internal communications.

Both in the provision of air services and in telecommunications, the small island countries of the South Pacific have been very reliant upon assistance from external sources. In colonial times they had little influence on the decisions on what was to be provided, where or when and little chance of ensuring continuity of services as technologies altered operational environments encouraging extra-regional demands to be met in different ways. Even as independent states, they are still dependent upon imported knowledge and technology besides the aid capital to finance investments of any size. Their scale of economic activity precludes opportunities to direct research and development specifically tailored to meet their particular needs.

MARGINALIZATION

Brookfield (1978:60) has discussed the notion of marginalization which has plagued developments in the Pacific islands. Marginalization can be seen as a condition of social and economic dependency wherein a single outer island or a whole group of islands may become marginalized

... by the spatially-differentiating forces of economic development, social and political change. It has by definition lost at least a large measure of independence as a decision-making unit; its economy may retain a varying measure of autarky from a subsistence point of view, but its cash economy depends on trade controlled elsewhere; in most cases, the major part of its transport to and from the markets is also provided from elsewhere.

The development of air services across the South Pacific illustrates the concept of marginalization. Early postwar routes at first utilized
flying-boats. Their limited range encouraged 'milk-run' type route structures connecting island groups. However, land-based planes quickly supplanted the ageing flying-boats as they offered better returns and higher speeds. Not all flying-boat bases had ground landing strips nearby. Not all the hastily prepared landing strips from the war years were suitable for continued civilian use or conveniently located to act as refuelling points on trans-Pacific routes. Some quickly became redundant as aircraft performance improved and they could be overflown because local demand was insufficient to warrant a transit call. Now it is possible for flights to completely omit stops en route between city-pairs on opposite sides of the Pacific rim.

Through time, only a small proportion of airports in the South Pacific has been able to upgrade facilities to match the rising standards of service required to meet the needs of ever larger aircraft, and fewer are needed to mount the trans-Pacific services which are of greater commercial concern to the external metropolitan powers. Yet air services have become an essential element in regional patterns of travel. Vast ocean distances separate states, and islands within states, encouraging aviation developments especially for passenger movements.

Even in Papua New Guinea, the largest Melanesian country in terms of land area, aviation is supremely important for internal communications because of the tremendous difficulties encountered when constructing surface roads over inhospitable terrain. Factors of geography have thus lent impetus to the development of civil aviation in Melanesia out of proportion to the state of general economic development. Aviation is vital to much of the tourist traffic and tourism is of central importance to places like Fiji. Consequently Fiji continues to grant generous fifth freedom traffic rights to foreign airlines in an attempt to discourage them from overflying her territory. Plant (1979) has pointed out that definitions of 'development' invariably are 'core' oriented, the Pacific islands epitomizing the characteristics of the 'periphery' within the modern world system. International air transport, like telecommunications, has tended to tie island states more firmly to the control of the 'core' states. Industries that are very reliant upon both air transport and telecommunications are likewise heavily dependent upon decisions made in the economic 'core' areas. Britton (1979) illustrates this fact with respect to tourism and related activities.

TOWARDS AN INDEPENDENT CAPABILITY

It has been a difficult task for the smaller island nations to wrest favourable bilateral air rights agreements from their more powerful neighbours. Fiji's case is illustrative. Air Pacific's first international routes were largely confined to linking island states like Western Samoa, Tonga, Vanuatu (New Hebrides), Tuvalu (Ellice Is.), Kiribati (Gilbert Is.), Nauru and the Solomon Islands to the transfer point at Nadi, hub of South Pacific trans-Pacific routes flown by the metropolitan powers. The desire of island nations for direct access by their own carriers to Australia, New Zealand and North America was largely frustrated by the relevant authorities and commercial interests in those same metropolitan powers. Their airlines had pioneered the route systems and were
understandably reluctant to relinquish any of the business they had strived
to develop.

Consequently, Air Pacific's first through service to Australia was
forced to follow the circuitous route from Nadi via Port Vila and Honiara
to Brisbane. French influence in the then Condominium of the New Hebrides
veted the possibility of more direct services via Port Vila to Sydney as
such a service would inevitably have affected the seat loadings on UTA via
Noumea. No Fiji-Australia direct services were granted to the island
carrier and, anyway, Air Pacific did not have the equipment to fly direct
schedules. Its BAC 1-11s could, however, make the direct flight between
Fiji and Auckland, but the New Zealanders were not about to share their
near monopoly of direct services between the two countries. Fiji was
offered routes to New Zealand via Tonga or via the New Hebrides (Vanuatu),
New Caledonia and Norfolk Island with Norfolk Island a mandatory stop if
the rights via New Caledonia were exercised. Significantly, all these
routes required the acquiescence of third parties, especially France and
Tonga. Norfolk Island could not accommodate the BAC 1-11 jets and Tonga's
airport would require payload restrictions until coconut trees were removed
from the glide paths and/or the runway was lengthened. Other route
possibilities offered by New Zealand in the early 1970s further emphasized
the regional flavour expected of Air Pacific.

In return for New Zealand and Australian generosity in granting such
rights to the Fijian carrier, New Zealand retained the rights to operate
from New Zealand to Nadi and beyond to the Cook Islands, Honolulu and
points in the USA and Canada, and additionally from New Zealand to Nadi and
beyond to Guam ( Marianas), Japan, China, and Hong Kong. Australia was
permitted to operate from Australian ports to Nadi and beyond to Honolulu
and points in the USA and Canada, Tahiti, Mexico and South America. Seen
in retrospect, these exchanges of air rights can only be viewed as
discriminatory.

Subsequently Qantas withdrew its Brisbane-Nadi services in favour of
Air Pacific when Fiji gained rights to operate to Australia via Noumea.
New Zealand has gradually yielded to Fijian insistence on a more equal
sharing of the traffic between their two countries. Leverage for a direct
Suva-Auckland service by Air Pacific came from Tonga's curfew on Sunday
flying. More recently, Air Pacific is leasing space on Qantas B747s for
direct Nadi-Sydney sales, foreshadowing the day when they will fly their
own equipment on that route.

THE SINGLE AIRLINE CONCEPT

Air Pacific was once considered the primary candidate as the South
Pacific island states' single jointly owned carrier, the idea being that
island countries in the region could share in the development of a single
regional carrier whose primary objective would be to act as a feeder/
distributors airline for the major trunk route carriers of the metropolitan
powers. After Qantas acquired the airline from Harold Gatty in 1958, and
with the entry of Air New Zealand and British Airways as major shareholding
partners, management and control of the Board was very much external to
island minority shareholding interests. Operations were conducted with a
view to helping solve the region's civil aviation problems, especially essential communications with dependent territories.

The concept of a single regional airline was doomed to failure for both political and social reasons, even though most expert opinion agreed that the idea was technically feasible and commercially sound. It was essential for the airline to enjoy full support from the various island nations if its poorly patronized east-west sectors were to be sustained. Unfortunately, basing the airline in Suva, from whence all services commenced and finished, did not meet the aspirations of other island governments to acquire expertise in all facets of airline operations. Hopeless telecommunications, night restricted operations, weight restricted runways, and other technical difficulties all conspired to present to intermediate ports of call most unsatisfactory levels of service. The net result of island dissatisfaction was for the various independent governments to attempt to develop their own capability and for Air Pacific to become identified as a truly Fijian carrier. Nauru, with the backing of phosphate revenues, vigorously challenges other established carriers in the Melanesian region, leaving little room for regional empathy.

Even so, international air services between Melanesian countries have mostly remained in the hands of Air Pacific because Air Nauru has not secured traffic rights at intermediate stages. One of Air Nauru's recent route expansions connects Nauru via Honiara and Port Vila to Auckland, but it can only sell seats on journeys to or from Nauru. Travellers from Nadi in Fiji to Honiara in the Solomon Islands are provided with the same plane service by Air Pacific with full traffic rights en route at Port Vila. Vanuatu travellers had, in the past, the option of travelling via Honiara or Noumea on Air Pacific services. Provided the traveller is willing to take a little longer and face the possible inconvenience of changing planes at Nauru, then Air Nauru offers relatively cheap travel between Melanesian ports, and between those ports and Melbourne or Auckland.

Whether or not the very recent independence of Vanuatu and the short independence experience of the Solomon Islands will see a dramatic restructuring of air services remains uncertain. Both Air Pacific and Air Nauru wish to consolidate their positions and act on behalf of their less affluent neighbours. Air Nuigini has not evidenced expansionary aims within Melanesia itself leaving the field to the other two carriers.

Vanuatu could represent a key pivot in the regional airline system for Melanesia. Before independence it was denied the opportunity for direct air services to Australia and New Zealand. French control of the New Hebridean Condominium's air traffic rights meant that the UTA hegemony on the Noumea-Port Vila sector was not compromised by diversion of traffic from Noumea.

Just as the larger carriers of the metropolitan powers established routes using intermediate fifth freedom traffic rights, so Air Pacific and any other regional carrier face the problems of having to share the traffic they develop with whatever carriers emerge in the newly sovereign states of Melanesia. All that has changed is the scale, for now the more developed of the Melanesian states act as the external suppliers of air transport capacity for their less developed neighbours. Inevitably, time will see
the phasing out of indirect routeing and the introduction of direct services flown by or on a charter basis for the independent island states.

Air Nuigini management relations with the Papua New Guinea government have not been exactly smooth. This may account for the apparent disinclination to expand regional Melanesian services and to concentrate on domestic operations alongside a few long distance international services. Jet services were introduced domestically after the acquisition of four F28 jets from Air Nauru. This has dramatized the disparities in services between domestic airports, for only a few of the towns have airports capable of receiving the F28s. The qualitative capacity gap between the turboprop F27s and third level domestic carriers was large enough. The deployment of F28s domestically highlights the lack of trunk route airport facilities at all provincial centres, limiting the possibilities for phasing out the F27s or increasing the opportunities for multi-destination schedules for flights out of the capital Port Moresby. It is where large scale investment projects take place that the airport infrastructure is most likely to be improved. The process of marginalization or increasing disparities in transport facilities is thus likely to become more pronounced in Papua New Guinea as development takes place.

Each new assertion of national sovereignty has made the political climate less receptive to the single airline concept and reduced the likelihood of concerted multilateral efforts to overcome the region's long list of aviation woes. Newly independent countries are often fiercely nationalistic. They wish to be free not only politically, but economically. Hence, having shed themselves of colonialism they find it irritating when they must remain dependent upon outsiders for the provision of much of the goods and services needed to advance their development, air services included. As they strive to overcome excessive external controls, they are not inclined to obscure their fresh blooms of independence in wreaths of regional cooperation.

IMPROVED PROSPECTS FOR COOPERATION

Dillenbeck (1980) suggests that whatever the reasons for past inability amongst the regional airlines to join forces in order to achieve economic, operational and commercial large-scale benefits, the present situation is so desperate that they have no other alternative for survival than to enter into massive cooperative projects in all possible fields of activity and once and for all bury national prestige.

A single regional airline incorporating the international carriers of the various small states in the South Pacific is likely to remain a dream of centralist planners until such time as the states in the region decide upon the formation of a unified economic community after the manner of the European Economic Community. That is not to suggest, however, that the airlines of the region will not take earlier evolutionary steps towards forms of cooperation that will enable them to retain their identities at the same time as realizing the benefits from interlocking strategies, standardization of equipment, integrated spares and maintenance programmes, joint advertising, joint timetabling, joint sales and ground staffing, joint training, and in specific instances the pooling of traffic rights.
Cooperation on virtually any worthwhile scale was unthinkable in the 1970s. One of the major obstacles was undoubtedly inequality. The internal tensions between the very unequal shareholders in Air Pacific, first candidate as the single regional airline, were such as to reduce that airline very rapidly to one whose objectives were unashamedly Fijian. The island participants could not contribute equally either by way of infrastructure, business, or cash. Accordingly, the services that were operated distributed benefits quite unequally. Lesser members of the consortium contrived to establish their own rival carriers with mandates to promote, naturally enough, their own nationalist interests.

Although central to Melanesia geographically, the Solomon Islands and Vanuatu remain very much a part of the periphery in an economic and organizational sense. Their international air services are provided by 'foreigners'. Concerning international air services, therefore, Fiji and Papua New Guinea are closer to the 'core' than the 'periphery' when compared with the Solomon Islands and Vanuatu. Yet Fiji and Papua New Guinea themselves are associated more with the periphery than the core in the context of relations with Australia, New Zealand and other major powers. Change the scale of focus and Australia and New Zealand can be seen as members of the periphery in contrast to the USA. No matter at what level we focus, it is evident that the people concerned wish to obtain a larger measure of control and less dependence upon outsiders for providing such things as air services. This is reflected in the desire to have their own carriers.

Mistrust has not been abolished in the southwest Pacific. However, the 1980s pose a very different situation to that prevailing throughout most of the 1970s. Air Nuigini, Air Pacific and Air Nauru, the three main regional carriers operating international services throughout Melanesia, have all gained much experience at the bargaining table and confidence that they can win a greater share of the traffic involving their own and other island countries. It is obvious that they cannot now be considered simply as feeder/distributor airlines for the other major trans-Pacific carriers. Even so, each of the regional airlines lacks the resources to mount, package and promote convenient schedules independently of outside assistance, particularly in their major foreign markets, and they cannot expect their metropolitan rivals to place island interests first. It therefore makes sense for them to act in concert on the promotional front after eliminating duplications and other inefficiencies between their own networks.

In the 1980s, Fiji, Papua New Guinea and Nauru are far better placed to enter any cooperative ventures as near equal partners with corresponding guarantees of equal benefits. Their airlines have all acquired jet status, with indications that commonality of aircraft type is a distinct possibility. Air Nauru has Boeing 737 and B727 jets and Air Pacific appears to be seriously considering replacing its third BAC 1-11 with a B737, leasing one until it takes delivery of its own. Air New Zealand also operates B737s and one of the Australian domestic carriers, Ansett Airlines is to acquire them as well. This will increase the potential pool of spare parts in the region and the opportunities for shared maintenance facilities if necessary.
It is pertinent to note that the island governments in Melanesia and their national airlines may not have much time in which to build their position as the providers of small jet services to the region. Australia has not yet sought to match the regional airline links between Brisbane and Honiara, Brisbane and Noumea, or Brisbane and Nadi. However, pressure has been mounting in Australia for changes in both domestic and international civil aviation policy. The USA has two of its carriers, Pan American and Continental, flying into Australia in competition with Qantas. Australian domestic carriers, Ansett Airlines, TAA, and East-West Airlines, all would welcome the opportunity to fly internationally, particularly to adjacent countries. Qantas would like the opportunity to fill empty seats on the domestic sectors of its international routes in the interests of airline economics and national fuel economy.

If the two government owned airlines, Qantas and TAA, eventually merge for their mutual benefit, and Ansett Airlines are allowed to develop regional international links, this would provide Australian carriers with ideal equipment for shorter regional services in the southwest Pacific. Regional carriers based in the islands would face stiff competition from operators based in Australia because of the Australian carrier's exceptionally well developed sales networks at the source of much island tourist traffic. Before this scenario can become a reality, it is in the regional carrier's interests to consolidate their position by collectively strengthening their marketing system and/or seek pooling arrangements with an Australian or New Zealand carrier.

PHYSICAL OPERATIONAL PROBLEMS

Another major obstacle in the way of the formation of a single regional airline in the 1970s was the inadequacy of many countries' airport facilities. Short runways (always a problem in tropical climates), sub-standard runway strengths, complete absence of instrument landing systems (ILS) and other modern navigational aids, glide-path obstructions in the form of coconut palms or fringing hills, cramped terminal facilities for passengers and freight, questionable fire-fighting and related emergency equipment, and hopeless communications, all compounded management headaches and ensured that productivity levels for aircraft and aircrew were abysmal.

Again, it was a picture of very unequal capacity to participate and a recipe for frustration and charges of favouritism that led certain states to seek their own solutions rather than rely upon the uncertainties of possible development in neighbouring territories.

Some of the most pressing physical obstacles to international civil aviation operations in the region have been alleviated as operations enter the decade of the 1980s. As far as communications are concerned, the widespread introduction of earth satellite stations has marked the end of that depressing era when it was a complicated and time consuming process for operator and client alike to try and confirm any bookings for intermediate locations. Let alone try and change them at the last moment. Computer assisted reservation systems are gradually appearing at the major regional nodes and providing on-line interrogation of international
connections. Unfortunately, domestic communications in most of the island countries have not improved in step with the international linkages. Information transfer at the local level remains as frustrating as ever.

Runway lengths have been extended or are in the process of being extended. Navigational aids are making a welcome appearance and emergency equipment is being upgraded. Night flying support at regional airports is essential if greater aircraft utilization is to be achieved. There is evidence of gradual improvements, but restrictions at intermediate points can halt all night flying as the aircraft do not have the range to overfly such problem spots. Even in daylight, they must still fly close to their maximum range over water and carry sufficient fuel reserves to reach alternative airports which are seldom nearby.

The net result of improvements in regional international aviation facilities is that airline fleets are becoming jet oriented, reducing the need to retain turboprop equipment like the HS748 simply because of physical limitations at some airports. Domestic aviation in the islands is, on the other hand, experiencing the necessity of obtaining aircraft suited to local operations as the jets used on regional routes are inappropriate. Unlike their major metropolitan neighbours, the island states cannot expect economies from the merging of their domestic and international operations as the facilities available are so different. In fact, it would appear to be in their best interests to divorce their international and domestic operations since the equipment and air crew requirements are becoming so dissimilar and the political and social pressures are likewise incongruent.

One factor which probably will hasten the day when more outer islands are equipped with airstrips for use by domestic air transport, is the growing need for the island states to mount adequate surveillance services to police their two hundred nautical mile economic zones. The programme of airport developments in Fiji appears to be partly a response to this need. Once equipped with flying facilities, the outer islands may find their domestic shipping services will decay all the more rapidly as passengers transfer to the faster mode, but only if they can afford the rising fares. Unless advantage is taken of the freight capability of the aircraft to move such items as fresh or chilled fish to the Suva market, all that the introduction of air transport may achieve is the easing of travel for administrators from central government and the hastening of the one-way migration of outer islanders to the primate city. Domestic air services that leave domestic shipping without sufficient business to survive, pose a very real problem to island governments unless the air services themselves have a significant freight capability. It is also most useful if that freight capability eases the transfer problems between domestic and international services.

FINANCIAL CONSIDERATIONS

Island nations in the South Pacific are likely to be persuaded to make greater efforts to cooperate in civil aviation matters more by problems of rapidly escalating costs and the need to find the necessary capital to acquire efficient aeroplanes than by any other single factor.
Unfortunately, it is seldom possible to acquire exactly the right amount of capacity to service customer demand even given the absence of seasonality factors. Limited route networks merely serve to compound this problem by reducing the possibilities for schedule adjustments. In such circumstances, leasing extra capacity on a temporary basis is a more attractive solution than owning aircraft which must stand idle for excessive periods. It also presupposes that the appropriate aircraft are available and the owner airline has insufficient work itself for them, indeed welcoming the opportunity to increase the aircraft's productivity.

Traffic potential on some South Pacific sectors, especially those on an east-west axis linking small island states, is too small to justify more than two flights per week with aircraft of B737 capacity and in some cases even two flights is excessive; but at least two flights per week is necessary for customer convenience particularly if alternative routings are either non-existent or grossly circuitous. If more than one operator holds rights over such sectors or near parallel sectors, and they all wish to exercise their rights, each individual airline may find even one flight per week to be uneconomical and difficult to market attractively. It will often impose operational difficulties in positioning relief crews without leaving them grounded longer than is necessary from a safety standpoint.

In the past, Air Pacific overcame a problem of temporary excess capacity by leasing one of its BAC 1-11 jets to Air Malawi until route developments to New Zealand and Australia necessitated its recall. Subsequently a third BAC 1-11 was purchased, but now management feel there is insufficient regional work for three BAC 1-11s and it would be prudent to sell one and obtain leased B737 capacity for specific services, particularly as several neighbouring airlines appear to have excess B737 capacity available. Whereas the BAC 1-11 cannot normally service the Nadi-Brisbane sector non-stop in either direction, the B737 can, reducing the need for a technical non-traffic stop at either Noumea or Vila en route. As there is greater demand for Australia-Fiji services than there is for intermediate points, overflying the intermediate points on some services becomes attractive.

Three airlines with excess B737 capacity could be approached by Fiji. Air New Zealand provided such a service to Polynesian Airlines before delivery of that airline's own B737. Also, Air New Zealand is finding it economically necessary to reduce frequencies on some domestic services which may release more B737 capacity for regional operations that could be on its own account or on behalf of others. In fact, Air New Zealand is strategically well placed to provide intermittent extra capacity for other regional operators as its domestic services provide the cushion to ease the scheduling problems when short lease periods are contemplated.

Polynesian Airlines are unlikely in the short term to have enough work for their one B737 jet. They need to find other markets for their surplus capacity. That market may be Fiji. The third potential supplier of B737 or B727 capacity to Air Pacific is Air Nauru. It certainly has available capacity to lease, but whether the differences between the management of the two airlines can be smoothed sufficiently for such an arrangement to be negotiated is a moot point. UTA, Air Tungaru and Polynesian Airlines have all chartered Air Nauru capacity.
Chartering is a role to which Air Nauru is well suited in that its own population is so small and tourist attractions so limited that it does not itself generate much traffic and must rely upon servicing other countries demands for much of its revenue. Air Nauru is the willing provider of air services to states which cannot afford their own international airlines. Those states can provide the necessary traffic rights at intermediate points on Air Nauru's far flung network. Regional cooperation is essential if Air Nauru is not to remain a highly subsidized public relations enigma. One can expect Air Nauru to continue to offer attractive leasing deals in the region, and Air Pacific may yet be a customer.

It is a very encouraging sign in the South Pacific that more joint ventures are making their appearance. Dual flight designators are not uncommon, for instance FJ/UT, PH/UT and QF/FJ. More are foreshadowed in the 1980s. It is a means by which routes with insufficient capacity for more than one operator can be flown with the costs and revenues shared by the partners holding traffic rights. It also benefits from joint promotion by the airlines concerned, and when traffic eventually grows often leads to pooled operations as management realizes the value of continued cooperation.

RESTRUCTURING POSSIBILITIES

Just as Tonga, still without an international airline of its own, has been able to attract more frequent air services than its small isolated population warrants, so Vanuatu, also without its own international airline, is placed strategically to take advantage of its mid Melanesian location. It may become a hub of regional international air movements in a manner which New Caledonia has never really exploited. Noumea does act as a gateway for UTA/JAL flights from Tokyo, but Nadi can now challenge that role especially as aircraft will fly Tokyo-Nadi-Auckland. Other long distance UTA flights focus upon Noumea, but Noumea is the target with little regard for regional redistribution of traffic. Thus independent Vanuatu in the 1980s can offer the possibilities of non-stop services to New Zealand and Australia for its own nationals besides one-stop through plane services to the same destinations from other island states.

Most of the island states in Melanesia desire direct or same plane through services to Australia and New Zealand. Since control of their own air traffic rights came with independence, they are now able to encourage the development of these services. A glance at the map will show that both New Caledonia and Vanuatu are ideally located to act as cross roads for such services either on the Australia-Fiji axis, the Nauru-Australia axis, or the Papua New Guinea/Solomons/Nauru-New Zealand axis.

Figure 1 displays the international air services which operated in 1974. By 1979 they had evolved to those shown in Figure 2. The political, technological and physical background to these services is given in Kissling (1980). In the 1980s, we could expect further restructuring as both the Solomon Islands and Vanuatu decide how their respective air rights agreements with Australia and New Zealand are to be operated. One possible restructuring of Melanesian international air services involving the Solomon Islands and Vanuatu is set out below (see also Figure 3).
Figure 2

MAY 1979
AIR SERVICES - SOUTH PACIFIC
*No Rights - technical only
Air Pacific would cease to operate any of its Brisbane services via Honiara in favour of the more direct Nadi-Vila-Brisbane route now feasible following Vanuatu's independence. It would continue Nadi-Noumea-Brisbane services as well, probably in conjunction with UTA on the Noumea-Nadi sector as now occurs. Twice weekly schedules via Noumea and via Vila could be augmented by twice weekly direct Nadi-Brisbane schedules, provided Air Pacific lease the appropriate B737 equipment from one of its neighbouring airlines. Indications are that Air New Zealand is to be the supplier, but Polynesian Airlines could offer the attraction of providing a through plane connection to Apia in Western Samoa if its B737 was leased by Air Pacific for direct Nadi-Brisbane services. Fiji's rights into Sydney may have to be flown via leased cabin space in Qantas B747s until Fiji decides upon replacement aircraft for its BAC 1-11s. At least the cooperative arrangement gives Air Pacific the chance to market the sector itself rather than see its share of the traffic distributed amongst 'fifth freedom' operators like Canadian Pacific, Pan American and Continental.

The gap created by Air Pacific's withdrawal from the Nadi-Vila-Honiara-Brisbane sectors could be filled very neatly by Air Nauru flying on behalf of both the Solomon Islands and Vanuatu in conjunction with its own rights between Nauru and New Zealand and Nauru and Australia. At the present time it operates a once weekly service Nauru-Honiara-Vila-Auckland but does not hold intermediate point traffic rights. Provided the various bilateral agreements can be made to permit Air Nauru to operate on behalf of other island states, and they can pool their rights, it would seem to be a very sensible means of ensuring necessary east-west connections as part of north-south services, for it is the latter which generate the most traffic. Only minimal deviation would be required. Air New Zealand could be expected to reciprocate at least on the Auckland-Vila-Honiara sectors if traffic out of New Zealand warranted it, and in so doing increase the New Zealand presence in the region which is otherwise dominated by Australia.

Until Solair is suitably equipped, the Solomon Islands will continue to require outsiders to provide the Honiara-Brisbane services. This is the Solomons Islands' most important route. If Air Nauru is contracted to provide Solomon Island entitlements rather than Air Pacific, and if these entitlements can again be flown in conjunction with those held by Nauru, a cooperative venture between Nauru and the Solomon Islands could see them linked by a through service Nauru-Honiara-Brisbane-Melbourne with full traffic rights except on the Australian cabotage sector Brisbane-Melbourne.

Neither Honiara nor Vila airports are of the necessary standard to accept B727 aircraft on a regular basis. This limits Air Nauru to using Noumea as its staging point for bringing its B727s from Nauru to headquarters in Melbourne, again without traffic rights on the Noumea-Melbourne sector. Should either Honiara or Vila manage to upgrade their airports to accommodate larger aircraft of the medium size like B727s or their expected replacements in the next generation of aircraft, then direct Melbourne services would become a distinct possibility, further reducing the demand on the short Vila-Noumea sector. This latter sector is mainly flown on a charter basis by Air Nauru for UTA along with Noumea-Wallis Island services. Chartering capacity from the various regional airlines would seem the best means of ensuring the link is maintained without the necessity of keeping specialist equipment and aircrew just for that job.
Air Nuiigini's intentions in the region are not clear. It would appear that apart from links to immediate neighbours when traffic is sufficient, i.e. the Solomons Islands and Indonesia but not Nauru, Air Nuiigini seems intent upon concentrating on longer haul connections to places like Kagoshima, Manila, Hong Kong and Honolulu using B707 aircraft rather than deploying its F28s in a purely regional role even though the F28s are quite suited to that role. It is unlikely that Air Nuiigini could hope to divert much island traffic via Port Moresby when Noumea and Nadi offer equally good connections and Air Nauru offers a cheaper alternative to places like Hong Kong and Kagoshima. A far more attractive proposition than an island-hopping route to Auckland would be direct services tied in with onwards services to Hong Kong or Jakarta, but such 'sixth' freedom endeavours as attempted by Nauru do not meet with the approval of the countries at either end who naturally resist the erosion of their 'third and fourth' freedom traffic potentials. Until Papua New Guinea as a destination generates enough traffic to support several carriers over the same routes, then it is unlikely that Port Moresby will be used as a means to bypass Australia to reach places like Fiji or New Zealand.

TELECOMMUNICATIONS AND COOPERATION

Telecommunications technology in the form of earth satellite stations offers island nations a far better chance to participate than has been their experience with international civil aviation developments. They can telescope in time the development process and all enjoy a similar standard of service, something that, had submarine cable remained the only alternative, would not have been the case. No capital city is likely to be left out of these developments or bypassed in future developments since satellite communications can have such a wide footprint, simultaneously covering the whole of Melanesia and beyond.

It is interesting to note that implementation of telecommunication developments has followed closely upon the investigatory work done by the International Telecommunications Union/United Nations Development Project (ITU/UNDP) in the South Pacific. Usually projects of this nature involve a considerable time lag before any recommendations become a reality, especially considering the relative poverty of the countries concerned, but in this instance the right technology became available at favourable prices at the opportune moment. It also meant that certain countries like Australia, New Zealand and Papua New Guinea could pass on some of their redundant equipment at very favourable rates to island countries which still needed such equipment for developments in their domestic networks.

Paradoxically, the relative ease of participating in international telecommunications, compared with air transport, does not mean that domestic telecommunication services will likewise be mounted more simply than domestic civil aviation. The gulf between domestic and international capability is far wider for telecommunications than for civil aviation. External interests in both instances have been more concerned with establishing the external links, with the responsibility for the domestic reticulation resting firmly with national authorities. In the case of civil aviation, those authorities had more time to marry the external/internal components. Not so in the case of telecommunications.
The sudden upgrading of international communication links has meant that few of the countries in Melanesia have the local experience and expertise to handle modern telecommunications equipment. Some have resorted to franchising as a means of obtaining that expertise, others have recruited overseas and linked training of local people to the temporary importation of expertise. South Pacific Forum countries, through the coordinating functions of The South Pacific Bureau for Economic Co-operation (SPEC), have access to a training centre. Even so, it will be several years before the technical expertise is available locally. Meanwhile expectations of improved levels of service which satellite communications can offer will remain the preserve of main centres of population until rural communications networks are greatly improved.

Table 1

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<th>Telecommunications Facilities</th>
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<tr>
<td><strong>Melanesia</strong></td>
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<td>Papua New Guinea</td>
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<td>Solomons</td>
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<td>Vanuatu</td>
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<tr>
<td>New Caledonia</td>
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<td>Fiji</td>
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<td><strong>Other</strong></td>
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<td>Fed. States of Micronesia</td>
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<td>French Polynesia</td>
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There has been mounting political, social and economic pressure for improvement of domestic telecommunication deficiencies as a direct consequence of the dramatic advances in international links. With the exception of the Federated States of Micronesia, all but the smallest South Pacific countries either have obtained or have under construction efficient and modern telecommunication facilities (see Table 1). The question is now being asked whether or not satellite rather than terrestrial solutions can be used to solve rural telecommunications deficiencies. A paper prepared by ITU (project RAS/78/048) on behalf of SPEC, canvasses the prospects and makes comparisons with the technical solutions to Australian outback telecommunication needs.
None of the small states in the South Pacific could contemplate having its own satellite. Even if they all joined forces in a cooperative venture, they still could not afford their own satellite. However, as the ITU paper notes 'the thrust of history is for countries to join together to create a common pool of demand for implementation of high total cost/low unit cost technologies. In international forums this has resulted in dramatic cost reductions over recent years in both actual as well as constant price terms'. Because of the region's geography and historical affinity with Australia and New Zealand, the paper suggests that the needs of the small island countries could be incorporated within a larger regional system, in fact could be served by association with the proposed Australian domestic satellite system.

Perhaps one of the most exciting aspects of satellite rather than terrestrial solutions to domestic communications in the Pacific island context is that the introduction of high technology need not necessarily result in marginalization of communities. In fact the reverse could well be the case, for isolated corners of archipelagos that have never had much by way of communications could enjoy much the same standards of service as urban communities. This is because of the relative insensitivity to distance of satellite costs compared to conventional terrestrial links. A second advantage of satellite systems is that they permit flexibility to combine small needs on both permanent and intermittent bases.

Most compelling of all would seem to be the relative costs. The ITU paper stresses that 'there is no way with existing technologies that any combination of terrestrial systems for rural telecommunications can be made competitive with a shared usage satellite solution'. When satellite terminals are produced in large quantities, costs per unit fall and if common to a regional system, spares and maintenance facilities can be pooled. Allocation between countries and within countries can also change easily through time as developments take place and supplementary terrestrial systems become economically justified. Many of the Australian outback communication problems mirror those encountered in South Pacific island contexts; the ITU consultants do not see the need for system planners to do anything particularly exceptional for the islands.

If the footprinting of the Australian domestic satellites can be such as to offer scope for South Pacific island participation, and the in-orbit spare can be positioned with possible island use subject to preemptive recall, then a relatively low cost solution to rural telecommunications problems in Melanesia and throughout most of the South Pacific island communities is a distinct possibility. Australian influence in the region would be enhanced by such a positive cooperative gesture, the costs of which would be relatively small but the benefits to the islands conversely enormous.

Unfortunately, it seems that footprinting of the Australian domestic satellite to give general coverage of the South Pacific islands is not likely because of power and other technical considerations, though some beams may be directed to the South Pacific. Antenna dishes would need to be somewhat different than envisaged for widespread deployment of rural stations. Some of the potential users of the Australian domestic satellite system will require instantaneous backup should normal circuits cease to
function. For instance, Transport Australia needs real time communications for air navigation and air traffic control purposes. If the in-orbit spare satellite was temporarily out of position and not immediately available because it was being used for Pacific islands coverage, unacceptable breaks in communication within Australia could occur. Much of the insurance value of the in-orbit spare satellite would be lost. Any preemptive uses of spare capacity on the Australian domestic satellite are thus likely to be confined to domestic operations. Repositioning is out of the question should priority users suddenly need to capture circuits from functions taking low cost advantage of the system's insurance capacity.

If Australia does not provide the leadership in the Melanesian telecommunications field as far as satellite solutions are concerned, then it may not be too long before Japanese or other powers step in instead. For the present, a technically and economically attractive development for island nations as a spin-off from the needs of users in the more developed neighbouring countries is unlikely to eventuate unless they develop the political will in those developed countries to give foreign aid considerations greater weight, or somehow align domestic commercial needs and foreign policy factors. Unlike transport, telecommunications technology gives prospects for complete coverage of island communities even if island governments must continue to wait for external sources of aid. Undoubtedly the new age of telecommunications in the South Pacific lends a new dimension to regional development and regional cohesion.

BEYOND DIVERSITY?

Access to air services is unlikely to exhibit much uniformity in Melanesia. On the international scene, there are definite signs that each country will be served by direct connections to major foreign markets rather than via indirect routeing. There is also a growing commonality in aircraft types. However, uniformity on the international front is not matched by similarities in service levels within the domestic networks of individual countries. Marginalization at the domestic scale remains a difficult problem.

There is the potential for geographic isolation to be minimized so far as telecommunications are concerned. In this field, modern technology does not necessarily bring benefits to a few specific places. It can enable a widespread enjoyment of reliable communications. But if the most modern satellite solutions to rural telecommunications are not embraced, then the gap in quality between international and domestic services will grow rather than diminish, with some communities remaining peripheral in more than a geographical sense.
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DOMESTIC SHIPPING: OWNERSHIP, ORGANIZATION AND CONTROL

Anne C. Dunbar

INTRODUCTION

A substantial body of literature now exists on small-island development and the inherent issues of isolation, marginalization and fragmentation. Within this, a subset of studies has emerged dealing explicitly with transport and, more particularly, with inter-island shipping (Couper 1965, 1967, 1979; Baker 1972, 1974; Brookfield, 1978, 1979, 1980; Dick 1978, 1979; UNESCO/UNFPA 1977; UNCTAD 1978; et al.). In addition, individual island governments have commissioned detailed reports on the status of their own island shipping linkages (e.g. Papua New Guinea Department of Transport 1971; McNamara and Perkins 1980 (Solomon Islands), and various national planning office studies). In recognizing the key role of effective transport services in the realization of their long term development plans, governments are now having to face the prospect and implications of much greater and more direct intervention in the operations of the commercial shipping sector.

The seemingly late arrival of such concerted interest in the national-scale organization and operation of internal shipping largely reflects the laissez-faire attitudes which prevailed during the colonial period. Although the administrations attempted to maintain a presence throughout the scattered islands of the archipelagos for political reasons, the commercial trading companies (which had quickly dominated the transport and marketing sectors of the plantation-based economies) were under no obligation to provide any form of welfare service to outer islands, nor indeed perceived any such need. Company shipping, with various individually operated trading vessels working on its periphery, was observed to perform the required functions of collecting copra from plantations or villages and of distributing imported goods. Thus, the administrations saw little cause for government-level involvement and, given the apparently chaotic mix of vessel types, route patterns, freight charges and operational goals which developed in the 'free enterprise' fleets, no doubt preferred to let the principles of 'survival of the fittest' hold sway in island shipping rather than meddle with forces and structures which were imperfectly understood. Only when the colonial powers began consciously preparing for independence was there any overt recognition of the scale of the spatial inequalities created by concentrated company activity in high production/consumption areas. It is the reality of this situation with which newly independent governments now have to cope. They are faced with a population which, in varying degrees, has become locked into the world cash economy and which, despite vast
differences in level of accessibility to central port-towns, expects to receive the goods and services associated with this changing lifestyle. It is here that the lack of accumulated experience, amongst both expatriate planning 'experts' and indigenous decision-makers, is so telling in the archipelagic environment.

Much of the contemporary work on island shipping systems has tended to gravitate towards finding responses to changing maritime technologies (Maxwell Stamp Associates Ltd 1978; Brookfield 1980) and away from the descriptive categorization of domestic fleets into formal/informal sectors, expatriate/indigenous ownership patterns and government/private control systems. Useful as all these approaches and contributions may be, there must be some clearer identification of the policy options which may be open to island governments, and of their structural and spatial implications. The debate on new vessel designs and cargo-handling systems tends to overshadow the more fundamental questions pertaining to the ownership and control of this new technology, and to isolate shipping as an element in the infrastructure rather than integrate it into the full complexity of economic, social and political relations of which it is a part. The aims of this paper are therefore to identify the nature of the 'island shipping problem', to suggest a schema of possible policy options, and discuss their implications in relation to specific Melanesian archipelagos.

THE NATURE OF THE DOMESTIC SHIPPING PROBLEM

Unless the products of the soil and sea can be delivered to island ports for shipment, the whole programme of economic development from the 'grass roots' collapses (National Transport Survey, BSIP 1976).

Such is the nature of the problem. Without an effective inter-island transport system the whole basis of small-island participation in the cash economy breaks down and severe developmental imbalances occur between those islands with access to the pivotal points in the system (the international ports) and those without. Increasing diversities in levels of social and economic opportunity intensify the core-periphery structure of the archipelagos and so lead to further concentration of shipping services in the areas of greatest economic activity. Caught in this downward spiral, the marginal regions must face the prospect of isolation from the cash economy and a drastic modification of their development aspirations. The fact that domestic shipping is unable to meet the demands of island populations throughout the archipelago essentially constitutes the problem; the set of factors which combine to produce this problem, however, are very complex and varied and must be understood if government is successfully to embark on policies to control the situation.

The factors of relevance to the archipelagic shipping problem relate to obvious geographic constraints (long sea distances, small volumes of cargo, difficult coastlines and the lack of suitable sites for wharves), historical legacies of the colonial era (domination by expatriate trading companies, polarization of the space-economy around the international ports, and concentration of shipping activity upon those areas of greatest copra production which are in closest proximity to these ports), and a
whole range of technical and organizational constraints which stem not only from ongoing internal processes but also from changing external developments. The common denominator in all these factors is that of cost, or, more precisely, that of rising operating costs which must eventually be passed on to the consumers of the service. Whereas consideration of the physical problems of distance and the specific technical problems of small ship operations have received much attention in the literature, the intention here is to look more closely at the way in which expatriate company operations have affected the subsequent development of island fleets and so to view the 'problem' more as a progressive phenomenon than a set of discrete issues. In this way it is possible to stress the deep seated structural impact which company domination of island trading achieved and the legacies of this which are apparent in contemporary domestic shipping systems.

The pervasiveness of the expatriate trading company system throughout Melanesia is well known (see Brookfield with Hart 1971:249-51). As the principal engines of commercial colonization, the metropolitan-based companies have been major forces shaping the space-economy not only of the wider region but also of individual archipelagos. Having originally opened up the islands for commercial agriculture, and, as part of the political colonial machine, having won the covert support of the colonial governments through their strategic command of the all important sea links, the expatriate trading companies achieved a high degree of domination from the outset. Through their vertically integrated operations, a small number of large companies (notably Burns Philp and Co. Ltd., W.R. Carpenters, Steamships Trading Co., Morris Hedstrom, and la Maison Ballande of Noumea), was able to control not only the key strands in the internal trading networks but also those linking the island economy to its overseas markets. With their economies of scale and their ability to cross-subsidize between various fields of activity when their shipping operations suffer temporary losses, the companies have tended progressively to squeeze out private traders or merely absorb them into their own network.

Whereas in the early years of colonial occupation company vessels tended to operate directly from their bases in Australia or New Caledonia (in the case of Messageries Maritimes) to selected anchorages within Melanesian archipelagos, the increase in vessel size and the use of steamships rather than sailing vessels on the long haul runs meant that break-of-bulk ports grew up in the islands and that differentiation between external and internal services occurred. Thus intra archipelago trading by international vessels progressively ceased and a new pattern of company operations became established. The growth of the port towns and their development as the bases for branch company activity saw a progressive polarization of economic activity. The company vessels working internally operated on routes radiating out from these locations and, understandably, preferred to conduct as much business as possible close to the import/export centres. As expatriate traders pulled out of the islands under the threat of financial ruin (often having got into serious credit difficulties with the companies) so the colonas with plantations on the periphery of company operations found themselves increasingly marginalized. Indeed, as early as the 1930s, colonas in Vanuatu were demanding (unsuccessfully) government subsidies to upgrade shipping services to their small plantations in what had become, by reason of the superimposition of a
tightly controlled company power structure, the 'outer islands'. What had previously been a relatively 'open' trading system, with miscellaneous vessels tramping freely throughout the archipelagos, had become a 'closed' system with the establishment of international ports and the designation of official ports of entry.

Control of port operations was the next obvious step, and indeed, until as recently as 1972, the two trading houses in Vanuatu owned the only available wharves in Vila and so charged wharfage on all goods (imports, exports, and internal cargoes) passing across them. Couper (1965:97) notes a similar development of company power in Fiji during the early decades of this century, with a gradual division of the archipelago into the core areas served by merchant company vessels and the outer areas which were left to the small 'freight earners' (mainly traders who still maintained trade stores there). Couper suggests that the company interests in the port town of Suva were no doubt behind the successful resistance to scheduling of any more ports of entry, especially on Vanua Levu, which might have weakened their dominant position. The situation developed rather differently in Papua New Guinea where, until 1967, overseas vessels carried nearly all the cargo between 'main ports' within the territory, leaving locally registered vessels to serve outports, plantations and mission stations. After 1967, specialized shipping companies on the Australia-Papua New Guinea run introduced unit-load vessels which were restricted to fewer main ports than the conventional vessels they replaced (Rimmer 1972). However, as will be discussed later, this has had the effect of handing inter-main-port trade over to Papua New Guinea based companies and so radically altering the pattern of local shipping.

The core-periphery structure was therefore gradually strengthening and those areas offering the prospect of larger profits to shipowners were becoming more clearly defined, so making the outer areas even more unattractive. After the Depression, when many expatriate plantations were abandoned throughout Melanesia, the companies proved themselves flexible enough to capture the trade of local, indigenous producers. As local production grew (by 1948 over half the copra exported from Vanuatu was being produced by villagers), the villagers became increasingly dependent on the services of company ships which not only purchased their copra but also brought consumer goods to their doorsteps. This inability of islanders to provide for their own transport needs, and yet their desire to participate in the cash economy (and moreover their preference for company ships with their stores stocked full of tempting imported goods), has essentially made for a process of 'power amplification' (Baumgartner et al. 1976) favouring and reinforcing the power of those controlling the trading linkages. In Vanuatu, it may be argued that such control effectively precluded the development of indigenous middleman-entrepreneurial activity until the companies found themselves threatened by impending political independence. Since the copra economy is basically littoral, the producers can each negotiate directly with the ships calling at their nearest anchorage. Thus, owning the principal means of distribution (the ships themselves) the companies are in a position to act as middleman as well as supplier and exporter and opportunities for indigenous entrepreneurship have been largely restricted to the village level (usually as storekeepers). Only since the mid 1970s have ni-Vanuatu begun entering the domestic shipping scene in any numbers as commercial vessel owners, a time
which relates to high copra prices, growing political awareness (and an associated frustration with company domination), and a weakening in the company monopoly as rising operating costs forced a contraction of services.

In Vanuatu, indigenous participation in island shipping represents diversification from their store owning and taxi running enterprises - and many of these owners know that if their shipping ventures fail they always have their other businesses to return to. Such attitudes constitute a major problem for any grand design of establishing a fully fledged indigenous shipping industry, for the level of investment in maintenance and repairs of the vessels tends to be very low. Lacking capital and accumulated expertise, village kompari or individuals have bought old, often unsafe vessels which, needing to make quick profits in order to pay back the bank loan as soon as possible, are run on the core routes in competition with the company ships. The outer areas, for which such vessels would appear to be ideal, remain isolated. The lack of navigational skills amongst their skippers, the unseaworthiness of the craft and the long, open sea distances often involved, mean that such voyages are rarely attempted. Thus, the increase in local shipping operations does not appear to have increased the tonnage capacities, or even the frequency of services to outer islands, but, as has occurred in Fiji and the Solomon Islands, has led to overtonnaging in the core areas.

In all the archipelagos, the company response to increasing indigenous competition has frequently been to form de facto cartels whereby freight rates can be manipulated (e.g. Baker 1974). Rate undercutting by companies means that the less efficient, less capital-secure shipping enterprises are either driven out of business or forced to operate on the periphery of company activities, usually in the outer islands. Since these vessels are indeed less efficient and often maintained to a less competitive standard, the outer islands find themselves doubly disadvantaged. Not only do they not have the benefits of big-ship company services, with the full range of consumer goods (the purchase of which is generally the motivating force behind village copra production), but the vessels which do occasionally call can only provide a poor quality service at a relatively high cost.

In very general terms, domestic fleet development has tended to polarize into a core of a small number of larger, relatively well maintained, expatriate owned vessels dominating the most profitable routes, and a broad periphery of older, unreliable, and considerably smaller vessels having to work in the outer areas or in the interstices of company operations and operating on a variety of scales of commercial activity. Nevertheless, the island shipping problem does not end here. A number of changes can be identified which are affecting all sectors of shipping regardless of ownership structures, and which, being superimposed on this deeply polarized pattern of activity, add yet another dimension to the situation facing independent governments today. The most fundamental problem is that of steadily rising operating costs. In part this stems from the general ageing of the domestic fleet and a subsequent increase in maintenance costs. (In 1971, almost half the cargo carrying fleet in Papua New Guinea - some 109 vessels - was over twenty years old and, in Vanuatu, almost two thirds of the fleet fell into this category in 1979.)

Reasons
for the absence of fleet renewal are complex but obviously relate to falling profitability of the business. In the high risk island trade, a new ship, while having lower maintenance costs, has higher capital costs. As Dick (1979) points out, it is more attractive to import an older ship and finance the maintenance outlays from current revenue than to import a new ship and have to bear the higher interest costs on the investment. Also, as companies pull out of island shipping (as Burns Philp, Morris Hedstrom and W.R. Carpenters have done in Fiji), so the responsibilities of domestic services fall increasingly on the old, inadequate vessels of indigenous entrepreneurs who have none of the capital support to buy newer vessels, or on government services which have yet to determine the degree to which they are to be involved in commercial freighting/passenger work.

In addition to rising maintenance costs, all operators have been faced with rising fuel costs, wages and the costs of meeting new safety standards imposed by governments. Against all these costs, the level of freight rates has remained too low to allow any margin for the replacement of capital equipment. Although, as will be shown later, various governments have attempted route subsidies and freight subsidies to try to induce operators to run ships to outer islands, the lack of infrastructural investment there (in the way of cleared channels, passage markers, navigational beacons and wharves) makes such voyaging particularly hazardous and unattractive. A further factor is the increasing modal split, whereby passengers increasingly travel by air while cargo goes by sea, resulting in a loss of revenue to shipowners for whom passengers constitute a profitable 'cargo' - one which Brookfield (1980) aptly describes as being able to load and discharge itself quickly and without costly handling equipment.

At present then, it appears that domestic fleets are heading for almost certain obsolescence unless some means of regeneration or complete restructuring can be found. The island shipping problem, as identified in these general terms, is one rooted in the circular causation process of marginalization, itself rooted in the inherent spatial inequalities of colonial company trading and the realities of geographical fragmentation. So as to escape from further, somewhat dangerous, generalizations about domestic fleets, each archipelago will now be briefly considered in terms of its own particular problems and its own particular responses (both governmental and technological).

DOMESTIC FLEETS IN ISLAND MELANESIA: A COMPARISON IN ORGANIZATION AND CONTROL

Papua New Guinea

The larger scale of economic activity and population in Papua New Guinea make comparisons with conditions in the Solomon Islands, Fiji and Vanuatu rather difficult, and the complex set of local-shipping hinterlands at each main port creates a very different pattern of linkages. Furthermore, the government has been much involved in trying to build up a strong local-shipping industry, currently regulated by the Office of
Concentration of main ports in Papua New Guinea

- Main ports (designated after unification of overseas cargoes)
- Ex-Main Ports
- Subsidiary ports

Legend:
- ○ Main ports
- ★ Ex-Main Ports
- ● Subsidiary ports

Distance scale: 0 250 500 kilometres
Transport. With the introduction of unit-load, overseas ships to a select number of main ports (Port Moresby, Lae, Rabaul, Madang, Kieta and Kavieng), considerable reliance has been placed on the inter-main-port coastal fleet to redistribute unitized cargoes around the islands to ports with suitable wharf facilities. The Commission of Inquiry into Coastal Shipping (Papua New Guinea Department of Transport 1971) declared that this fleet, which comprised nineteen general cargo vessels over 150 grt, was obsolete and should be replaced. A large part of the problem has been overtonnaging on the inter-main-port routes, which eventually resulted in the Administration establishing a Coastal LICencing Authority (Rimmer 1972). This restricted the entry of additional vessels of over 200 grt into the coastal trade and imposed route restrictions on new licensees where necessary. Because of the ageing structure of the fleet, however, shipowners subsequently demanded permission from the Administration to raise their freight rates (a 30 per cent increase on some routes was demanded by some operators - Rimmer 1972:54). Aware of the contradiction between supporting the operators while necessarily neglecting its responsibilities to the wider community (on whom the increased costs would fall), the Administration appointed the aforementioned Commission of Inquiry to consider ways in which this 'industry' could be regulated so as to provide modern and efficient methods of operation at reasonable prices. However, despite the Commission's recommendations on licensing of vessels and companies and on rate increases of 5 and 10 per cent on certain long distance routes, the inter-main-port routes were still overtonnaged by as much as 50 per cent (National Planning Office, Papua New Guinea 1978:73).

Away from the inter-main-port routes, great reliance is placed on the government fleet for the provision of services. The Final Report of the Investigation of the Government Fleet (Papua New Guinea Office of Transport 1977) states (p.13) that "whereas commercial shipping enterprises both coastal and overseas provide for the import and export of essential commodities, the Government Fleet services the remote and developing areas of the country to the benefit of the Community". Such services are not intended to compete with private enterprise already operating, but are focused on areas where, for economic reasons, commercial craft will not venture. However, costs of operating the government fleet increased from K1.28 million in 1973/74 to K2.46 million in 1976/77, in spite of the fact that high priority has been given to replacing obsolete vessels to reduce maintenance and operating costs. By the end on 1978 over K4 million had been spent on a vessel replacement programme (many of the vessels had been the original surplus Allied vessels which formed the nucleus of the government fleet after World War II), and alternative ways of operating the fleet were being considered. Amongst these were suggestions that commercial enterprise be invited to take on the entire functions of the government fleet on a tender basis, that private firms be subsidized to carry out government functions, or that all assets and complete control of provincial fleets be handed over to their respective governments. The last suggestion was the one which gained highest recommendation.

It might be argued that the introduction of unitized cargoes has had a differential impact on regional development. Those regions with pivotal ports offering direct overseas services tend to be favoured at the expense of regions served by 'feeder' services, which, as Rimmer (1972:109) states,
Solomon Islands: location of main ports and wharves
creates the 'classic dilemma of trying to balance the welfare interests of Papua New Guineans against the premium placed on economic growth' (and transport efficiency). The government's national development strategy, outlined in a white paper in 1976, heavily stresses the importance of rural development and decentralization of economic activity. The 1978-81 National Public Expenditure Plan states that, in a bid to provide a more equal distribution of economic benefits, 'shipping services will be upgraded and extended to improve communications, and hence development opportunities, in coastal and island regions, and to reduce dependence on air transport' (National Planning Office, Papua New Guinea 1978:101). With the government fleet in serious difficulty, it is not easy to see how such 'upgrading' will be effective even in the short term without consideration of the underlying causes of shipping's failure to deal equitably itself with all areas. Furthermore, without a concept of a 'total transport system' (Couper 1979:4) the government would appear to be committed to a policy of subsidization for eternity.

The Solomon Islands

As in Papua New Guinea, the government fleet in the Solomons plays a major commercial role in outer island areas. Although its main raison d'être is to provide cargo and passenger services which, because of the lack of private sector interest would not otherwise be available, the fleet has been criticized for its tendency to compete with private shipowners. Because it is highly subsidized, it can set low freight rates (as can mission-run ships), but this tends to attract cargoes away from commercial shipping concerns which, if they are to compete, must similarly offer lower rates and suffer a reduction in earnings. This has resulted in low private investment in shipping and 'less than efficient' operations (Special Committee on Provincial Assembly, Solomon Islands 1978). As the same report goes on to state, 'it is becoming increasingly clear that indigenous shipowners do not have the capital or the expertise to efficiently operate the inter-island and inter-province shipping links', an observation which makes the recent withdrawal of many Chinese traders doubly regrettable. It appears that high running costs relative to freight rates, ageing vessels and captains, political uncertainty and the high costs of new vessels, all contributed to their decision to leave the trade (Ward and Proctor 1980).

Because there are as yet no route licensing schemes, the bulk of private shipping activity is concentrated on prime routes in the main island chain. Proposals for licensing had been made as early as 1971, but there was difficulty in establishing which routes or areas should be subsidized and by how much and the proposals were not pursued. Given this lack of central control it is not surprising that the outer areas are almost totally dependent upon government services. The introduction of container services from Australia and New Zealand has meant that the number of international ports has been effectively reduced from three to two; Gizo has lost its direct connections with these countries and its goods must now be transhipped at Honiara (with a consequent rise in freight costs on goods destined for Western Province). As the transport task shifts from overseas vessels on to higher cost internal services, so the pressure on the domestic fleet can be expected to intensify. As Ward and Proctor (1980) indicates, the time must be approaching when the government has to
Fiji: geographical allocation of freight rate subsidies ($F per tonne)

Source: UNESCO/UNFPA (1977) and Saggar (1978)
make serious, long term decisions about the level and nature of future investments in shipping, and particularly with regard to the adoption of appropriate technologies for transshipping unitized cargoes within the archipelago.

Fiji

Until relatively recently government involvement in domestic shipping had been limited to that of regulation of safety standards and control of freight rates and route subsidies. Following the withdrawal of a number of private, conventional steel-hulled vessels from the trade during a recession in the late 1960s (notably those of Burns Philp, Carpenters and Morris Hedstrom), and the phasing out of vessels on the less profitable routes, the government was forced to review its policy on non commercial involvement. By 1977 the only shipping companies still operating were Williams Shipping and Rabi Holdings, and the manager of one of them estimated that an initial outlay of $5-6 million would be necessary from the government to find suitable replacements by 1980 (Pacific Islands Monthly October 1977). The government has therefore embarked on a programme of building and operating a fleet of steel landing craft with loading ramps. Furthermore, the trend is for the carriage of cargo in barges towed by tugs which operate to Levuka and Vanua Levu, and less frequently to Taveuni. Nevertheless, as the UNESCO study of eastern Fiji (1977) shows, the island services are generally deteriorating with only those centres close to Suva still maintaining regular and frequent services.

Again, rising operating costs are the cause of the breakdown in outer island services. In 1972, the government began subsidizing commercial operators in a scheme which involved the division of the archipelago into eight zones. The subsidies on cargo (copra and general) covered all freight costs above an inward rate of $F7/ton and an outward rate of $F11/ton outside the main island (Viti Levu). Between 1972 and 1977 the scheme cost the exchequer over $F1.5 million (Sagar 1978), but yet there was evidence to suggest that price differentials between inner and outer islands had continued to widen (Brookfield 1978:77). For this reason, freight subsidy schemes ought perhaps to be seen only as short term measures and not as a substitute for a more rigorous investigation of the underlying causes of outer island problems. The UNESCO report (UNESCO/UNFPA 1977) does in fact assess a number of different strategies, in each of which radical restructuring and integration of all strands in the transport network form the key elements. In Fiji it is intended to create a number of 'central trading points' similar to those suggested by Couper (1965), undertake restrictive licensing of vessels on specific routes, and rely increasingly on government services in non commercial areas.

Vanuatu

Having only just achieved political independence, Vanuatu is still in the process of ascertaining the nature of its shipping problems and indeed of working out its longer term development strategies. Government
Vanuatu: Concentration of inter-island shipping activity
regulation of domestic shipping under joint colonial rule was negligible and until the mid 1970s the commercial fleet was dominated by the company ships serving the more profitable areas close to Vila and, more particularly, Luganville. The ships of the three administrations (French, British and Condominium) largely fulfilled a non commercial role, although certain French Residency vessels would carry private cargoes and passengers at commercial rates where necessary and one steel vessel was seconded to work specifically with the French cooperative organization, SCAF.

The most concerted effort to break the now familiar pattern of concentrated shipping activity in the core areas came with the introduction of a cooperative shipping service aimed at serving all the anglophone cooperative societies on a nationwide system of operation. To achieve this, a commercial shipping company was formed (a joint venture between Sofrana-Unilines of Noumea and the Co-operative Federation, called Vanua Navigation) using two chartered steel vessels. The two established expatriate companies held the advantage in that, in the absence of route licensing schemes, they could still concentrate on the inner areas while the cooperative ships were away in the outer islands fulfilling their obligations there. Furthermore, the two companies formed a de facto cartel in which freight rates (uniform throughout the group) have been kept at an artificially low level. Vanua Navigation is understandably anxious that freight rates should be increased for it is estimated that for every one tonne of copra carried the company loses almost $A20 (mainly on account of having to take on unprofitable voyages to remote locations). Indeed, early in 1980, the government stepped in and gave the Co-operative Federation a grant of $A125,000 to cover its losses. Such a gesture is indicative of the now independent government's attitude to the expatriate companies and it is not unreasonable to suppose that domestic shipping will ultimately be restricted to ni-Vanuatu ships and companies only. If such a plan is adopted some massive programme of fleet renewal and training of both seamen and shore staff must be developed in the near future.

The bulk of the commercial fleet is made up of small, ageing vessels working on routes which are already overtonnaged. For most of the indigenous operators shipping is merely a short term venture which will cease when the vessel sinks or the business becomes too unprofitable. However, nearly all these vessels fulfil local social roles and it is clearly inappropriate to assess them in purely economic terms. Without some form of decisive government intervention, it is probable that the fleet will rapidly degenerate as these poorly capitalized shipping ventures collapse and the ships fall into disuse. Following the recent political disruptions and the subsequent withdrawal of most expatriate, small scale shipping concerns, and given the possibility that both Burns Philp and CFNH might be prevented from operating (despite the fact that Burns Philp has agreed to offer half of its branch company shares to locals), this would seem to be a uniquely opportune time to consider options for complete restructuring of internal linkages on what is, to all intents and purposes, almost a clean slate. It will be interesting to see what sort of 'choice' the government will in fact have - the demands of an electorate used to having its own, unregulated village ships and to being offered a wide range of consumer goods from the company ship-board stores might stall any radical government plans for a centrally controlled shipping system. The degree to which islanders have been absorbed into the cash economy and have
adopted western style materialist attitudes might well be the most fundamental constraint on the range of options open to the government.

A spectrum of possible options, not necessarily related to the situation in Vanuatu, is considered below.

A GENERALIZED SCHEMA OF GOVERNMENT POLICY OPTIONS AND THEIR LIKELY IMPLICATIONS

Free enterprise

The basic assumption involved here is that non-regulation of the shipping sector would allow the free play of market forces to produce the most competitive cost-effective system of operation. Adoption in full of such a policy implies that a government is prepared to abandon its economically unprofitable, peripheral regions and give full rein to the polarizing forces already at work. If expatriate companies gain the monopoly on operations, with the strength of a vertically integrated business network behind them, the question will ultimately arise as to how free the host government is to plan its own space economy, for control of transport essentially means control over the direction of internal development projects. Furthermore, such companies will only remain while profits warrant their presence; the government is therefore very vulnerable - if the companies pull out the internal network of commercial linkages collapses. Where long term operation is envisaged the dominant companies may invest in high technology systems and so stimulate the growth of a whole new set of industries and services. Alternatively, the pattern of activity arising from a free enterprise policy may merely follow a path to stagnation or decline, particularly where the economy is still tied to the production of a single export staple and cannot, on its own impetus, stimulate new forms of economic activity. This might be the result in Vanuatu if the government were to permit the companies to remain. While copra continues to produce high earnings on the world market, the shipping system will tend to be self-regulating in the long run, with the most efficient vessels gaining control of the most profitable cargoes. During times of falling world copra prices or after certain catastrophes (severe hurricane damage or prolonged droughts), even the strongest shipping operators may prefer to cut their losses and pull out completely. Clearly, for newly independent nations consumed with the ideal of self-reliance and self-determination, such a policy of unregulated competition can hardly be considered a valid option; being identified with the laissez-faire capitalism of the colonial period (Dick 1977) it has strong overtones of exploitation and can scarcely be viewed as a safe political stance for a new government.

Regulated, private ownership

Under this system the government controls vessel registration and licensing, freight rates and route licensing, with the assumption that 'controlled' competition between private operators will ensure efficiency and a greater equity of service. The spatial implications will depend on
the efficacy of the route licensing/freight subsidy scheme. Some degree of
polarization will be inevitable but outer areas should receive at least the
minimum of commercial services in addition to government social and
administrative visits (although obviously the inhabitants must not expect
to have a high level of participation in the cash economy). Since freight
rates are centrally controlled, competition will be based on the
differentiating factor of service quality. Some operators might be
prepared to invest in new equipment and more modern vessels (for example,
second hand landing craft or, if the system required it, vessels adapted
for carrying containers between main ports) in order to win a greater share
of the trade. In general terms, this type of policy offers the possibility
of establishing a 'shipping industry' based on local entrepreneurship,
characterized by a range of vessel types and levels of organization (formal
and informal) with designated government bodies acting as overseers. The
government fleet would maintain responsibility for social welfare services,
clearing channels and installing navigational aids, and providing training
for seamen. This appears to be the option most island nations are already
heading for since it conforms to schemes for decentralization and the
desire to integrate transport systems with rural development projects. The
outer areas cannot be expected to flourish dramatically, nor can there be
any expectation of an equal spread of development investment.

A cooperative controlled system

This option relies on the establishment of a nationwide system of
cooperative societies which hold the monopoly on all internal trading and
overseas marketing. Through a licensing scheme, no private commercial
shipping activity would be permitted since this would undermine the whole
basis of cross-subsidizing routes. (Private operators would cream off the
bulk of the profits themselves by concentrating on the low cost/high
density routes.) Government acts indirectly through the copra board and
is responsible for providing the necessary infrastructure (wharves,
navigational aids and feeder roads, for example), but not for operational
decision making which lies entirely in the hands of the cooperative
managing body and its regional/local branches. In spatial terms, the aim
is to provide an even distribution of service throughout the archipelago to
to all cooperative societies (which essentially incorporates all rural
economic activity). The use of warehousing in all islands, linked where
possible to land-based feeder roads or 'speedboat style' local sea links,
would permit the bulking of produce and would also act as a reservoir of
consumer goods. Although the intensity of commercial interaction would be
greatest in the core areas, the outer regions would still be offered the
same level of trading opportunities despite their smaller scale of
production and consumption. It may further be expected that the sites of
the island warehouses (analogous to central trading points) would develop
into secondary centres and so create a hierarchy of rural service centres.

With regard to technology, the ships serving the key warehouses ought
to be modern, purpose-built vessels equipped with efficient cargo handling
gear to ensure a fast turnaround in the international ports, and with
specially designed boats for fast ship-to-shore transfer of cargoes in the
islands (for example, mini landing craft with protected inboard engines for
negotiating surf). It is probable that most warehouses would be in the
vicinity of wharves but such structures should not be relied upon as permanent fixtures since they tend to suffer badly from hurricane damage. The feeder vessels working from the warehouses are likely to be more conventional, unless funds (from government) permit a fleet of landing craft or similar special purpose vessels, and although owned by the cooperative organization would be manned, maintained and repaired by local islanders. On this account, the technology ought not to involve complex sets of machinery and highly specialized operating skills because it then becomes too vulnerable to breakdowns and delays in repairs.

As a national shipping network, this option permits a much greater degree of integration between islands of the archipelago and therefore must be politically advantageous given that most governments are currently striving to achieve some degree of national unity. Furthermore, since it is intrinsically non governmental in its operations, it should have much greater appeal to islanders who see it as belonging to them and its success or failure as depending on their efforts. This level of identification is rarely found in government-run schemes where the recipients of the service are alienated from decision making. Perhaps the most serious criticism of the cooperative scheme is the implicit assumption that political and social differences between village groups can be surmounted and that 'cooperation' can indeed occur. This scheme also demands that villagers work together rather than as individuals each seeking his or her own personal wealth and it is likely that those who are frustrated by their inability to run their own trading operations will either move to the urban centres or try to operate illegally.

Government nationalization

Depending upon government development strategies, nationalization could involve either a spatially polarized service or an equally distributed one. In either case the essential fact is that government holds total control, both operationally and organizationally, with only local, informal services (i.e. those fulfilling social roles) remaining in private hands. If a nation has severe resource constraints in some of its islands the government might decide to concentrate all its investment efforts in those areas which will show some return and to stop draining money away in 'persistent loss' islands. Alternatively, the government could adopt a system aimed at providing 'adequate' shipping services throughout the archipelago (as, for example, if the Marine Department took on the responsibility of organizing all voyages using its own vessels). Complete government control offers the opportunity of supervising a renewal and revitalization of the fleet, perhaps with high technology sea transit systems or simply with second hand barges, tugs and landing craft.

However, as a centrally controlled monopoly system, there is a great danger of sub optimal performance. It may be that the equity principle eventually proves too costly to maintain and that, since only a relatively small proportion of the electorate live in the outer areas, the government feels 'safe' to begin cutting back on these services. It may be that the end result of an equal distribution policy will be that of the polarized growth option, although achieved at greater cost owing to heavy initial outlays in welfare services and failed development projects.
A variant: direct subsidization

A variant with applicability to the last three options (private, regulated enterprise; cooperative organization; government nationalization) is one in which the charges levied for all individual services, irrespective of who runs them, are based on actual operating costs. On paper, the high density routes would show lowest costs; the outer islands, high costs. However, by negotiating direct subsidies, perhaps paid from consolidated government revenue, the differentials are reduced in keeping with welfare and decentralization policies. These subsidies are agreed before voyaging over a period commences and thus operators have to strive to keep within their allotted budgets, and by so doing ensure an efficient service. The operators do not have to cross subsidize their routes. Local communities or sub-regional government operators can thus run their own services secure in the knowledge that, after a season's trading, they will receive the subsidies previously negotiated. This level of participation engenders a degree of self-reliance and an awareness of the true costs and difficulties involved. Unlike centrally controlled systems, it also allows services to be tailored to suit specific route requirements. Each operator would be obliged to keep audited accounts of his voyages and would thus be kept informed of his performance. This would also allow planning officers to monitor any improvement or worsening in the outer island situation.

CONCLUDING COMMENTS

In general terms, it would appear that Melanesian governments are drifting towards the 'compromise' option of private ownership under government control. However, this appears to be a forced response to the pressure of (worsening) circumstances rather than a conscious policy decision. The ownership, organization and control of shipping in archipelagic environments is of such fundamental importance to the population that it cannot fail to be a political concern. The prospect of grappling with the problems now facing domestic shipping (and hence the problems facing the majority of the population) are particularly daunting for newly independent national governments. Shipping is the life blood of almost every community in island Melanesia; if overt government action were to further disrupt services, albeit unintentionally, perhaps by trying to restrict vessel ownership to nationals when in reality indigenous owners are seriously ill-prepared for assuming such a heavy task, the government cannot fail but to be criticized and even ousted. Whereas it is politically 'safe' to keep on building wharves here and there and to add new vessels to the government fleet so as to provide better welfare services in the outer islands, it is by no means 'safe' for a government to commit the nation to a particular transport strategy when external factors beyond its control can, at any time, bring about a very different (possibly detrimental) result. Seen in this light, many governments will prefer to appear to be doing a little while in fact doing nothing.

In Vanuatu, for example, it would seem that the government would be justified in expanding the cooperative system of operations into a fully fledged national organization with all the necessary infrastructural supports. However, whether this is compatible with villagers' changing aspirations (and hence whether it is a dangerous move for the government to
make) is a crucial question, particularly since many islanders have already shown discontent with the cooperative services by helping to buy a trading vessel for their own village. For islanders in less remote areas, the flexibility and social status of running their own trading vessel is clearly preferable to being obliged to bulk their cargo and wait for a cooperative or government ship to come and collect it. Such considerations may perhaps be viewed as being indicative of the contradictions set in motion by increasing immersion in a 'western style' consumerism which prizes individual endeavour and personal gain above social and economic cooperation. It is therefore possible that a policy involving a centrally controlled system of operations or the superimposition of an alien, exclusive technology could be defeated by the nature of the aspirations and expectations of the people it is supposed to serve.

In summary, this paper has sought to address the domestic shipping problem not only in terms of the structural inequalities inherited from unregulated competition in the colonial period, but also in terms of the position from which independent governments must now attempt to deal with them. Whereas shipping studies have traditionally focused on the problems of changing technologies, rising operating costs and the relative merits of different regulatory policies, for example, it is argued that such 'discrete' treatment must give way to a broader investigation of the working of the political economy in which shipping operates and in which governments must make their decisions. The ownership, organization and control of domestic fleets is increasingly becoming the direct concern of governments and any attempt to assess the changing fortunes of shipping and the outer areas necessarily requires consideration of purely political constraints as well as the more obvious economic ones.

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ROADS

M.W. Ward

The pidgin word not has the English meanings 'track', 'path', 'road', 'way', or 'course'. Any one of these is indicative of the importance of the road in the social, economic, and perhaps even political life of people, whether they live in Melanesia or elsewhere, and whether we think of present, past or future time. Roads, in one form or another, are an integral part of peoples' lives. They influence the ease or difficulty (sometimes expressed as time or cost) with which people, goods and ideas can move from one place to another, and have done throughout the greater part of human history. Despite major external changes, such as escalation of oil prices in the 1970s, personal mobility appears to be highly valued by people, in developing as well as in developed countries. It seems, therefore, that roads and their influences for good or bad are likely to stay with us for a long time.

This paper has two sections, the first a brief history of roads in Melanesia and the second an examination of the effects of roads on the economic and social life of the area.

ROAD DEVELOPMENT IN MELANESIA

Pre contact

It is a truism to say that there have been 'roads' of a sort in Melanesia for almost as long as there have been people. Rivers, and more particularly river valleys, may have provided the initial routeways inland from the island coasts. Today's population distribution maps show that Melanesian settlers penetrated far beyond areas accessible by canoe, eventually leaving only the least hospitable areas unoccupied. Hughes (1977) and others have shown the farreaching traditional trade links which existed in pre-contact Melanesia, and which presuppose some form of recognized overland path and right of way, even if it consisted of a series of discrete lengths. Within group territories, recognized and often well worn walking tracks existed, both in pre-contact times and at present. The track network facilitated fundamentally important economic and social exchange, and still does (Brookfield with Hart 1971:chapter 13 passim).
1870-1950

With the advent of Europeans road development in a more modern sense began. The most significant differences from the earlier era were that the orientation of roads changed, the physical width and surface quality of land routes improved, and the degree of security on roads sometimes increased. In the first eighty years of the European territorial presence (to about 1950) the main purpose of road building in Melanesia was to provide inland access to ports. Early European settlement was in the coastal lowlands, often focussing on a harbour or anchorage where people and goods could be exchanged between larger and smaller vessels. Examples are numerous: Port Moresby, Samarai, Rabaul, Alexishafen, Madang, Suva, Noumea, Luganville, Lautoka, Salamaua, Kavieng. European-organized agricultural activities spread first along coastal lowlands accessible to service by small vessels and the first mining ventures were either on offshore islands (e.g. Sudest (1888), Misima (1889), Woodlark (1895) - see Nelson 1976) or relatively close to the coast, as in the case of the first nickel mines in New Caledonia (Brookfield with Hart 1971).

Road building during this period progressed outward from the port towns until physical difficulties or lack of economic incentive defeated the technology of the day. (For completeness we should include railways under the heading of roads here, the prime example being the construction of narrow gauge systems serving the sugar industry of Viti Levu and Vanua Levu in Fiji, completed by 1920 and still in use.) The classic example of road building in this era is what is now called the Bulominski Highway southeast from Kavieng, named after the German administrator who directed its construction in the first decade of the century. It was the first modern road of significant length in Papua New Guinea and its coronus surface provided German planters along the northeast coast of New Ireland with horse-and-cart access to the port of Kavieng, and German administrators with access to coastal villages.

Other roads in similar locations were constructed for similar purposes during the period. Examples include the circumferential highway around Viti Levu built between 1921 and 1938, the basis of a road system built by convict labour in southern New Caledonia before 1900 (Brookfield with Hart 1971) and, in Papua New Guinea, the road north from Madang to Alexishafen (Sek harbour) and a little beyond, the cart road connecting the government station at Old Rigo and small port at Kapa Kapa with the European plantations fifteen miles away on the Wanigela river, and some of the network of roads connecting plantations on the Gazelle peninsula with Rabaul.

In summary, the roads built in Melanesia during the long prewar period were of small total length, generally 'port-feeder' roads, and were built largely by low technology methods with consequently low design standards. The traffic they carried was light, initially horse and cart but later small numbers of motor vehicles. These roads were intimately linked with the growth of exports and the firm establishment of the colonial economy throughout Melanesia. They served mainly the expatriate community and any benefits to the indigenous populations were largely incidental.
Nevertheless these early roads marked the beginning of changes common throughout those areas of Melanesia which they touched. Traditional societies were disturbed to the extent that physical movement on land was now easier, quicker and cheaper for both Melanesians and expatriates. The latter had clear objectives - to facilitate the utilization of the resources which they perceived, namely agricultural, mineral, forest and human. For the Melanesians new economic opportunities arose, and the transition to a cash economy commenced, but at the cost of the loss of some part of traditional exchange systems and pertaining social values.

1950-1965

In the history of roads in Melanesia as well as in many other ways, the second world war marks the great point of change. Technology took a great leap forward with the bulldozer, and its usefulness was demonstrated in Melanesia in the building of wartime airfields, roads (vehicle tracks) and other earthmoving activities. Attitudes also changed, about administration, economic and social relationships, and responsibilities. The revealed existence of the large populations in the interior highlands of Papua New Guinea posed a new challenge to administrators and potential entrepreneurs. The potential of aircraft in Papua New Guinea had been ably demonstrated by the servicing of the Wau/Bulolo goldmines in the 1930s and the next two decades were to see an unparallelled exercise in the 'opening up' of a country by the use of aircraft.

The first inland road penetration of length in Melanesia was the road from Lae to Bulolo and Wau completed by the first bridge across the Markham about 1948. Road networks centering on the main ports were gradually extended further, but some of those roads which had been built for war purposes were allowed to decline, as for example the Bulldog Track. In Vanuatu over a hundred miles of roads and serviceable bridges on Efate and Santo were a legacy from the war, and tracks passable for motor vehicles were maintained on other islands (HMSO 1953:3, 32). It was not until the later 1950s that a significant programme of road construction was begun in interior Fiji.

The main development of communications in Papua New Guinea in the 1950s and early 1960s was in the building of airstrips, and following them the construction of roads focussing on airstrips, first to provide access for the administrators, and later to carry the cargoes generated by the increasing interest in commercial production of exportable crops, in particular coffee from the highlands. Thus, in the New Guinea highlands a pattern of 'kiap roads' developed, focussing on the airports (which were located at the administrative and missionary centres) and eventually linking these centres together. By the 1960s the most urgent need for surface access was to link the highlands with a port, and this was achieved with the completion of the Kassam pass about 1965.

The road map of Papua New Guinea about 1960 comprised a dozen or more very small networks feeding the main ports and a wide scatter of short lengths of road in the interior, focussing on airstrips. In the highlands a rudimentary network existed but with significant gaps between the major basins. Some relatively intense networks of local wartime roads remained,
but were dying from lack of traffic. None of the other main islands of Melanesia experienced the use of light aircraft to the same degree, hence roads remained focussed on ports.

In Papua New Guinea, and elsewhere in Melanesia, the postwar surge of economic and social development, coupled with the great rise in availability and use of motor vehicles for land transport, brought about strongly increased demand for roads and motor transport. Melanesians recognized that effective access to towns and markets was necessary for their own economic benefit, and hence stimulated strong new pressures for road building at a local level. In Papua New Guinea they showed themselves willing to devote their own labour and money to the construction and improvement of local service roads often on locations approximating those of preexisting walking tracks. Self-help construction was undertaken elsewhere in Melanesia also, as in southern Malekula in Vanuatu where 20 km of road was built by local people in 1972. Melanesian ownership of motor vehicles increased, though the life of individual vehicles and Melanesian-owned transport enterprises was often short.

The process of change from traditional to monetized economies continued apace and simultaneously social horizons broadened. The presence of ever increasing lengths of road helped stimulate internal migration, the spread of ideas, and perhaps even political consciousness.

1965-1975

The last decade of the colonial era was marked in Papua New Guinea by, first, greater coordination and effectiveness of transport planning, and, secondly, emphasis on fostering national unity.

The World Bank's Report on the Economic Development of Papua and New Guinea (IBRD 1965) led to the establishment of an Office of the Coordinator of Transport (later to become the Directorate of Transport, and eventually the present Department of Transport and Civil Aviation). One of the first major tasks of the office was to conduct a comprehensive survey of the transport needs of the whole country, the findings of which are encompassed in the UNDP Transport Survey (Halcrow and Partners 1969). This survey laid the basis for national transport planning, and set transport needs in all modes and in all areas in a national context for the first time.

The official policy towards roads in Papua New Guinea at this time (1968) was that they should support national development, as the following summarized extracts from a policy statement of the Directorate of Transport show:

Broad Policy Objectives:

(a) To develop at least a minimum system of inter-regional land and sea communications
(b) To make cost reductions and improve capital efficiency
(c) To service planned developed schemes
(d) To service planned and expected urban growth
(e) To service and stimulate diversified rural development
(f) To support the air transport industry.
In addition four corollary requirements were stated:

(a) Provision of secure, reasonably efficient land or sea transport links to all major population groups
(b) Improved servicing of existing traditional agricultural development
(c) Servicing of planned land settlement, village concentration and forestry development schemes
(d) Servicing of the expected growth of new industries such as tea or cattle in newer areas where economic development had to date been marginal.

At this time over one third of the Administration's budget was devoted to transport, and about one quarter of all the budget for capital works and maintenance was spent on roads.

The document concludes:

In the planning of road development, especially of major highways, careful consideration is required of their wide regional and other effects, extending well beyond the few Districts which may be immediately affected and influencing other areas and industries throughout the Territory. Few other investments are so important for nation building as the development of a sound road system and the planning and financing of national highways must be assessed in relation to their effects on the country as a whole (extracts from Territory of Papua New Guinea Directorate of Transport 1968).

When translated into action this policy placed emphasis (so far as roads were concerned) on the development of a moderately high quality main road network designed to link the major towns on the larger islands of Papua New Guinea, hence supporting the building of national unity at the time of independence. Since long lead times are involved in the design and execution of major road projects the carrying out of this policy still continues. International financial assistance was sought and obtained for the upgrading of the Highlands Highway from Lae ultimately to Mendi. (By 1979 this road continued as far west at Lake Kopiago.) The Sepik Highway linked Wewak to Maprik and now reaches Lumi in the Sandaun (West Sepik) Province. The Hiritano Highway was completed westward from Port Moresby to beyond the border of Gulf Province and will ultimately form part of a trans-island road to link Papua with the highlands and Lae. East of Port Moresby the Magi Highway continues to be extended towards Alotau. Madang is now linked to Lae and there is an almost completed road connection to Wewak. In New Britain a road will ultimately link Rabaul with Kimbe.

In other parts of Melanesia in recent decades some expansion of road networks has occurred and standards of existing roads have been improved.
Post 1975

In Papua New Guinea since independence emphasis in road planning and development has moved yet again, this time towards regional development. Devolution of central political powers and some financial resources to the twenty provinces together with a national development policy which emphasizes rural development and greater equality of opportunity have contributed towards a greater emphasis on regional development. Thus there is now increased recognition of the need to improve access to hitherto marginal areas, and administrative machinery has been developed to permit provinces to allocate some resources to this within their own areas. Obviously for some provinces the development of sea transport or other alternative forms of transport is equal or greater in importance than the development of roads, but the planning and construction of new roads and the upgrading of existing roads, together with improved maintenance continue throughout the country. For example, in Morobe Province since 1975 the Slate Creek-Aseki, Pinsicnafen-Sialum, and Lae-Boana roads have been completed, a Wau-Garain road examined in detail, and a coast road from Lae to Pinsicnafen mooted. In Madang Province the north coast road now reaches beyond Bogia to East Sepik Province, the Ramu Highway provides an overland link to Lae, and a road from Madang to Simbai is the highest priority provincial development project.

In Vanuatu the national unity theme blends with that of regional development. The expressed aims of road development in 1978 are: 'To link communities so that they can benefit from common facilities such as health and education; to permit the transportation of products for marketing or transshipment; to open up new areas for agricultural or other development'. It is intended that both peri-urban and rural roads will be improved and 'the rural programme will be drawn up with the aim of integrating existing communities, strengthening their economic and social potential and integrating them into the national communications network' (Government of the New Hebrides 1978).

The following table summarizes the available information on road lengths in five countries of Melanesia about 1975.

The largest country, Papua New Guinea, has the largest length of road, but New Caledonia possesses the densest network of roads and also the greatest length of road per capita. Papua New Guinea has the longest length of road per vehicle. Because of an estimated low number of vehicles as well as a low length of road the Solomon Islands also shows a fairly high length of road per vehicle ratio.

The demand for roads is still strong, despite increasing fuel costs and criticism from some quarters that roads enhance urban problems by permitting easier migration which in turn deprives rural areas of people who might otherwise play an active part in rural development.

In the last hundred years Melanesia has experienced a change from a situation where there were 'roads' only in the form of paths or waterways to one in which a large proportion of the population is within reasonable distance of, and dependent on, a trafficable road. People and goods traverse the main roads at volumes, speeds and comparative costs which would have been hard to predict a few decades ago. For better or worse the
Table 1
Roads in Melanesia, c.1975

<table>
<thead>
<tr>
<th>Country</th>
<th>Main</th>
<th>Secondary</th>
<th>Country</th>
<th>Urban</th>
<th>Total</th>
<th>1000 sq km</th>
<th>1000 people</th>
<th>1000 vehicle</th>
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<tr>
<td>Fiji</td>
<td>1,139a</td>
<td>457g</td>
<td>817d</td>
<td>20</td>
<td>2,443</td>
<td>133</td>
<td>4</td>
<td>86</td>
</tr>
<tr>
<td>New Caledonia</td>
<td>360a</td>
<td>1,050g</td>
<td>2,500d</td>
<td>n.a.</td>
<td>4,710</td>
<td>247</td>
<td>34</td>
<td>65</td>
</tr>
<tr>
<td>Vanuatu</td>
<td>n.a.</td>
<td>n.a.</td>
<td>384</td>
<td>n.a.</td>
<td>640</td>
<td>43</td>
<td>6</td>
<td>188</td>
</tr>
<tr>
<td>Papua New Guinea</td>
<td>(1) 3,600e</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>17,241</td>
<td>37</td>
<td>6</td>
<td>467</td>
</tr>
<tr>
<td>Guinea</td>
<td>(2) 4,779f</td>
<td>12556</td>
<td>n.a.</td>
<td>1,016</td>
<td>18,351</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solomon Islands</td>
<td>(1) 455g</td>
<td>n.a.</td>
<td>n.a.</td>
<td>964g + 800h</td>
<td>1,864i</td>
<td>93j</td>
<td>5j</td>
<td>355</td>
</tr>
</tbody>
</table>

(a) bitumen surfaced  (f) 'main' including sealed and unsealed
(b) unsealed        (g) government
(c) stone surfaced   (h) private plantation and logging roads
(d) tracks          (i) 'motorable' road
(e) highways or trunk roads (j) excluding private roads

Sources: Europa Publications 1979, for Fiji, New Caledonia, Vanuatu, Papua New Guinea (1) and Solomon Islands (1)
Solomon Islands (2) - Solomon Islands 1979:163
Papua New Guinea (2) - Papua New Guinea Department of Transport and Civil Aviation 1975
sudden cessation of transport by road would be felt in the lives of almost all Melanesians, in terms of their monetary incomes, the food and drink they consume, the clothes they wear, the tools they use, their social contacts, and their awareness of and contact with the world beyond their village.

EFFECTS OF ROADS IN MELANESIA

The theme of this series is Melanesia - Beyond Diversity. I take this to imply that beyond diversity lies similarity. It can be argued that the development over the last century of a modern network of roads (or more specifically a modern system of transport and communications) has had similar effects throughout Melanesia, as indeed in other parts of the world. Certainly the history of road development has been broadly similar in Papua New Guinea, Fiji, the Solomons, Vanuatu and New Caledonia, although there are differences in detail in the scale of the undertakings and the degree of completion or stage of the process so far achieved. The differences are less in the purposes of the exercise than in the results.

The effects on the movement of people

How have roads affected the movement of people in Melanesia? There seems little doubt that the movement of people has increased, both in distance and volume. A hundred years ago we can assume that individuals usually moved over only relatively small distances overland. Salisbury (1962:25) set a limit of 16 km for a Siame village in the Eastern Highlands of Papua New Guinea; the grandchild of that villager today would think nothing of catching a ride on a passenger vehicle to go 200 km to Lae for the weekend. Personal movement has become a commonplace event in Melanesia.

There are several reasons for this. One is that the road has become recognized as 'neutral ground'. Everyone is free to move safely along it (safe at least from attack by human enemies, if not from the risk of being killed in a motor accident). A second is that there is now some incentive to move. At the end of the village road lies a town, maybe an inland town with a weekly market and shops selling rice, tinned meat or fish, lollywater and beer, bread, western clothes, kerosene, and so on, and with government officers and some services that one might want to utilize, and people with whom one might want to exchange news. Further down the highway is the port city, with its certainty of the presence of wantoks and the reputed chance of a job, or at least the perceived opportunity to make money in one way or another. A third reason is that it is comparatively easy to travel: vehicles are numerous and the cost is fairly small. In 1979 it cost K5 to travel from Wau to Lae (4 Australian cents per km), and it took about half a day, with a choice of perhaps twenty to thirty public motor vehicles (PMVs). In the 1920s one could fly from Wau to Lae in an hour or so for £35 ($A70); today the air fare is about K20 ($A25). Before the air link was established one had to face a minimum of three days hard walking to Salamaua and a boat trip to follow if one wanted to go to the Markham river mouth.
The volume of movement has increased out of sight. Of course all of Melanesia has experienced dramatic total population growth over the last century, and with it urban growth. Where there were formerly no towns there are now scores, the largest of them cities of over 100,000 people. The presence of roads has been one contributing factor in the urban migration which has created them. But the movement to towns has not only been a permanent or long-stay migration. At the present time shorter term or circular migration is a common feature in Papua New Guinea, with people visiting towns for periods of weeks or months, a freedom of choice which is facilitated by easy road travel. As well, regular daily commuting from the peri-urban regions has become a realized possibility. When I studied the Rigo road in 1968 daily commuting to work in Port Moresby occurred from Tubusereia (about 36 km) and weekly commuting from Gaire (about 65 km). A decade earlier some people were commuting up to 40 km to Suva, and a similar situation exists in New Caledonia with movement to Noumea.

Access to the use of vehicles has now become within the reach of virtually every Melanesian. The following table presents some statistics on vehicle numbers in Melanesia at the present time.

Table 2

<table>
<thead>
<tr>
<th>Country</th>
<th>Year</th>
<th>Passenger cars ('000)</th>
<th>Commercial vehicles ('000)</th>
<th>Total vehicles ('000)</th>
<th>Total vehicles per 1000 people 1970</th>
<th>Total vehicles per 1000 people 1976</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiji</td>
<td>1976</td>
<td>18.1</td>
<td>10.2</td>
<td>28.3</td>
<td>30</td>
<td>49</td>
</tr>
<tr>
<td>New Cal.</td>
<td>1976</td>
<td>52.5</td>
<td>19.8</td>
<td>72.3</td>
<td>355</td>
<td>536</td>
</tr>
<tr>
<td>Vanuatu</td>
<td>1973</td>
<td>2.6</td>
<td>0.8</td>
<td>3.4</td>
<td>24</td>
<td>35</td>
</tr>
<tr>
<td>PNG</td>
<td>1976</td>
<td>17.7</td>
<td>19.2</td>
<td>36.9</td>
<td>12</td>
<td>13</td>
</tr>
<tr>
<td>Sol.Is.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
</tbody>
</table>


The case of New Caledonia is exceptional in Melanesia and reflects both the high proportion of its population which is non Melanesian, and the relatively small non-monetary sector.

Figure 1 traces the growth in vehicle numbers between 1967 and 1976 in four countries of Melanesia, discriminating between passenger cars and commercial vehicles. New Caledonia has the largest number of vehicles, but also (in 1976) a ratio of 2.7 passenger cars to every commercial vehicle, a discrepancy which may well reflect the dual society and economy of that country. In Vanuatu, the number of vehicles is very small but the ratio of passenger cars to commercial vehicles is even higher at 3.3:1. In both cases the ratio is increasing. In Fiji the total number of vehicles is less and the ratio of passenger cars to commercial vehicles was 1.8:1 in 1976, having declined from a high of 2.6:1 in 1972. Papua New Guinea has gone even further along this road. The number of passenger cars reached a peak in 1972, declined with the exodus of expatriates before independence,
Figure 1


- NEW CALEDONIA
  - Passenger cars
  - Commercial vehicles

- FIJI

- NEW HEBRIDES (VANUATU)

- PAPUA NEW GUINEA
  - 1967, 68, 69, 70, 71, 72, 73, 74, 75, 76
and was overtaken by the numbers of commercial vehicles in 1976, when the ratio was 0.9:1.

Statistics of vehicle registration always carry some doubt as to their accuracy and it would be wrong to draw too much out of these comparisons, but the relative proportions are probably a reasonable indication of the existing situation and do seem to imply a relatively smaller proportion of Papua New Guinea's resources being consumed in the form of cars and petrol by the richest section of society and a greater share going towards commercial carriage of freight and passengers than was the case a decade earlier.

Among the undesirable effects of roads and widespread use of motor vehicles must be included death and injury due to accidents. Detailed statistics are not readily available but it is an unfortunate fact that the incidence of accidents involving motor vehicles has risen steadily in Melanesia as elsewhere and now forms a significant cause of death and hospitalization in most countries of Melanesia.

Effects on the movements of goods

Simultaneously with the development of roads in Melanesia there has been a vast growth in the movement of goods, and at the same time a reduction in the time and cost of their movement overland. National statistics for volumes of production and for exports and imports measure the development of the national economies of the Melanesian countries in terms of developed world criteria. It is impossible to attribute an exact proportion of the overall production which has been made possible by roads but it is obviously a very significant share.

More amenable to indicative measuring is the reduction in transport costs and vehicle operating costs which can be directly attributed to the construction of roads and their continued upgrading. Table 3 and the ensuing discussion give some examples for particular roads in Papua New Guinea.1

Expressed in terms of constant (1971) prices freight rates on the longest road haul in Papua New Guinea fell dramatically between 1967 and 1979, but have begun to rise again in the late 1970s, presumably due to fuel price increases. In 1977 actual freight rates for the 480km between Lae and Mt Hagen ranged between K55-58 per tonne (i.e. 11.46 toea/tonne/km) whereas the maximum approved rate was K75 per tonne (i.e.15.6 toea/tonne/km) (Papua New Guinea Department of Transport 1977:60). The difference reflects competition between subcontractors. These figures refer to freight charges from Lae to Mt Hagen. The return freight charge for coffee over the same distance was 6 toea/tonne/km.
Table 3

Changes in freight rates on the Highlands Highway, 1967-1980

<table>
<thead>
<tr>
<th>Year</th>
<th>Freight rates between Lae and Mt Hagen (toea/tonne/km)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Actual prices</td>
</tr>
<tr>
<td>1967</td>
<td>11.3&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>1970</td>
<td>8.5&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>1973</td>
<td>8.5&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>1977</td>
<td>11.5&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>1979</td>
<td>11.0&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>1980</td>
<td>13.0</td>
</tr>
</tbody>
</table>

Sources: (a) Papua New Guinea Department of Transport 1973.
(b) Highland Freighters
(c) World Bank 1980 (using deflator developed by Lam 1977)

Freight rates in 1980 on other main roads in Papua New Guinea are of the same order, but show some interesting local variations, for example: from Lae to Bulolo (125 km), where there is no sea competition, the rate is 20 toea/tonne/km; from Lae to Madang (338 km) the rate is 8.3 toea/tonne/km. The freight charge by sea on this route is K30 per tonne, and the road operators have to price at K28 per tonne to compete. On the Hiritano and Magi highways west and east of Port Moresby, where there is sea competition, freight rates are 10 toea/tonne/km.

It is worth noting that in 1967 the distance from Lae to Mt Hagen by the old Highlands Highway was 520 km, but in 1980 this had been reduced to 480 km through relocation and upgrading of the highway. The effect of road improvement on transport time is dramatic: whereas in 1967 it could take a truck several days to make the journey from Mt Hagen to Lae, in 1980 the time was reduced to about twelve hours.

Even more dramatic changes are brought about when road replaces air as the transport mode. After the Highlands Highway became reliable in the late 1960s air cargo through Madang airport fell from 28,295 tons in 1965-66 to 7,658 tons in 1968-69, and was a mere 438 tons in 1979 (Taylor and Partners 1972, and Air Niugini).

From Lae to Boana in the Huon peninsula the air freight was formerly K50 per tonne. By road in 1980 the rate is K20 per tonne. The return freight charge for coffee from Boana to Lae was formerly K35 per tonne by air and is now K20 per tonne by road. From Lae to Pindiu by air the freight rate was formerly K90 per tonne. Today freight sent by sea from Lae to Finschhafen and by road from Finschhafen to Pindiu costs K40 per tonne. The comparable return rates for coffee are K60 per tonne by air and K40 per tonne by land and sea.

The reductions in freight costs to the consumer reflect the reductions in operating costs to the road transport operators brought about by road improvements. The calculation of vehicle operating costs is complex since it must take account of many factors, including the physical parameters of
the road, vehicle characteristics, speeds, fuel, maintenance, crew costs, depreciation and overheads. The calculation has been undertaken several times for Papua New Guinea. It will suffice here to say that the better the road the lower the operating costs, and to indicate the range of costs with a recent Papua New Guinea example: operating costs for heavy commercial vehicles range from K1,040 per 1,000 km on very steep roads with very rough unpaved surface, to K642 per 1,000 km on flat roads with smooth, paved surface. These costs decline to the lightest class of vehicle (Rendels Economics 1979, Tables 50 and 53).

The volume of traffic using roads in Melanesia has increased spectacularly with road improvement and with population and increasing incomes per capita. Unfortunately traffic volume statistics are very sparse. Some recent data are available for two points near Lae: a twelve hour count taken at the Markham bridge on the Lae-Wau road in July 1979 found an average of 120 vehicles per day to Lae and 128 vehicles per day from Lae over six days. Of these 32 per cent were cars and utilities, 26 per cent light trucks, 12 per cent 4-wheel drive vehicles, 8 per cent heavy trucks, and 6 per cent buses (Department of Transport count). A twelve hour truck count taken at Lae weighbridge on 20 November 1979 (not during the main coffee season) observed 256 trucks, of which 103 stopped. Of these 57 per cent came from or went to the highlands, 41 per cent to the Wau road, and 3 per cent to the Markham valley. The main freight being carried was plywood and timber from Bulolo to Lae, and foodstuffs (mainly rice), fuel, construction materials and equipment, agricultural produce, drinks, tobacco. (Privately collected data.) In the coffee season coffee to Lae would be a major part of the freight flow. Very much higher volumes of traffic flow occur on main urban roads and on certain main roads close to large towns in Melanesia, such as Suva-Nausori and around Noumea.

Effects on the movement of ideas

Passengers and goods are not the only items which move along roads. Ideas and information also travel widely, as do other less desirable things such as venereal disease. The spread of information has been examined in some detail for an area in the East Sepik Province of Papua New Guinea by Allen (1977:332-338). He found that while the existing formal systems of information dissemination were relatively ineffective, the informal systems in which information moves with people were much more effective. The presence of main roads and feeder roads, together with the movement along them of village-based trucks and the village people they carry from day to day, provides a structure over which information travels with surprising speed. Allen traces the spread of information about and membership of the Peli Association, a political-religious movement which attained wide support in the East Sepik between 1969 and 1972. Information spread rapidly through the East Sepik along the main road from the east and then down feeder roads, and finally diffused to villages not on roads. The spread of earlier innovations before the presence of the road was much slower, took place on a broader front, and depended on dissemination by walkers along local track networks.

In the case of Papua New Guinea it can be argued that the road building programmes of the late 1960s and early 1970s contributed directly to the building of national unity before and after independence.
Provincial governments are now using the provision and upgrading of roads and other forms of access as a tool of regional development, and indeed as a tool of political influence.

Even though a significant proportion of the population still does not have close access to roads, the propensity to travel seems to be fairly high. There can be relatively few villages remaining from which some men have not made their way out to the road systems and along them to the centres of information of the towns, and then back to their village. As Allen says, 'the stimulus of improved communications upon internal tourist traffic cannot be overlooked' (1977:335). Experience in other countries where the road and public transport systems are rather more advanced, such as Indonesia and Thailand, shows a very high level of internal movement for social as well as economic reasons. Provided escalating fuel prices do not cause fares to rise beyond the reach of villagers it must be expected that the level of personal movement will continue to rise in Melanesia, as it has elsewhere in the developing world.

OTHER CONSIDERATIONS

The criticism is often made that the main beneficiaries of improved road systems are the middlemen, the transporting agents, and the importers and distributors of manufactured goods; not the primary producers (McCall 1977). This probably is to some extent true throughout Melanesia, as elsewhere in the world. Bouchard's study of the impact of roads in the Okapa region of Papua New Guinea found that road improvement did not increase prices paid to coffee growers by middlemen (Bouchard 1972:87), who were thus presumably capitalizing on the road improvement benefits. On the other hand Bouchard (1972:89) suggests that the new roads increased the utility of money for producers. Another study examined the distribution of benefits on the Rigo road (Doulman 1977) and found that the greatest part of the benefits went to village producers of vegetables now able to market in Port Moresby. Obviously overall generalizations cannot be made.

A broad view over a long time in Melanesia must allow that the gradual extension of a dendritic road pattern has created opportunities for cash cropping far more widely distributed than was the case without roads. New opportunities for business activities in the form of road transport and trading operations have arisen, and at least some of these have been taken up by Melanesians, although outsiders (that is, either non-national companies, colonists, or non-local Melanesians) have also been quick to utilize them. Counter measures in the form of discriminatory regulation are available, but governments are often reluctant to use them.

Another criticism often made is that although roads are claimed to enhance the effectiveness of government-directed social services (e.g. health, education or agricultural extension), they do not in fact do so. Again, this criticism may well be true in part for Melanesia as elsewhere, but the fault surely is not so much with the presence of roads as with the organization of the services.

More serious is the accusation that the extension of road systems in developing countries has the long term effect of inevitably tying the existing systems of rural production and way of life into the national
economy and hence the world-wide capitalist system. It seems to me that this is of course true, but equally true is that at the present time this seems to be what a majority of Melanesians, along with a large proportion of the rest of the world, wants. In my experience in Melanesia, limited as it may be, people living in remote areas without roads recognize that the coming of a road will bring with it many things which may be socially deleterious, yet the assumed economic advantages outweigh these disadvantages in their assessments.

It is a truism to say that neither places nor people are equal in their natural endowments. It may be that while 'development' efforts should still be directed towards improving the lot of the poorest, nations increasingly will have to recognize that inequalities will persist. Melanesia is fortunate in that the extremes of wealth and poverty are much less widely separated than in many other countries, and all reasonable policies should be directed towards maintaining this situation (or reducing the gap).

CONCLUSION

The first part of this paper endeavoured to show that there has been a broad similarity in the development of road systems in the island countries of Melanesia. Ports and shipping services were established first, but gradually coastal and inland roads have replaced feeder coastal shipping services, and, in Papua New Guinea, the expensive air services. The process still continues, but shipping connections and some air services obviously will remain essential links in the transport system of island nations.

The development of roads aided other aspects of development, particularly export-oriented agriculture and the transition to a monetized economy. But as well as permitting a flow of produce and people away from the rural areas, roads also permit return flows, of money, store goods (which many see as in part deleterious to health and society), and ideas.

I believe that these effects are common throughout Melanesia, though the stage reached differs from place to place. Increased personal mobility ('seeing things with ones' own eyes') brings a wider appreciation of what is happening in the rest of the country, the Pacific region, and the world. This, and the word-of-mouth transmission of experience, things seen, and ideas heard and discussed, which follows from the use of roads, contributes to a wider perception of changes occurring. The future of Melanesians, as of people elsewhere in the world, is by now inextricably interlocked with externalities over which they have little control. We, and they, may not like this, but the alternatives do not offer much comfort to the peoples of Melanesian nations.

Over the last few decades Melanesians without roads have made the demand for access probably their most strongly expressed desire, even though they recognize the deleterious effects a road may bring to their way of life. There is as yet no sign of this demand slackening in the remoter parts of Papua New Guinea, although it may have lessened in New Caledonia and Fiji. The 'mok', both literally and metaphorically, appears to have been chosen as part of the modern way of life in Melanesia.
I am indebted to Dr. D. Townsend of the University of Papua New Guinea for providing the freight rate data used in Table 3 and subsequent paragraphs.

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